

---

# UNCERTAINTIES IN THE SEE TRANSMISSION NETWORK AND EVALUATION OF RISK FOR FUTURE INFRASTRUCTURE INVESTMENTS

---

## APPENDIX II



---

SEPTEMBER, 2009

BLANK PAGE

**Report prepared by****ENERGY INSTITUTE HRVOJE POŽAR, Zagreb, Croatia****EKC, Belgrade, Serbia****on behalf of****SECI PROJECT GROUP ON REGIONAL TRANSMISSION SYSTEM PLANNING****with Support From****UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT****Washington, DC, USA**

**File Title: Uncertainties in the SEE Transmission Network and Evaluation of Risk For Future Infrastructure Investments – APPENDIX II**

**Region: South East Europe**

**Commissioner: USEA (coordinator: William Polen)**

**Sponsorship: USAID**

**Consultant: ENERGY INSTITUTE HRVOJE POZAR, Zagreb, Croatia**      **EKC, Belgrade, Serbia**

**Authors: Goran Majstrovic (EIHP)**      **Djordje Dobrijevic (EKC)**

**Davor Bajš (EIHP)**      **Nebojša Jovic (EKC)**

**Nijaz Dizdarevic (EIHP)**      **Andrija Oros (EKC)**

**Dino Mileta (EIHP)**      **Tomo Martinovic (EKC)**

**Contact persons: Goran Majstrovic (EIHP)**      **Miroslav Vukovic (EKC)**

**Telephone: ++385 1 6326 128**      **+381 11 397-42-73**

**Fax: ++ 385 1 6040 599**      **+381 11 397-18-13**

**e-mail: [gmajstro@eihp.hr](mailto:gmajstro@eihp.hr)**      **[miroslav.vukovic@ekc-ltd.com](mailto:miroslav.vukovic@ekc-ltd.com)**

## ACKNOWLEDGMENTS

*Authors of this Study would like to thank all SECI members who took time to participate in project preparation and USAID for financial support not only for this Study, but the Project as a whole. Regional transmission planning group under the infrastructure of SECI has been established and financially supported by USAID since 2001.*



## APPENDIX II CONTENTS

13.	APPENDIX II:	258
13.1.	Impact of the Kosovo TPP construction on SEE transmission system	258
13.1.1.	Export from TPP Kosovo C to Italy and CENTREL	258
13.1.2.	Export from TPP Kosovo C to Montenegro, Albania, Macedonia and Greece	265
13.2.	Impact of the Krsko NPP 2 construction on SEE transmission system	272
13.2.1.	Export from NPP Krsko 2 to Italy	272
13.2.2.	Export from NPP Krsko 2 to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece	279
13.3.	Impact of the Kozjak PSHPP construction on SEE transmission system	286
13.3.1.	Export from PSHPP Kozjak to Italy	286
13.3.2.	Export from PSHPP Kozjak to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece	293
13.4.	Impact of possible large penetration of Wind power plants	299
13.4.1.	Export to Italy, Turkey and CENTREL	299
13.5.	Impact of HVDC link Albania – Italy	308
13.5.1.	Export from Bulgaria and Romania to Italy	308
13.5.2.	Export from BIH to Italy	315
13.6.	Impact of HVDC link Montenegro – Italy	324
13.6.1.	Export from Bulgaria and Romania to Italy	324
13.6.2.	Export from BIH to Italy	331
13.7.	Impact of HVDC link Croatia – Italy	338
13.7.1.	Export from Bulgaria and Romania to Italy	338
13.7.2.	Export from BIH to Italy	345
13.8.	Impact of HVDC link Turkey – Romania	352
13.8.1.	Export from Turkey to CENTREL	352
13.8.2.	Export from Ukraine to Turkey	358
13.9.	Albanian Power Balance Uncertainty	365
13.9.1.	Albanian Power System Is Self-Balanced	365
13.9.2.	Albanian Power System Exports 500 MW	371
13.10.	Bulgarian Power Balance Uncertainty	378
13.10.1.	Bulgarian Power System Is Self-Balanced	378
13.11.	Bosnia and Herzegovina's Power Balance Uncertainty	386
13.11.1.	Bosnia and Herzegovina's Power System Is Self-Balanced	386
13.11.2.	Bosnia and Herzegovina's Power System Exports 1000 MW	392
13.12.	Croatian Power Balance Uncertainty	401
13.12.1.	Croatian Power System Is Self-Balanced	401
13.12.2.	Croatian Power System Imports 1000 MW	408
13.13.	Macedonian Power Balance Uncertainty	416
13.13.1.	Macedonian Power System Is Self-Balanced	416
13.13.2.	Macedonian Power System Imports 300 MW	422
13.14.	Montenegrin Power Balance Uncertainty	428
13.14.1.	Montenegrin Power System Imports 300 MW	428
13.14.2.	Montenegrin Power System Exports 300 MW	434
13.15.	Romanian Power Balance Uncertainty	438
13.15.1.	Romanian Power System Is Self-Balanced	438
13.15.2.	Romanian Power System Exports 1000 MW	444
13.16.	Serbian Power Balance Uncertainty	452
13.16.1.	Serbian Power System Is Self-Balanced	452
13.16.2.	Serbian Power System Imports 500 MW	458

13.17. Slovenian Power Balance Uncertainty.....	465
13.17.1. Slovenian Power System Is Self-Balanced.....	465
13.17.2. Slovenian Power System Exports 400 MW.....	471
13.18. Turkish Power Balance Uncertainty.....	478
13.18.1. Turkish Power System Exports 1000 MW.....	478
13.18.2. Turkish Power System Imports 1000 MW.....	485
13.19. UNMIK Zone Power Balance Uncertainty.....	492
13.19.1. UNMIK Zone Power System Is Self-Balanced.....	492
13.19.2. UNMIK Zone Power System Exports 1000 MW.....	495

## 13. APPENDIX II: TABLES

### 13.1. Impact of the Kosovo TPP construction on SEE transmission system

#### 13.1.1. Export from TPP Kosovo C to Italy and CENTREL

Table 13.1.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario TPP Kosovo C exports 2120 MW to Italy

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1342.2	1491.9	0.0	0.0	0.0	-200.0	50.2	-200.0
AL			457.2	689.7	-201.2	0.0	462.6	-21.1	452.4	
20			8794.8	7603.7	0.0	14.4	0.0	1000.0	176.6	1000.0
BG			2806.6	3045.8	-45.0	121.3	3007.2	349.4	2342.3	
30			3165.9	2610.1	0.0	0.0	0.0	490.2	65.5	490.0
BA			807.5	724.5	0.0	0.0	901.0	309.9	674.1	
35			39012.4	49222.0	0.0	1.1	0.0	-10672.0	461.4	-10672.0
IT			7124.2	10816.5	0.0	-156.8	12555.1	-505.0	9524.6	
40			3138.9	3483.0	0.0	0.0	0.0	-434.5	90.5	-435.0
HR			627.1	1074.2	0.0	0.0	1376.9	-60.1	989.9	
45			4539.5	6500.0	0.1	0.0	0.0	-2047.7	87.2	-2048.0
HU			1189.5	1926.6	177.3	-29.6	2413.7	311.8	1217.2	
50			10299.3	10371.1	0.0	0.0	0.0	-350.0	278.2	-350.0
GR			2119.7	5312.0	170.1	9.3	6617.5	79.2	3152.8	
55			4410.4	-4593.5	0.0	4.8	0.0	8884.3	114.9	8886.0
UX			322.6	637.5	0.0	12.6	2295.5	465.3	1502.7	
60			1501.6	1577.0	0.0	0.0	0.0	-100.0	24.6	-100.0
MK			423.2	573.6	-31.6	0.0	406.2	22.7	264.8	
65			1207.1	0.0	0.0	0.0	0.0	1200.0	7.1	1200.0
UA			-168.6	0.0	0.0	0.0	653.4	372.8	111.9	
70			10284.7	9416.9	0.0	87.7	0.0	545.2	234.9	545.0
RO			2681.4	4075.6	511.1	271.8	4584.1	-374.9	2782.0	
75			3016.0	2514.0	0.0	8.6	0.0	424.2	69.2	424.0
SI			1197.5	811.0	0.0	52.8	593.9	180.3	747.2	
80			54591.0	54622.1	0.0	0.0	0.0	-800.0	769.0	-800.0
TR			4552.9	7792.0	1175.5	0.0	17196.0	-136.9	12918.4	
90			9861.0	7871.1	0.0	17.8	0.0	1760.4	211.6	1760.0
RS			3052.5	2853.5	0.0	77.0	1731.7	-689.0	2542.8	

91	629.5	805.2	0.6	1.9	0.0	-200.0	21.8	-200.0
ME	274.6	299.2	-35.4	11.0	241.9	35.7	206.0	
95	501.4	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-364.7	0.0	0.0	0.0	40.0	-340.1	15.4	
TOTALS	156295.6	153494.7	0.6	136.5	0.0	0.0	2663.9	0.0
	27103.4	40631.6	1720.8	369.5	55076.6	0.0	39444.6	



Figure 13.1.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario TPP Kosovo C exports 2120 MW to Italy and CENTREL

Table 13.1.2: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2015, scenario TPP Kosovo C exports 2120 MW to Italy and CENTREL

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I
71,XME_DI11	400.00,	31410,LDIVAC1	400.00,	1,	1,	852.90,	14.02,	853.01,	81.78

Table 13.1.3: Changes in power flow greater than 250 MW in area of SEE in winter maximum 2015, scenario TPP Kosovo C exports 2120 MW to Italy and CENTREL

BRANCHES WITH FROM OR TO END MW FLOWS DIFFERING BY MORE THAN 250.0 MW:											
IN WORKING CASE				IN BASE CASE							
X	FROM BUS		X	TO BUS	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
34020	[JNIS2 1	400.00]	34070	[JTKOSB1	400.00]	1	-427.9	16.7	200.4	-34.0	628.3 146.8
34070	[JTKOSB1	400.00]	34071	[JTKOSC1	400.00]	2	-467.2	-47.2	117.9	15.5	585.1 125.2
34070	[JTKOSB1	400.00]	34071	[JTKOSC1	400.00]	1	-467.2	-47.2	117.9	15.5	585.1 125.2
184	[XRI_PE11	400.00]	34089	[JKPEC31	400.00]	1	-378.3	80.1	189.8	58.1	568.1 150.2
184	[XRI_PE11	400.00]	36001	[ORIBAR11	400.00]	1	378.3	-80.1	-189.8	-58.1	-568.1 150.2
34071	[JTKOSC1	400.00]	34089	[JKPEC31	400.00]	1	569.6	-11.8	7.2	-25.5	-562.4 98.7
13	[XTR_PG11	400.00]	14405	[WTREB11	400.00]	1	136.7	-132.1	-279.0	-80.8	-415.7 304.0
13	[XTR_PG11	400.00]	36005	[OPODG211	400.00]	1	-136.7	132.1	279.0	80.8	415.7 304.0
71	[XME_DI11	400.00]	20078	[HMELIN11	400.00]	1	-852.9	-14.0	-447.4	-21.4	405.5 47.5
71	[XME_DI11	400.00]	31410	[LDIVAC1	400.00]	1	852.9	14.0	447.4	21.4	-405.5 47.5
81	[XSK_KB11	400.00]	34072	[JKURO21	400.00]	1	-403.3	28.6	-10.6	28.8	392.8 97.4
81	[XSK_KB11	400.00]	26111	[YSK 5 1	400.00]	1	403.3	-28.6	10.6	-28.8	-392.8 97.4
34070	[JTKOSB1	400.00]	34072	[JKURO21	400.00]	1	574.7	5.1	191.2	-25.5	-383.5 66.7
34040	[JRPMLA1	400.00]	34045	[JSMIT21	400.00]	1	839.8	-29.0	486.0	-62.6	-353.9 42.1
26064	[YSK 41	400.00]	26111	[YSK 5 1	400.00]	1	-217.7	105.6	130.0	92.7	347.7 159.7
74	[XER_SM11	400.00]	20030	[HERNES11	400.00]	1	510.1	-78.9	164.9	-62.2	-345.3 67.7
74	[XER_SM11	400.00]	34045	[JSMIT21	400.00]	1	-510.1	78.9	-164.9	62.2	345.3 67.7
20078	[HMELIN11	400.00]	20120	[HOBROV11	400.00]	1	-433.2	-6.6	-111.8	-58.6	321.3 74.2
14404	[WGACKO1	400.00]	14405	[WTREB11	400.00]	1	-96.1	81.0	206.0	53.6	302.1 314.5
14404	[WGACKO1	400.00]	18401	[WMOST41	400.00]	1	315.9	-30.9	13.8	-21.9	-302.0 95.6
34031	[JOBREN12	400.00]	34920	[JTKOLB1	400.00]	A	-356.7	-27.6	-56.0	-3.7	300.7 84.3
34015	[JKRAG21	400.00]	34920	[JTKOLB1	400.00]	A	-254.0	-85.8	-551.4	-70.3	-297.4 117.1
34020	[JNIS2 1	400.00]	34080	[JJAGO41	400.00]	A	148.4	-12.0	-148.6	11.0	-297.0 200.1
34015	[JKRAG21	400.00]	34080	[JJAGO41	400.00]	A	19.6	8.7	315.2	-2.2	295.6 999.9
34031	[JOBREN12	400.00]	34040	[JRPMLA1	400.00]	1	262.1	-88.5	-23.6	-104.9	-285.8 109.0
36001	[ORIBAR11	400.00]	36010	[OPLJE211	400.00]	1	-64.0	-65.1	-348.5	-41.5	-284.5 444.3
20060	[HKONJS11	400.00]	20120	[HOBROV11	400.00]	1	286.7	-20.8	2.5	-21.4	-284.1 99.1
34030	[JOBREN11	400.00]	34040	[JRPMLA1	400.00]	2	260.9	-85.2	-22.5	-104.2	-283.3 108.6
34025	[JNSAD31	400.00]	34050	[JSUBO31	400.00]	1	617.0	-14.2	336.5	-18.4	-280.5 45.5
11	[XMO_KO11	400.00]	20060	[HKONJS11	400.00]	1	372.6	27.0	96.7	30.9	-275.9 74.0
11	[XMO_KO11	400.00]	18401	[WMOST41	400.00]	1	-372.6	-27.0	-96.7	-30.9	275.9 74.0
82	[XKA_KC11	400.00]	10015	[AKASHA1	400.00]	1	321.1	-23.2	55.1	-28.4	-266.0 82.9
82	[XKA_KC11	400.00]	34071	[JTKOSC1	400.00]	1	-321.1	23.2	-55.1	28.4	266.0 82.9

Table 13.1.4: Results of contingency (n-1) analysis in winter maximum 2015, scenario TPP Kosovo C exports 2120 MW to Italy and CENTREL

<-----	MONITORED BRANCH	>-----	CONTINGENCY	RATING	FLOW	%
31210*LDIVAC2	220.00 156 XPA_DI21	220.00 1	BASE CASE	320.1	373.6	114.6
153*XPE_DI21	220.00 20101 HPEHLI21	220.00 1	SINGLE 269	362.0	415.3	112.8
153*XPE_DI21	220.00 31210 LDIVAC2	220.00 1	SINGLE 269	320.1	415.3	127.6
328*XMA_IB51	110.00 31050 LILBIS5	110.00 1	SINGLE 269	65.0	95.4	141.7
153*XPE_DI21	220.00 20101 HPEHLI21	220.00 1	SINGLE 707	362.0	382.8	104.2
153 XPE_DI21	220.00 31210*LDIVAC2	220.00 1	SINGLE 707	320.1	372.6	117.9

MONITORED VOLTAGE REPORT:									
SYSTEM		CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN		
'BG220	'	RANGE SINGLE 100	12252 VOCHIF2	220.00	0.81976	0.95962	1.10000	0.90000	
'BG220	'	RANGE SINGLE 124	12286 VUZUND2	220.00	0.89747	1.00568	1.10000	0.90000	
'GR400	'	RANGE SINGLE 432	22759 GTH_AG11	400.00	1.05214	1.02548	1.05000	0.90000	
'GR400	'	RANGE SINGLE 432	23123 GKPATR11	400.00	1.05232	1.03841	1.05000	0.90000	
'GR400	'	RANGE SINGLE 432	23125 GKPATC11	400.00	1.05241	1.03839	1.05000	0.90000	
'GR400	'	RANGE SINGLE 432	23126 GKPATC12	400.00	1.05236	1.03850	1.05000	0.90000	
'GR400	'	RANGE SINGLE 432	23173 GDISTO11	400.00	1.05325	1.03814	1.05000	0.90000	
'GR400	'	RANGE SINGLE 432	23174 GDISTO12	400.00	1.05287	1.03827	1.05000	0.90000	
'GR400	'	RANGE SINGLE 432	23180 GAXELO12	400.00	1.05253	1.03895	1.05000	0.90000	
'GR400	'	RANGE SINGLE 432	23181 GAXELO11	400.00	1.05250	1.03917	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23064 GK_MEG13	400.00	1.05405	1.04137	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23066 GK_MEG11	400.00	1.05405	1.04137	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23123 GKPATR11	400.00	1.05350	1.03841	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23125 GKPATC11	400.00	1.05359	1.03839	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23126 GKPATC12	400.00	1.05353	1.03850	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23173 GDISTO11	400.00	1.05422	1.03814	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23174 GDISTO12	400.00	1.05403	1.03827	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23180 GAXELO12	400.00	1.05371	1.03895	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23181 GAXELO11	400.00	1.05377	1.03917	1.05000	0.90000	
'GR400	'	RANGE SINGLE 462	23036 GK_KOR13	400.00	1.06346	1.01768	1.05000	0.90000	
'GR400	'	RANGE SINGLE 462	23068 GK_MEG14	400.00	1.06106	1.02970	1.05000	0.90000	
'GR400	'	RANGE SINGLE 463	23037 GK_KOR14	400.00	1.06346	1.01768	1.05000	0.90000	

'GR400	'	RANGE SINGLE 463	23067	GK_MEG12	400.00	1.06106	1.02970	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23126	GKPATC12	400.00	1.06928	1.03850	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23180	GAXELO12	400.00	1.06928	1.03895	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23181	GAXELO11	400.00	1.06909	1.03917	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23180	GAXELO12	400.00	1.06873	1.03895	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23181	GAXELO11	400.00	1.06854	1.03917	1.05000	0.90000
'RO220	'	RANGE SINGLE 567	28042	RRIURE2	220.00	0.89439	0.97639	1.10000	0.90000
'RO220	'	RANGE SINGLE 567	28043	RSTUPA2	220.00	0.88580	0.97486	1.10000	0.90000
'RO220	'	RANGE SINGLE 637	28855	RMOSTI2	220.00	0.87962	1.03854	1.10000	0.90000
'RO220	'	RANGE SINGLE 642	28907	RSTILP2	220.00	0.83986	0.97983	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28094	RROSIO2	220.00	0.89914	1.02804	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28095	RVETIS2	220.00	0.89002	1.01545	1.10000	0.90000
'RS400	'	RANGE SINGLE 739	34085	JSOMB31	400.00	0.86841	0.98575	1.05000	0.90000
'RS220	'	RANGE SINGLE 785	34200	JSABA32	220.00	0.89101	1.02153	1.10000	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 100	: OPEN LINE FROM BUS 12250 [VGORIA2 220.00] TO BUS 12252 [VOCHIF2 220.00] CKT 1
SINGLE 124	: OPEN LINE FROM BUS 12275 [VMI3 2 220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 269	: OPEN LINE FROM BUS 71 [XME_DI11 400.00] TO BUS 31410 [LDIVAC1 400.00] CKT 1
SINGLE 432	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23172 [GDISTO13 400.00] CKT 1
SINGLE 433	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23173 [GDISTO11 400.00] CKT 1
SINGLE 462	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23036 [GK_KOR13 400.00] CKT 1
SINGLE 463	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23037 [GK_KOR14 400.00] CKT 1
SINGLE 473	: OPEN LINE FROM BUS 23123 [GKPATR11 400.00] TO BUS 23126 [GKPATC12 400.00] CKT 1
SINGLE 475	: OPEN LINE FROM BUS 23126 [GKPATC12 400.00] TO BUS 23180 [GAXELO12 400.00] CKT 1
SINGLE 567	: OPEN LINE FROM BUS 28043 [RSTUPA2 220.00] TO BUS 28044 [RBRADU2 220.00] CKT 1
SINGLE 637	: OPEN LINE FROM BUS 28855 [RMOSTI2 220.00] TO BUS 28935 [RRAC.M2 220.00] CKT 1
SINGLE 642	: OPEN LINE FROM BUS 28906 [RTELEA2 220.00] TO BUS 28907 [RSTILP2 220.00] CKT 1
SINGLE 670	: OPEN LINE FROM BUS 28039 [RROSIO1 400.00] TO BUS 28094 [RROSIO2 220.00] CKT 1
SINGLE 707	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1
SINGLE 739	: OPEN LINE FROM BUS 34050 [JSUBO31 400.00] TO BUS 34085 [JSOMB31 400.00] CKT 1
SINGLE 785	: OPEN LINE FROM BUS 34170 [JOBREN2 220.00] TO BUS 34200 [JSABA32 220.00] CKT 1

Table 13.1.5: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario TPP Kosovo C exports 2120 MW to Italy and CENTREL

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1627.4	1723.7	0.0	0.0	0.0	-150.0	53.7	-150.0
AL			659.3	779.7	-205.2	0.0	477.4	49.5	512.7	
20			9644.6	8411.0	0.0	15.6	0.0	1000.0	218.0	1000.0
BG			3387.6	3357.9	0.0	181.8	3295.5	243.8	2899.5	
30			2968.5	2897.8	0.0	0.0	0.0	0.2	70.5	0.0
BA			1136.7	1017.2	0.0	0.0	899.8	206.5	812.8	
35			43806.2	54409.8	0.0	1.1	0.0	-11012.0	407.4	-11012.0
IT			9551.7	11942.3	0.0	147.7	12386.9	-794.5	10643.3	
40			3462.6	4359.0	0.0	0.0	0.0	-999.6	103.2	-1000.0
HR			743.8	1075.9	0.0	0.0	1500.1	132.1	1035.9	
45			5240.0	7180.0	0.1	0.0	0.0	-2047.7	107.7	-2048.0
HU			1521.4	2128.1	177.4	-29.2	2392.7	165.4	1472.3	
50			11748.5	11426.0	0.0	0.0	0.0	0.0	322.5	0.0
GR			3065.5	5724.7	203.4	9.4	6671.4	86.9	3698.7	
55			5235.9	-4356.2	0.0	4.7	0.0	9448.5	138.8	9450.0
UX			652.7	622.8	0.0	12.6	2278.4	461.3	1834.4	
60			1935.8	2001.9	0.0	0.0	0.0	-100.0	33.8	-100.0
MK			699.1	752.3	-31.4	0.0	402.1	-6.5	385.6	
65			1207.8	0.0	0.0	0.0	0.0	1200.0	7.8	1200.0
UA			-125.5	0.0	0.0	0.0	651.7	401.5	124.7	
70			13306.4	12110.2	0.0	89.4	0.0	800.3	306.5	800.0
RO			3373.3	4455.6	778.0	283.0	5551.6	-238.8	3647.1	
75			3966.0	2990.0	0.0	8.7	0.0	890.1	77.2	890.0
SI			1443.2	964.6	0.0	52.5	845.8	357.9	914.0	
80			77661.1	77342.9	0.0	0.0	0.0	-800.0	1118.2	-800.0
TR			9814.7	11034.0	996.9	0.0	22661.1	-184.3	20629.3	
90			9916.1	8298.8	0.0	17.4	0.0	1370.2	229.7	1370.0
RS			3420.3	2986.6	0.0	73.8	1735.3	-613.9	2709.0	
91			872.0	938.0	0.5	2.1	0.0	-100.0	31.3	-100.0
ME			344.3	346.6	-34.6	11.4	237.3	-4.0	262.2	
95			501.2	0.0	0.0	0.0	0.0	500.0	1.2	500.0
SK			-288.8	0.0	0.0	0.0	39.9	-263.0	14.1	
TOTALS			193100.1	189732.9	0.6	138.9	0.0	0.0	3227.6	0.0
			39399.3	47188.4	1884.6	743.0	62027.0	0.0	51595.5	



Figure 13.1.2: Aggregated border flows in area of SEE in winter maximum 2015, scenario TPP Kosovo C exports 2120 MW to Italy and CENTREL

Table 13.1.6: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2015, scenario TPP Kosovo C exports 2120 MW to Italy and CENTREL

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,STS,	MW,	MVAR,	MVA,	%I
12274,VMI	2	220.00,	12474,VMI	1 400.00, 1,	-542.63,	-108.56,	553.38,	83.33

Table 13.1.7: Changes in power flow greater than 250 MW in area of SEE in winter maximum 2015, scenario TPP Kosovo C exports 2120 MW to Italy and CENTREL

BRANCHES WITH FROM OR TO END MW FLOWS DIFFERING BY MORE THAN 250.0 MW:											
IN WORKING CASE					IN BASE CASE						
X	FROM BUS	X	TO BUS	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	
34020	[JNIS2 1	400.00]	34070	[JTKOSB1	400.00]	1	-361.1	-17.6	264.2	-39.5	625.3 173.1
34070	[JTKOSB1	400.00]	34071	[JTKOSC1	400.00]	2	-433.3	-58.6	153.9	20.2	587.3 135.5
34070	[JTKOSB1	400.00]	34071	[JTKOSC1	400.00]	1	-433.3	-58.6	153.9	20.2	587.3 135.5
184	[XRI_PE11	400.00]	36001	[ORIBAR11	400.00]	1	403.8	-66.1	-161.1	-76.0	-564.8 139.9
184	[XRI_PE11	400.00]	34089	[JPEC3 1	400.00]	1	-403.8	66.1	161.1	76.0	564.8 139.9
34071	[JTKOSC1	400.00]	34089	[JPEC3 1	400.00]	1	610.8	6.7	52.4	-44.8	-558.4 91.4
13	[XTR_PG11	400.00]	36005	[OPDGT211	400.00]	1	-265.0	105.4	152.4	83.4	417.3 157.5
13	[XTR_PG11	400.00]	14405	[RP TREBINJE	400.00]	1	265.0	-105.4	-152.4	-83.4	-417.3 157.5
81	[XSK_KB11	400.00]	26111	[YSK 5 1	400.00]	1	250.7	-2.5	-149.5	-13.1	-400.2 159.6
81	[XSK_KB11	400.00]	34072	[JUROS21	400.00]	1	-250.7	2.5	149.5	13.1	400.2 159.6
34070	[JTKOSB1	400.00]	34072	[JUROS21	400.00]	1	492.7	-7.9	102.4	-38.9	-390.3 79.2
26064	[YSK 41	400.00]	26111	[YSK 5 1	400.00]	1	14.3	74.5	370.3	77.4	356.0 999.9

34040	[JRPMLA1	400.00]	34045	[JSMIT21	400.00]	1	867.6	11.9	533.3	-23.6	-334.3	38.5
74	[XER_SM11	400.00]	34045	[JSMIT21	400.00]	1	-452.3	102.1	-126.3	64.6	326.0	72.1
74	[XER_SM11	400.00]	20030	[HERNES11	400.00]	1	452.3	-102.1	126.3	-64.6	-326.0	72.1
71	[XME_DI11	400.00]	31410	[LDIVAC1	400.00]	1	535.0	88.9	210.7	110.0	-324.3	60.6
71	[XME_DI11	400.00]	20078	[HMELIN11	400.00]	1	-535.0	-88.9	-210.7	-110.0	324.3	60.6
14404	[TE_GACKO	400.00]	14405	[RP_TREBINJE	400.00]	1	-155.7	92.6	155.3	70.5	311.0	199.7
14404	[TE_GACKO	400.00]	18401	[MO-4	400.00]	1	443.4	-4.4	132.4	-1.0	-311.0	70.1
20078	[HMELIN11	400.00]	20120	[HOBROV11	400.00]	1	-445.0	39.1	-134.5	-6.7	310.4	69.8
34020	[JNIS2 1	400.00]	34080	[JJAGO41	400.00]	A	244.9	-19.1	-49.4	-13.3	-294.4	120.2
34031	[JOBREN12	400.00]	34920	[JTKOLB1	400.00]	A	-416.3	-27.5	-122.0	-8.2	294.3	70.7
34015	[JKRAG21	400.00]	34920	[JTKOLB1	400.00]	A	-194.4	-113.2	-486.3	-99.0	-291.8	150.1
34015	[JKRAG21	400.00]	34080	[JJAGO41	400.00]	A	-57.7	30.3	233.5	20.6	291.2	504.4
36001	[ORIBAR11	400.00]	36010	[OPLJE211	400.00]	1	-34.3	-72.8	-315.8	-50.4	-281.5	821.1
20060	[HKONJS11	400.00]	20120	[HOBROV11	400.00]	1	179.3	-27.3	-97.8	-6.7	-277.0	154.5
11	[XMO_KO11	400.00]	20060	[HKONJS11	400.00]	1	351.2	-55.9	74.9	-37.4	-276.3	78.7
11	[XMO_KO11	400.00]	18401	[MO-4	400.00]	1	-351.2	55.9	-74.9	37.4	276.3	78.7
82	[XKA_KC11	400.00]	10015	[AKASHA1	400.00]	1	275.3	-28.8	6.5	-49.5	-268.9	97.7
82	[XKA_KC11	400.00]	34073	[JGJAK31	400.00]	1	-275.3	28.8	-6.5	49.5	268.9	97.7
34071	[JTKOSC1	400.00]	34073	[JGJAK31	400.00]	1	299.0	-40.3	33.5	-66.9	-265.5	88.8
34031	[JOBREN12	400.00]	34040	[JRPMLA1	400.00]	1	257.8	-91.0	-3.2	-103.8	-260.9	101.2
34030	[JOBREN11	400.00]	34040	[JRPMLA1	400.00]	2	256.6	-87.8	-2.1	-103.0	-258.7	100.8
34005	[ORIBAR 21	400.00]	34020	[JNIS2 1	400.00]	1	220.6	10.8	475.4	18.1	254.8	115.5
219	[XBE_OR11	400.00]	28009	[RNADAB1B	400.00]	1	-220.6	24.3	33.8	-24.0	254.3	115.3
12	[XUG_ER11	400.00]	14402	[TS_UGLJEVIK	400.00]	1	-179.8	70.7	73.4	44.3	253.1	140.8
12	[XUG_ER11	400.00]	20030	[HERNES11	400.00]	1	179.8	-70.7	-73.4	-44.3	-253.1	140.8

Table 13.1.8: Results of contingency (n-1) analysis in winter maximum 2020, scenario TPP Kosovo C exports 2120 MW to Italy and CENTREL

<----- MONITORED BRANCH ----->	CONTINGENCY	RATING	FLOW	%
10010*AEBS22	220.00 10125 ACEKIN2 220.00 1 SINGLE 19	370.0	386.0	102.7
10009*AEBS12	220.00 10125 ACEKIN2 220.00 1 SINGLE 22	370.0	384.0	102.4
28040*RLOTRU2	220.00 28366 RSIBIU2 220.00 1 SINGLE 621	333.4	393.1	112.9
28040*RLOTRU2	220.00 28100 RSIBIU21 220.00 1 SINGLE 622	333.4	393.1	112.9
28040*RLOTRU2	220.00 28366 RSIBIU2 220.00 1 SINGLE 719	333.4	393.0	112.1
28040*RLOTRU2	220.00 28100 RSIBIU21 220.00 1 SINGLE 720	333.4	393.0	112.1
31210*LDIVAC2	220.00 156 XPA_DI21 220.00 1 SINGLE 763	320.1	382.5	116.5
34100*JBGD172	220.00 34111 JBGD8 22 220.00 2 SINGLE 819	445.8	467.2	106.2
34100*JBGD172	220.00 34111 JBGD8 22 220.00 1 SINGLE 820	445.8	467.2	106.2

MONITORED VOLTAGE REPORT:	SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN	
'BG400	'	RANGE SINGLE 80	12473 VMI3 12	400.00	1.05126	1.03390	1.05000	0.90000
'BG220	'	RANGE SINGLE 134	12286 VUZUND2	220.00	0.89156	1.01208	1.10000	0.90000
'BG220	'	RANGE SINGLE 136	12282 VORFEJ2	220.00	1.10554	1.04718	1.10000	0.90000
'HU220	'	RANGE SINGLE 356	24005 MALBF 22	220.00	0.89275	1.04262	1.10000	0.90000
'HU220	'	RANGE SINGLE 357	24006 MALBF 21	220.00	0.89462	1.04267	1.10000	0.90000
'GR400	'	RANGE SINGLE 499	23126 GKPATC12	400.00	1.05038	1.02535	1.05000	0.90000
'GR400	'	RANGE SINGLE 499	23180 GAXELO12	400.00	1.05037	1.02572	1.05000	0.90000
'GR400	'	RANGE SINGLE 499	23181 GAXELO11	400.00	1.05019	1.02579	1.05000	0.90000
'RO220	'	RANGE SINGLE 691	28855 RMOSTI2	220.00	0.81821	1.01095	1.10000	0.90000
'RS400	'	RANGE SINGLE 796	34085 JSOMB31	400.00	0.85059	0.98144	1.05000	0.90000
'RS220	'	RANGE SINGLE 844	34200 JSABA32	220.00	0.87076	1.01381	1.10000	0.90000

CONTINGENCY LEGEND:	LABEL	EVENTS
SINGLE 19	: OPEN LINE FROM BUS 10009 [AEBS12	220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	: OPEN LINE FROM BUS 10010 [AEBS22	220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 80	: OPEN LINE FROM BUS 12471 [VMI3 11	400.00] TO BUS 12473 [VMI3 12 400.00] CKT 1
SINGLE 134	: OPEN LINE FROM BUS 12275 [VMI3 2	220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 136	: OPEN LINE FROM BUS 12280 [VALEKO2	220.00] TO BUS 12282 [VORFEJ2 220.00] CKT 1
SINGLE 356	: OPEN LINE FROM BUS 24005 [MALBF 22	220.00] TO BUS 24034 [MDUME 2 220.00] CKT 1
SINGLE 357	: OPEN LINE FROM BUS 24006 [MALBF 21	220.00] TO BUS 24034 [MDUME 2 220.00] CKT 1
SINGLE 499	: OPEN LINE FROM BUS 23123 [GKPATR11	400.00] TO BUS 23126 [GKPATC12 400.00] CKT 1
SINGLE 621	: OPEN LINE FROM BUS 28040 [RLOTRU2	220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	: OPEN LINE FROM BUS 28040 [RLOTRU2	220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 691	: OPEN LINE FROM BUS 28855 [RMOSTI2	220.00] TO BUS 28935 [RRAC.M2 220.00] CKT 1
SINGLE 719	: OPEN LINE FROM BUS 28034 [RSIBIU1	400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	: OPEN LINE FROM BUS 28034 [RSIBIU1	400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 763	: OPEN LINE FROM BUS 31410 [LDIVAC1	400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1
SINGLE 796	: OPEN LINE FROM BUS 34050 [JSUBO31	400.00] TO BUS 34085 [JSOMB31 400.00] CKT 1
SINGLE 819	: OPEN LINE FROM BUS 34100 [JBGD172	220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 820	: OPEN LINE FROM BUS 34100 [JBGD172	220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2
SINGLE 844	: OPEN LINE FROM BUS 34170 [JOBREN2	220.00] TO BUS 34200 [JSABA32 220.00] CKT 1

### 13.1.2. Export from TPP Kosovo C to Montenegro, Albania, Macedonia and Greece

Table 13.1.9: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario TPP Kosovo C exports 2120 MW to Montenegro, Albania, Macedonia and Greece

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			943.5	1491.9	0.0	0.0	0.0	-599.9	51.5	-600.0
AL			460.1	689.7	-198.4	0.0	457.5	10.6	415.7	
20			8813.2	7603.7	0.0	14.4	0.0	1000.2	194.8	1000.0
BG			2964.4	3045.8	-44.8	120.7	2988.5	292.7	2538.5	
30			3147.3	2610.1	0.0	0.0	0.0	490.0	47.1	490.0
BA			692.9	724.5	0.0	0.0	911.6	319.4	560.6	
35			40265.1	49222.0	0.0	1.1	0.0	-9399.8	441.9	-9400.0
IT			7040.0	10816.5	0.0	-157.0	12570.0	-541.0	9491.7	
40			3099.3	3483.0	0.0	0.0	0.0	-435.3	51.6	-435.0
HR			358.5	1074.2	0.0	0.0	1408.6	17.7	675.2	
45			5391.9	6500.0	0.1	0.0	0.0	-1200.0	91.8	-1200.0
HU			960.2	1926.6	178.2	-29.6	2423.7	94.1	1214.6	
50			9184.0	10371.1	0.0	0.0	0.0	-1469.8	282.7	-1470.0
GR			2283.8	5312.0	169.1	9.3	6569.7	204.3	3145.2	
55			4397.5	-4593.5	0.0	4.8	0.0	8885.8	100.4	8886.0
UX			-3.3	637.5	0.0	12.8	2320.7	379.8	1287.3	
60			1102.3	1577.0	0.0	0.0	0.0	-499.9	25.2	-500.0
MK			447.7	573.6	-31.4	0.0	402.0	45.1	262.4	
65			1207.2	0.0	0.0	0.0	0.0	1200.0	7.2	1200.0
UA			-195.2	0.0	0.0	0.0	653.8	346.3	112.4	
70			10255.0	9416.9	0.0	88.3	0.0	544.8	204.9	545.0
RO			2514.6	4075.6	512.8	273.9	4616.1	-241.8	2510.2	
75			2994.1	2514.0	0.0	8.8	0.0	423.9	47.4	424.0
SI			982.2	811.0	0.0	54.0	608.4	178.1	547.5	
80			54595.7	54622.1	0.0	0.0	0.0	-799.9	773.7	-800.0
TR			4622.5	7792.0	1175.3	0.0	17194.7	-121.9	12971.8	
90			9848.4	7871.1	0.0	17.9	0.0	1759.8	199.6	1760.0
RS			2968.2	2853.5	0.0	77.1	1736.4	-691.0	2465.1	
91			429.4	805.2	0.5	1.9	0.0	-399.9	21.6	-400.0
ME			272.7	299.2	-35.1	11.0	240.7	68.1	170.2	
95			501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK			-384.8	0.0	0.0	0.0	40.0	-360.7	15.9	
101			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	

103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	156175.2	153494.7	0.6	137.3	0.0	0.0	2542.7	0.0
	25984.6	40631.6	1725.5	372.2	55142.4	0.0	38384.1	



Figure 13.1.3: Aggregated border flows in area of SEE in winter maximum 2015, scenario TPP Kosovo C exports 2120 MW to Montenegro, Albania, Macedonia and Greece

Table 13.1.10: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2015, scenario TPP Kosovo C exports 2120 MW to Montenegro, Albania, Macedonia and Greece

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT, STS,	MW,	MVAR,	MVA,	%I
				***** NONE *****				

Table 13.1.11: Changes in power flow greater than 250 MW in area of SEE in winter maximum 2015, scenario TPP Kosovo C exports 2120 MW to Montenegro, Albania, Macedonia and Greece

BRANCHES WITH FROM OR TO END MW FLOWS DIFFERING BY MORE THAN 250.0 MW:												
IN WORKING CASE						IN BASE CASE						
X	FROM BUS		X	TO BUS	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	
81	[XSK_KB11	400.00]	26111	[YSK 5 1	400.00]	1	739.6	-55.0	10.6	-28.8	-729.0	98.6
81	[XSK_KB11	400.00]	34072	[JKURO21	400.00]	1	-739.6	55.0	-10.6	28.8	729.0	98.6
34070	[JTKOSB1	400.00]	34072	[JKURO21	400.00]	1	888.6	41.8	191.2	-25.5	-697.5	78.5
34070	[JTKOSB1	400.00]	34071	[JTKOSC1	400.00]	2	-535.0	-62.4	117.9	15.5	653.0	122.0
34070	[JTKOSB1	400.00]	34071	[JTKOSC1	400.00]	1	-535.0	-62.4	117.9	15.5	653.0	122.0
26064	[YSK 41	400.00]	26111	[YSK 5 1	400.00]	1	-452.6	145.9	130.0	92.7	582.5	128.7
34020	[JNIS2 1	400.00]	34070	[JTKOSB1	400.00]	1	-246.0	-26.5	200.4	-34.0	446.4	181.4
34071	[JTKOSC1	400.00]	34089	[JKPEC31	400.00]	1	379.7	-17.1	7.2	-25.5	-372.5	98.1
184	[XRI_PE11	400.00]	36001	[ORIBAR11	400.00]	1	166.4	-62.3	-189.8	-58.1	-356.2	214.1
184	[XRI_PE11	400.00]	34089	[JKPEC31	400.00]	1	-166.4	62.3	189.8	58.1	356.2	214.1
206	[XFL_BI11	400.00]	26005	[YBITOL1	400.00]	1	-327.5	60.7	-5.6	40.9	321.9	98.3
82	[XKA_KC11	400.00]	34071	[JTKOSC1	400.00]	1	-368.2	13.8	-55.1	28.4	313.1	85.0
82	[XKA_KC11	400.00]	10015	[AKASHA1	400.00]	1	368.2	-13.8	55.1	-28.4	-313.1	85.0
26005	[YBITOL1	400.00]	26064	[YSK 41	400.00]	1	-95.2	97.8	214.8	73.8	310.0	325.6
10011	[AELBS21	400.00]	10015	[AKASHA1	400.00]	1	-339.4	94.6	-57.3	63.0	282.1	83.1
2	[XZE_KA11	400.00]	10020	[AZEMLA1	400.00]	1	-84.1	84.3	171.2	55.3	255.3	303.6

Table 13.1.12: Results of contingency (n-1) analysis in winter maximum 2015, scenario TPP Kosovo C exports 2120 MW to Montenegro, Albania, Macedonia and Greece

<-----	MONITORED BRANCH	>-----	CONTINGENCY	RATING	FLOW	%
316*XTR_HN51	110.00 36050 OHNOVI51	110.00 1	SINGLE 196	89.6	90.7	102.6
24034*MDUME 2	220.00 24096 MMART 21	220.00 1	SINGLE 344	426.8	448.1	100.1
24034*MDUME 2	220.00 24095 MMART 22	220.00 1	SINGLE 345	426.8	451.4	100.8
24034*MDUME 2	220.00 24096 MMART 21	220.00 1	SINGLE 356	426.8	448.2	100.1
24034*MDUME 2	220.00 24095 MMART 22	220.00 1	SINGLE 357	426.8	451.6	100.9
31210*LDIVAC2	220.00 156 XPA_DI21	220.00 1	SINGLE 707	320.1	550.7	166.5

MONITORED VOLTAGE REPORT:									
SYSTEM		CONTINGENCY	<-----	B U S	>-----	V-CONT	V-INIT	V-MAX	V-MIN
'BG220	'	RANGE SINGLE 100	12252	VOCHIF2	220.00	0.81761	0.95799	1.10000	0.90000
'BG220	'	RANGE SINGLE 124	12286	VUZUND2	220.00	0.89480	1.00376	1.10000	0.90000
'GR400	'	RANGE SINGLE 432	23173	GDISTO11	400.00	1.05048	1.03432	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23174	GDISTO12	400.00	1.05010	1.03443	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23064	GK_MEG13	400.00	1.05059	1.03777	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23066	GK_MEG11	400.00	1.05059	1.03777	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23173	GDISTO11	400.00	1.05054	1.03432	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23174	GDISTO12	400.00	1.05035	1.03443	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23181	GAXELO11	400.00	1.05009	1.03534	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23036	GK_KOR13	400.00	1.06023	1.01449	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23068	GK_MEG14	400.00	1.05783	1.02651	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23037	GK_KOR14	400.00	1.06023	1.01449	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23067	GK_MEG12	400.00	1.05783	1.02651	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23126	GKPATC12	400.00	1.06438	1.03467	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23180	GAXELO12	400.00	1.06438	1.03510	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23181	GAXELO11	400.00	1.06419	1.03534	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23180	GAXELO12	400.00	1.06383	1.03510	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23181	GAXELO11	400.00	1.06364	1.03534	1.05000	0.90000
'RO220	'	RANGE SINGLE 567	28043	RSTUPA2	220.00	0.89268	0.98013	1.10000	0.90000
'RO220	'	RANGE SINGLE 637	28855	RMOSTI2	220.00	0.88207	1.04044	1.10000	0.90000
'RO220	'	RANGE SINGLE 642	28907	RSTILP2	220.00	0.84356	0.98207	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28095	RVETIS2	220.00	0.89796	1.02188	1.10000	0.90000
'RS400	'	RANGE SINGLE 739	34085	JSOMB31	400.00	0.87984	0.99501	1.05000	0.90000

CONTINGENCY LEGEND:									
LABEL	EVENTS								
SINGLE 100	:	OPEN LINE FROM BUS 12250 [VGORIA2	220.00]	TO BUS 12252 [VOCHIF2	220.00]	CKT 1			
SINGLE 124	:	OPEN LINE FROM BUS 12275 [VMI3 2	220.00]	TO BUS 12286 [VUZUND2	220.00]	CKT 1			
SINGLE 196	:	OPEN LINE FROM BUS 13 [XTR_PG11	400.00]	TO BUS 36005 [0PODG211	400.00]	CKT 1			
SINGLE 344	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1			
SINGLE 345	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1			
SINGLE 356	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1			
SINGLE 357	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1			
SINGLE 432	:	OPEN LINE FROM BUS 22759 [GTH_AG11	400.00]	TO BUS 23172 [GDISTO13	400.00]	CKT 1			
SINGLE 433	:	OPEN LINE FROM BUS 22759 [GTH_AG11	400.00]	TO BUS 23173 [GDISTO11	400.00]	CKT 1			



SINGLE 462	:	OPEN LINE FROM BUS 23033 [GKYT_K11	400.00]	TO BUS 23036 [GK_KOR13	400.00]	CKT 1
SINGLE 463	:	OPEN LINE FROM BUS 23033 [GKYT_K11	400.00]	TO BUS 23037 [GK_KOR14	400.00]	CKT 1
SINGLE 473	:	OPEN LINE FROM BUS 23123 [GKPATR11	400.00]	TO BUS 23126 [GKPATC12	400.00]	CKT 1
SINGLE 475	:	OPEN LINE FROM BUS 23126 [GKPATC12	400.00]	TO BUS 23180 [GAXELO12	400.00]	CKT 1
SINGLE 567	:	OPEN LINE FROM BUS 28043 [RSTUPA2	220.00]	TO BUS 28044 [RBRADU2	220.00]	CKT 1
SINGLE 637	:	OPEN LINE FROM BUS 28855 [RMOSTI2	220.00]	TO BUS 28935 [RRAC_M2	220.00]	CKT 1
SINGLE 642	:	OPEN LINE FROM BUS 28906 [RTELEA2	220.00]	TO BUS 28907 [RSTILP2	220.00]	CKT 1
SINGLE 670	:	OPEN LINE FROM BUS 28039 [RROSIO1	400.00]	TO BUS 28094 [RROSIO2	220.00]	CKT 1
SINGLE 707	:	OPEN LINE FROM BUS 31410 [LDIVAC1	400.00]	TO BUS 80 [XRE_DI11	400.00]	CKT 1
SINGLE 739	:	OPEN LINE FROM BUS 34050 [JSUBO31	400.00]	TO BUS 34085 [JSOMB31	400.00]	CKT 1

Table 13.1.13: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario TPP Kosovo C exports 2120 MW to Montenegro, Albania, Macedonia and Greece

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1223.2	1723.7	0.0	0.0	0.0	-550.0	49.5	-550.0
AL			627.9	779.7	-203.7	0.0	477.6	100.8	428.7	
20			9666.1	8411.0	0.0	15.5	0.0	1000.0	239.6	1000.0
BG			3540.4	3357.9	0.0	181.1	3277.9	150.2	3129.1	
30			2949.9	2897.8	0.0	0.0	0.0	0.0	52.0	0.0
BA			986.4	1017.2	0.0	0.0	915.2	228.0	656.5	
35			45061.4	54409.8	0.0	1.1	0.0	-9740.0	390.5	-9740.0
IT			9594.2	11942.3	0.0	147.8	12393.7	-804.9	10702.9	
40			3427.9	4359.0	0.0	0.0	0.0	-1000.0	68.9	-1000.0
HR			499.4	1075.9	0.0	0.0	1535.2	198.0	760.7	
45			6093.4	7180.0	0.1	0.0	0.0	-1200.0	113.3	-1200.0
HU			1351.5	2128.1	178.6	-29.1	2405.4	-3.7	1482.8	
50			10635.7	11426.0	0.0	0.0	0.0	-1120.0	329.7	-1120.0
GR			3191.7	5724.7	203.1	9.3	6639.2	170.5	3709.5	
55			5226.8	-4356.2	0.0	4.8	0.0	9449.8	128.4	9450.0
UX			351.8	622.8	0.0	12.7	2300.5	337.3	1679.5	
60			1533.8	2001.9	0.0	0.0	0.0	-500.0	31.8	-500.0
MK			696.2	752.3	-31.3	0.0	400.4	39.9	334.5	
65			1207.6	0.0	0.0	0.0	0.0	1200.0	7.6	1200.0
UA			-166.8	0.0	0.0	0.0	652.4	363.7	121.9	
70			13257.9	12110.2	0.0	90.3	0.0	800.1	257.2	800.0
RO			3072.1	4455.6	784.4	286.2	5608.7	-38.6	3193.2	
75			3949.7	2990.0	0.0	8.9	0.0	890.0	60.8	890.0
SI			1232.5	964.6	0.0	53.8	868.3	338.2	744.2	
80			77662.6	77342.9	0.0	0.0	0.0	-800.0	1119.7	-800.0
TR			9854.6	11034.0	996.9	0.0	22660.3	-163.0	20647.0	
90			9895.0	8298.8	0.0	17.5	0.0	1370.0	208.7	1370.0
RS			3201.6	2986.6	0.0	74.3	1747.9	-659.8	2548.4	
91			665.1	938.0	0.5	2.1	0.0	-300.0	24.4	-300.0
ME			319.3	346.6	-34.8	11.5	239.5	46.9	188.6	
95			501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK			-328.6	0.0	0.0	0.0	40.0	-303.5	14.9	
TOTALS			192957.2	189732.9	0.6	140.2	0.0	0.0	3083.5	0.0
			38024.2	47188.4	1893.2	747.6	62162.1	0.0	50342.4	



Figure 13.1.4: Aggregated border flows in area of SEE in winter maximum 2015, scenario TPP Kosovo C exports 2120 MW to Montenegro, Albania, Macedonia and Greece

Table 13.1.14: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2015, scenario TPP Kosovo C exports 2120 MW to Montenegro, Albania, Macedonia and Greece

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,CKT,STS,	MW,	MVAR,	MVA,	%I
			***** NONE *****				

Table 13.1.15: Changes in power flow greater than 250 MW in area of SEE in winter maximum 2015, scenario TPP Kosovo C exports 2120 MW to Montenegro, Albania, Macedonia and Greece

BRANCHES WITH FROM OR TO END MW FLOWS DIFFERING BY MORE THAN 250.0 MW:											
IN WORKING CASE						IN BASE CASE					
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW %
	81 [XSK_KB11	400.00]	34072 [JUROS21	400.00]	1		-580.6	28.7	149.5	13.1	730.0 125.7
	81 [XSK_KB11	400.00]	26111 [YSK 5 1	400.00]	1		580.6	-28.7	-149.5	-13.1	-730.0 125.7
	34070 [JTKOSB1	400.00]	34072 [JUROS21	400.00]	1		739.9	9.0	102.4	-38.9	-637.5 86.2
	34070 [JTKOSB1	400.00]	34071 [JTKOSC1	400.00]	1		-472.2	-68.5	153.9	20.2	626.1 132.6
	34070 [JTKOSB1	400.00]	34071 [JTKOSC1	400.00]	2		-472.2	-68.5	153.9	20.2	626.1 132.6

26064	[YSK 41	400.00]	26111	[YSK 5 1	400.00]	1	-228.9	111.3	370.3	77.4	599.2	261.8
34071	[JTKOSCL	400.00]	35045	[JTKOSCG3	24.000]	1	-528.6	-62.7	0.3	1.8	528.9	100.1
34071	[JTKOSCL	400.00]	35046	[JTKOSCG4	24.000]	1	-528.6	-62.7	0.3	1.8	528.9	100.1
34071	[JTKOSCL	400.00]	35043	[JTKOSCG1	24.000]	1	-528.6	-62.7	0.3	1.8	528.9	100.1
34071	[JTKOSCL	400.00]	35044	[JTKOSCG2	24.000]	1	-528.6	-62.7	0.3	1.8	528.9	100.1
34020	[JNIS2 1	400.00]	34070	[JTKOSB1	400.00]	1	-188.7	-49.4	264.2	-39.5	452.8	240.0
34071	[JTKOSCL	400.00]	34089	[JPEC3 1	400.00]	1	427.5	-16.8	52.4	-44.8	-375.1	87.8
34071	[JTKOSCL	400.00]	34073	[JGJAK31	400.00]	1	399.5	-33.5	33.5	-66.9	-366.0	91.6
184	[XRI_PE11	400.00]	36001	[ORIBAR11	400.00]	1	203.8	-63.9	-161.1	-76.0	-364.9	179.0
184	[XRI_PE11	400.00]	34089	[JPEC3 1	400.00]	1	-203.8	63.9	161.1	76.0	364.9	179.0
26005	[YBITOL1	400.00]	26064	[YSK 41	400.00]	1	59.3	69.8	377.2	71.4	317.9	536.0
82	[XKA_KC11	400.00]	34073	[JGJAK31	400.00]	1	-316.4	33.4	-6.5	49.5	310.0	98.0
82	[XKA_KC11	400.00]	10015	[AKASHA1	400.00]	1	316.4	-33.4	6.5	-49.5	-310.0	98.0
206	[XFL_BI11	400.00]	26005	[YBITOL1	400.00]	1	-229.8	51.3	75.3	53.8	305.1	132.7
10011	[AELBS21	400.00]	10015	[AKASHA1	400.00]	1	-185.4	79.2	100.6	51.6	286.1	154.3

Table 13.1.16: Results of contingency (n-1) analysis in winter maximum 2020, scenario TPP Kosovo C exports 2120 MW to Montenegro, Albania, Macedonia and Greece

MONITORED BRANCH				CONTINGENCY	RATING	FLOW	%
316	XTR_HN51	110.00	36050*OHNNOVI51	110.00 1 SINGLE 207	89.6	92.8	104.3
24034	*MDUME 2	220.00	24096 MMART 21	220.00 1 SINGLE 367	426.8	516.4	115.3
24094	*MMART 4	400.00	24096 MMART 21	220.00 1 SINGLE 367	500.0	525.6	105.1
24034	*MDUME 2	220.00	24095 MMART 22	220.00 1 SINGLE 368	426.8	520.1	116.2
24094	*MMART 4	400.00	24095 MMART 22	220.00 1 SINGLE 368	500.0	529.4	105.9
24034	*MDUME 2	220.00	24096 MMART 21	220.00 1 SINGLE 379	426.8	516.6	115.4
24094	*MMART 4	400.00	24096 MMART 21	220.00 1 SINGLE 379	500.0	525.8	105.2
24034	*MDUME 2	220.00	24095 MMART 22	220.00 1 SINGLE 380	426.8	520.4	116.2
24094	*MMART 4	400.00	24095 MMART 22	220.00 1 SINGLE 380	500.0	529.6	105.9
28040	*RLOTU2	220.00	28366 RSIBIU2	220.00 1 SINGLE 621	333.4	393.1	112.2
28040	*RLOTU2	220.00	28100 RSIBIU21	220.00 1 SINGLE 622	333.4	393.1	112.2
28040	*RLOTU2	220.00	28366 RSIBIU2	220.00 1 SINGLE 719	333.4	392.8	111.6
28040	*RLOTU2	220.00	28100 RSIBIU21	220.00 1 SINGLE 720	333.4	392.8	111.6
34100	*JBGD172	220.00	34111 JBGD8 22	220.00 2 SINGLE 819	445.8	466.8	105.4
34100	*JBGD172	220.00	34111 JBGD8 22	220.00 1 SINGLE 820	445.8	466.8	105.4

MONITORED VOLTAGE REPORT:										
SYSTEM	CONTINGENCY	<----- B U S ----->			V-CONT	V-INIT	V-MAX	V-MIN		
'BG220	'	RANGE SINGLE 134	12286	VUZUND2	220.00	0.88841	1.00990	1.10000	0.90000	
'BG220	'	RANGE SINGLE 136	12282	VORFEJ2	220.00	1.10511	1.04412	1.10000	0.90000	
'HU220	'	RANGE SINGLE 356	24005	MALBF 22	220.00	0.89275	1.04262	1.10000	0.90000	
'HU220	'	RANGE SINGLE 357	24006	MALBF 21	220.00	0.89462	1.04267	1.10000	0.90000	
'RO220	'	RANGE SINGLE 691	28855	RMOSTI2	220.00	0.82249	1.01543	1.10000	0.90000	
'RS400	'	RANGE SINGLE 796	34085	JSOMB31	400.00	0.86377	0.99058	1.05000	0.90000	
'RS220	'	RANGE SINGLE 844	34200	JSABA32	220.00	0.88460	1.02019	1.10000	0.90000	

CONTINGENCY LEGEND:										
LABEL	EVENTS									
SINGLE 134	:	OPEN LINE FROM BUS 12275 [VMI3 2	220.00]	TO BUS 12286 [VUZUND2	220.00]	CKT 1				
SINGLE 136	:	OPEN LINE FROM BUS 12280 [VALEKO2	220.00]	TO BUS 12282 [VORFEJ2	220.00]	CKT 1				
SINGLE 207	:	OPEN LINE FROM BUS 13 [XTR_PG11	400.00]	TO BUS 36005 [OPDG211	400.00]	CKT 1				
SINGLE 356	:	OPEN LINE FROM BUS 24005 [MALBF 22	220.00]	TO BUS 24034 [MDUME 2	220.00]	CKT 1				
SINGLE 357	:	OPEN LINE FROM BUS 24006 [MALBF 21	220.00]	TO BUS 24034 [MDUME 2	220.00]	CKT 1				
SINGLE 367	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1				
SINGLE 368	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1				
SINGLE 379	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1				
SINGLE 380	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1				
SINGLE 621	:	OPEN LINE FROM BUS 28040 [RLOTU2	220.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1				
SINGLE 622	:	OPEN LINE FROM BUS 28040 [RLOTU2	220.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1				
SINGLE 691	:	OPEN LINE FROM BUS 28855 [RMOSTI2	220.00]	TO BUS 28935 [RRAC.M2	220.00]	CKT 1				
SINGLE 719	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1				
SINGLE 720	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1				
SINGLE 796	:	OPEN LINE FROM BUS 34050 [JSUBO31	400.00]	TO BUS 34085 [JSOMB31	400.00]	CKT 1				
SINGLE 819	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 1				
SINGLE 820	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 2				
SINGLE 844	:	OPEN LINE FROM BUS 34170 [JOBREN2	220.00]	TO BUS 34200 [JSABA32	220.00]	CKT 1				

## 13.2. Impact of the Krsko NPP 2 construction on SEE transmission system

### 13.2.1. Export from NPP Krsko 2 to Italy

Table 13.2.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario NPP Krsko 2 exports 1080 MW to Italy

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	AL		1338.4 476.8	1491.9 689.7	0.0 -199.8	0.0 0.0	0.0 458.8	-200.0 27.9	46.5 417.8	-200.0
20	BG		8805.3 2902.3	7603.7 3045.8	0.0 -44.9	14.4 120.9	0.0 2996.2	1000.0 321.2	187.2 2455.4	1000.0
30	BA		3147.8 715.2	2610.1 724.5	0.0 0.0	0.0 0.0	0.0 909.5	490.0 335.8	47.6 564.4	490.0
35	IT		39234.6 7818.3	49222.0 10816.5	0.0 0.0	1.1 -156.6	0.0 12518.7	-10480.0 -516.4	491.5 10193.5	-10480.0
40	HR		3107.8 479.1	3483.0 1074.2	0.0 0.0	0.0 0.0	0.0 1392.3	-435.0 40.4	59.8 756.8	-435.0
45	HU		5391.1 1008.6	6500.0 1926.6	0.1 178.2	0.0 -29.6	0.0 2420.2	-1200.0 143.5	91.0 1210.1	-1200.0
50	GR		10298.1 2145.1	10371.1 5312.0	0.0 170.2	0.0 9.3	0.0 6613.0	-350.0 112.3	277.0 3140.5	-350.0
55	UX		4408.9 268.8	-4593.5 637.5	0.0 0.0	4.8 12.7	0.0 2298.9	8885.7 459.5	111.9 1458.1	8886.0
60	MK		1501.6 453.4	1577.0 573.6	0.0 -31.4	0.0 0.0	0.0 403.6	-100.0 49.5	24.6 265.2	-100.0
65	UA		1207.1 -195.5	0.0 0.0	0.0 0.0	0.0 0.0	0.0 653.8	1200.0 346.5	7.1 111.8	1200.0
70	RO		10254.2 2512.8	9416.9 4075.6	0.0 512.8	88.4 273.9	0.0 4616.5	545.0 -234.0	203.9 2501.0	545.0
75	SI		4104.9 1187.4	2514.0 811.0	0.0 0.0	9.4 60.2	0.0 594.8	1504.3 -25.2	77.2 936.4	1504.0
80	TR		54592.7 4578.5	54622.1 7792.0	0.0 1175.4	0.0 0.0	0.0 17195.6	-800.0 -131.6	770.7 12938.2	-800.0
90	RS		7713.4 2625.8	7871.1 2853.5	0.0 0.0	17.8 76.6	0.0 1729.4	-360.0 -638.5	184.5 2063.8	-360.0
91	ME		628.6 299.3	805.2 299.2	0.5 -35.0	1.9 10.9	0.0 239.4	-200.0 61.3	21.0 202.2	-200.0
95	SK		501.4 -376.8	0.0 0.0	0.0 0.0	0.0 0.0	0.0 40.0	500.0 -352.4	1.4 15.7	500.0
101	XX (IT-GR)		0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0

102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	156235.8	153494.7	0.6	137.7	0.0	0.0	2602.9	0.0
	26898.9	40631.6	1725.6	378.2	55080.8	0.0	39230.7	

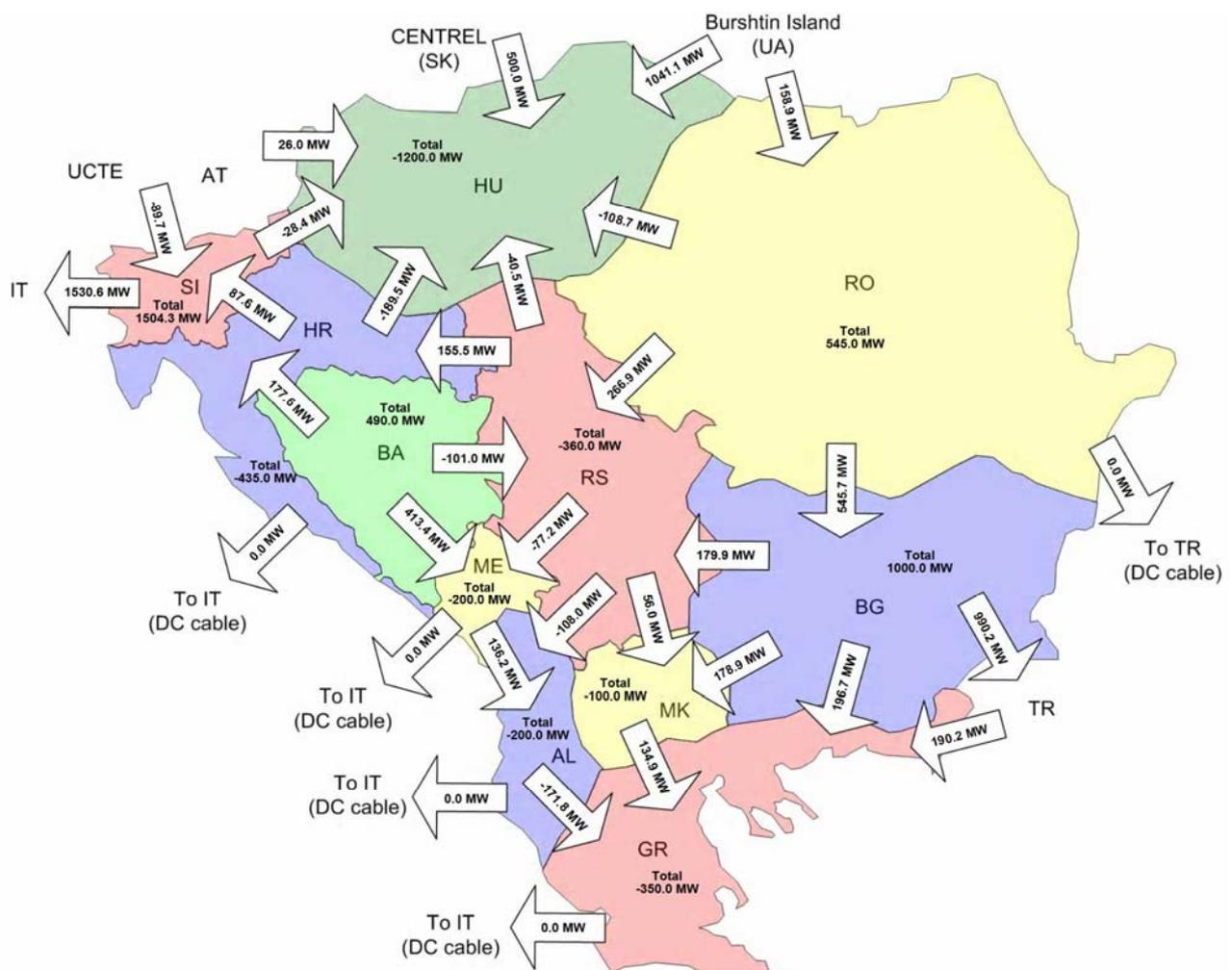


Figure 13.2.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario NPP Krsko 2 exports 1080 MW to Italy

Table 13.2.2: Branches loaded more then 80% of their thermal limits in monitored grid in winter maximum 2015, scenario NPP Krsko 2 exports 1080 MW to Italy

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I
71,XME_DI11	400.00,	31410,LDIVAC1	400.00,	1,	1,	852.90,	14.02,	853.01,	81.78

Table 13.2.3: Changes in power flow greater then 250 MW in area of SEE in winter maximum 2015, scenario NPP Krsko 2 exports 1080 MW to Italy

BRANCHES WITH FROM OR TO END MW FLOWS DIFFERING BY MORE THAN 250.0 MW:												
IN WORKING CASE					IN BASE CASE							
X-----	FROM BUS	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	
34020	[JNIS2 1	400.00]	34070	[JTKOSB1	400.00]	1	-427.9	16.7	200.4	-34.0	628.3	146.8
34070	[JTKOSB1	400.00]	34071	[JTKOSC1	400.00]	2	-467.2	-47.2	117.9	15.5	585.1	125.2
34070	[JTKOSB1	400.00]	34071	[JTKOSC1	400.00]	1	-467.2	-47.2	117.9	15.5	585.1	125.2
184	[XRI_PE11	400.00]	34089	[JKPEC31	400.00]	1	-378.3	80.1	189.8	58.1	568.1	150.2
184	[XRI_PE11	400.00]	36001	[ORIBAR11	400.00]	1	378.3	-80.1	-189.8	-58.1	-568.1	150.2
34071	[JTKOSC1	400.00]	34089	[JKPEC31	400.00]	1	569.6	-11.8	7.2	-25.5	-562.4	98.7
13	[XTR_PG11	400.00]	14405	[WTREB11	400.00]	1	136.7	-132.1	-279.0	-80.8	-415.7	304.0
13	[XTR_PG11	400.00]	36005	[OPODG211	400.00]	1	-136.7	132.1	279.0	80.8	415.7	304.0
71	[XME_DI11	400.00]	20078	[HMELIN11	400.00]	1	-852.9	-14.0	-447.4	-21.4	405.5	47.5
71	[XME_DI11	400.00]	31410	[LDIVAC1	400.00]	1	852.9	14.0	447.4	21.4	-405.5	47.5
81	[XSK_KB11	400.00]	34072	[JKURO21	400.00]	1	-403.3	28.6	-10.6	28.8	392.8	97.4
81	[XSK_KB11	400.00]	26111	[YSK 5 1	400.00]	1	403.3	-28.6	10.6	-28.8	-392.8	97.4
34070	[JTKOSB1	400.00]	34072	[JKURO21	400.00]	1	574.7	5.1	191.2	-25.5	-383.5	66.7
34040	[JRPMLA1	400.00]	34045	[JSMIT21	400.00]	1	839.8	-29.0	486.0	-62.6	-353.9	42.1
26064	[YSK 41	400.00]	26111	[YSK 5 1	400.00]	1	-217.7	105.6	130.0	92.7	347.7	159.7
74	[XER_SM11	400.00]	20030	[HERNES11	400.00]	1	510.1	-78.9	164.9	-62.2	-345.3	67.7
74	[XER_SM11	400.00]	34045	[JSMIT21	400.00]	1	-510.1	78.9	-164.9	62.2	345.3	67.7
20078	[HMELIN11	400.00]	20120	[HOBROV11	400.00]	1	-433.2	-6.6	-111.8	-58.6	321.3	74.2
14404	[WGACKO1	400.00]	14405	[WTREB11	400.00]	1	-96.1	81.0	206.0	53.6	302.1	314.5
14404	[WGACKO1	400.00]	18401	[WMOST41	400.00]	1	315.9	-30.9	13.8	-21.9	-302.0	95.6
34031	[JOBREN12	400.00]	34920	[JTKOLB1	400.00]	A	-356.7	-27.6	-56.0	-3.7	300.7	84.3
34015	[JKRAG21	400.00]	34920	[JTKOLB1	400.00]	A	-254.0	-85.8	-551.4	-70.3	-297.4	117.1
34020	[JNIS2 1	400.00]	34080	[JJAGO41	400.00]	A	148.4	-12.0	-148.6	11.0	-297.0	200.1
34015	[JKRAG21	400.00]	34080	[JJAGO41	400.00]	A	19.6	8.7	315.2	-2.2	295.6	999.9
34031	[JOBREN12	400.00]	34040	[JRPMLA1	400.00]	1	262.1	-88.5	-23.6	-104.9	-285.8	109.0
36001	[ORIBAR11	400.00]	36010	[OPLJE211	400.00]	1	-64.0	-65.1	-348.5	-41.5	-284.5	444.3
20060	[HKONJS11	400.00]	20120	[HOBROV11	400.00]	1	286.7	-20.8	2.5	-21.4	-284.1	99.1
34030	[JOBREN11	400.00]	34040	[JRPMLA1	400.00]	2	260.9	-85.2	-22.5	-104.2	-283.3	108.6
34025	[JNSAD31	400.00]	34050	[JSUBO31	400.00]	1	617.0	-14.2	336.5	-18.4	-280.5	45.5
11	[XMO_KO11	400.00]	20060	[HKONJS11	400.00]	1	372.6	27.0	96.7	30.9	-275.9	74.0
11	[XMO_KO11	400.00]	18401	[WMOST41	400.00]	1	-372.6	-27.0	-96.7	-30.9	275.9	74.0
82	[XKA_KC11	400.00]	10015	[AKASHA1	400.00]	1	321.1	-23.2	55.1	-28.4	-266.0	82.9
82	[XKA_KC11	400.00]	34071	[JTKOSC1	400.00]	1	-321.1	23.2	-55.1	28.4	266.0	82.9

Table 13.2.4: Changes in power flow greater then 50 MW through tie-lines in area of interest in winter maximum 2015, scenario NPP Krsko 2 exports 1080 MW to Italy

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 50.0 MW:												
IN WORKING CASE					IN BASE CASE							
X-----	FROM BUS	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	
31410	[LDIVAC1	400.00]	80	[XRE_DI11	400.00]	1	1296.2	223.0	732.5	225.8	-563.6	43.5
34050	[JSUBO31	400.00]	79	[XSA_SU11	400.00]	1	280.1	-153.8	-44.4	-100.2	-324.5	115.8
219	[XBE_OR11	400.00]	24013	[MBEKO 4	400.00]	1	160.5	-38.9	-64.9	-0.4	-225.4	140.5
217	[XER_PE11	400.00]	24141	[MPECS 4	400.00]	1	94.1	-39.3	-101.0	15.5	-195.1	207.4
218	[XER_PE12	400.00]	24141	[MPECS 4	400.00]	2	94.1	-39.3	-101.0	15.5	-195.1	207.4
84	[XRO_MU11	400.00]	65001	[UMUKACH	400.00]	1	26.1	-96.0	-160.8	-57.2	-186.9	716.5
31420	[LMARIB1	400.00]	9	[XKA_MAL1	400.00]	1	72.3	20.4	-82.9	29.6	-155.3	214.6
31210	[LDIVAC2	220.00]	156	[XPA_DI21	220.00]	1	370.4	-48.6	230.8	-39.1	-139.6	37.7
20166	[HZERJA11	400.00]	204	[XZE_HE11	400.00]	1	109.0	-75.2	-27.5	-58.1	-136.5	125.2
502	[XCI_PI12	400.00]	204	[XZE_HE11	400.00]	1	-108.8	19.3	27.5	-1.4	136.3	125.3
31435	[LCIRKO11	400.00]	501	[XCI_PI11	400.00]	A	-201.6	-24.1	-68.7	-27.6	132.9	65.9
75	[XSA_AR11	400.00]	24148	[MSAFA 4	400.00]	1	77.2	-25.5	-44.4	-5.2	-121.6	157.6
206	[XFL_BI11	400.00]	22559	[GAHS_F11	400.00]	1	117.8	-39.9	5.6	-40.9	-112.2	95.2
20	[XBG_TH11	400.00]	22366	[GK_LAG11	400.00]	1	92.5	12.9	196.5	-5.9	104.0	112.5
31450	[LKOZJK1	400.00]	10	[XKA_KO11	400.00]	1	43.3	13.0	-49.7	18.4	-93.0	214.7
69	[XTH_DU11	400.00]	22347	[GKYT_T11	400.00]	1	192.8	26.1	129.0	23.2	-63.7	33.1
198	[XMI_HA11	400.00]	60009	[THAMIT1	400.00]	1	524.5	64.6	578.7	58.2	54.2	10.3



Table 13.2.5: Results of contingency (n-1) analysis in winter maximum 2015, scenario NPP Krsko 2 exports 1080 MW to Italy

<----- MONITORED BRANCH ----->				CONTINGENCY	RATING	FLOW	%
31210*LDIVAC2	220.00	156 XPA_DI21	220.00	1 BASE CASE	320.1	373.6	114.6
153*XPE_DI21	220.00	20101 HPEHLI21	220.00	1 SINGLE 269	362.0	415.3	112.8
153*XPE_DI21	220.00	31210 LDIVAC2	220.00	1 SINGLE 269	320.1	415.3	127.6
328*XMA_IB51	110.00	31050 LILBIS5	110.00	1 SINGLE 269	65.0	95.4	141.7
153*XPE_DI21	220.00	20101 HPEHLI21	220.00	1 SINGLE 707	362.0	382.8	104.2
153 XPE_DI21	220.00	31210*LDIVAC2	220.00	1 SINGLE 707	320.1	372.6	117.9

MONITORED VOLTAGE REPORT:

SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
'BG220	' RANGE SINGLE 100	12252 VOCHIF2	220.00	0.81976	0.95962	1.10000
'BG220	' RANGE SINGLE 124	12286 VUZUND2	220.00	0.89747	1.00568	1.10000
'GR400	' RANGE SINGLE 432	22759 GTH_AG11	400.00	1.05214	1.02548	1.05000
'GR400	' RANGE SINGLE 432	23123 GKPATR11	400.00	1.05232	1.03841	1.05000
'GR400	' RANGE SINGLE 432	23125 GKPATC11	400.00	1.05241	1.03839	1.05000
'GR400	' RANGE SINGLE 432	23126 GKPATC12	400.00	1.05236	1.03850	1.05000
'GR400	' RANGE SINGLE 432	23173 GDISTO11	400.00	1.05325	1.03814	1.05000
'GR400	' RANGE SINGLE 432	23174 GDISTO12	400.00	1.05287	1.03827	1.05000
'GR400	' RANGE SINGLE 432	23180 GAXELO12	400.00	1.05253	1.03895	1.05000
'GR400	' RANGE SINGLE 432	23181 GAXELO11	400.00	1.05250	1.03917	1.05000
'GR400	' RANGE SINGLE 433	23064 GK_MEG13	400.00	1.05405	1.04137	1.05000
'GR400	' RANGE SINGLE 433	23066 GK_MEG11	400.00	1.05405	1.04137	1.05000
'GR400	' RANGE SINGLE 433	23123 GKPATR11	400.00	1.05350	1.03841	1.05000
'GR400	' RANGE SINGLE 433	23125 GKPATC11	400.00	1.05359	1.03839	1.05000
'GR400	' RANGE SINGLE 433	23126 GKPATC12	400.00	1.05353	1.03850	1.05000
'GR400	' RANGE SINGLE 433	23173 GDISTO11	400.00	1.05422	1.03814	1.05000
'GR400	' RANGE SINGLE 433	23174 GDISTO12	400.00	1.05403	1.03827	1.05000
'GR400	' RANGE SINGLE 433	23180 GAXELO12	400.00	1.05371	1.03895	1.05000
'GR400	' RANGE SINGLE 433	23181 GAXELO11	400.00	1.05377	1.03917	1.05000
'GR400	' RANGE SINGLE 462	23036 GK_KOR13	400.00	1.06346	1.01768	1.05000
'GR400	' RANGE SINGLE 462	23068 GK_MEG14	400.00	1.06106	1.02970	1.05000
'GR400	' RANGE SINGLE 463	23037 GK_KOR14	400.00	1.06346	1.01768	1.05000
'GR400	' RANGE SINGLE 463	23067 GK_MEG12	400.00	1.06106	1.02970	1.05000
'GR400	' RANGE SINGLE 473	23126 GKPATC12	400.00	1.06928	1.03850	1.05000
'GR400	' RANGE SINGLE 473	23180 GAXELO12	400.00	1.06928	1.03895	1.05000
'GR400	' RANGE SINGLE 473	23181 GAXELO11	400.00	1.06909	1.03917	1.05000
'GR400	' RANGE SINGLE 475	23180 GAXELO12	400.00	1.06873	1.03895	1.05000
'GR400	' RANGE SINGLE 475	23181 GAXELO11	400.00	1.06854	1.03917	1.05000
'RO220	' RANGE SINGLE 567	28042 RRIURE2	220.00	0.89439	0.97639	1.10000
'RO220	' RANGE SINGLE 567	28043 RSTUPA2	220.00	0.88580	0.97486	1.10000
'RO220	' RANGE SINGLE 637	28855 RMOSTI2	220.00	0.87962	1.03854	1.10000
'RO220	' RANGE SINGLE 642	28907 RSTILP2	220.00	0.83986	0.97983	1.10000
'RO220	' RANGE SINGLE 670	28094 RROSIO2	220.00	0.89914	1.02804	1.10000
'RO220	' RANGE SINGLE 670	28095 RVETIS2	220.00	0.89002	1.01545	1.10000
'RS400	' RANGE SINGLE 739	34085 JSOMB31	400.00	0.86841	0.98575	1.05000
'RS220	' RANGE SINGLE 785	34200 JSABA32	220.00	0.89101	1.02153	1.10000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 100	: OPEN LINE FROM BUS 12250 [VGORIA2 220.00] TO BUS 12252 [VOCHIF2 220.00] CKT 1
SINGLE 124	: OPEN LINE FROM BUS 12275 [VMI3 2 220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 269	: OPEN LINE FROM BUS 71 [XME_DI11 400.00] TO BUS 31410 [LDIVAC1 400.00] CKT 1
SINGLE 432	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23172 [GDISTO13 400.00] CKT 1
SINGLE 433	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23173 [GDISTO11 400.00] CKT 1
SINGLE 462	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23036 [GK_KOR13 400.00] CKT 1
SINGLE 463	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23037 [GK_KOR14 400.00] CKT 1
SINGLE 473	: OPEN LINE FROM BUS 23123 [GKPATR11 400.00] TO BUS 23126 [GKPATC12 400.00] CKT 1
SINGLE 475	: OPEN LINE FROM BUS 23126 [GKPATC12 400.00] TO BUS 23180 [GAXELO12 400.00] CKT 1
SINGLE 567	: OPEN LINE FROM BUS 28043 [RSTUPA2 220.00] TO BUS 28044 [RBRADU2 220.00] CKT 1
SINGLE 637	: OPEN LINE FROM BUS 28855 [RMOSTI2 220.00] TO BUS 28935 [RRAC.M2 220.00] CKT 1
SINGLE 642	: OPEN LINE FROM BUS 28906 [RTELEA2 220.00] TO BUS 28907 [RSTILP2 220.00] CKT 1
SINGLE 670	: OPEN LINE FROM BUS 28039 [RROSIO1 400.00] TO BUS 28094 [RROSIO2 220.00] CKT 1
SINGLE 707	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1
SINGLE 739	: OPEN LINE FROM BUS 34050 [JSUBO31 400.00] TO BUS 34085 [JSOMB31 400.00] CKT 1
SINGLE 785	: OPEN LINE FROM BUS 34170 [JOBREN2 220.00] TO BUS 34200 [JSABA32 220.00] CKT 1

Table 13.2.6: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario NPP Krsko 2 exports 1080 MW to Italy

DESIRED	FROM	TO	TO	BUS	TO	LINE	FROM	TO
X-- AREA --X	GENERATION	LOAD	SHUNT	SHUNT	CHARGING	NET INT	LOSSES	NET INT
10	1622.1	1723.7	0.0	0.0	0.0	-150.0	48.4	-150.0
AL	668.8	779.7	-204.6	0.0	475.2	100.1	468.8	
20	9660.2	8411.0	0.0	15.5	0.0	1000.4	233.3	1000.0
BG	3518.8	3357.9	0.0	181.2	3279.7	198.3	3061.2	
30	2949.9	2897.8	0.0	0.0	0.0	0.1	52.0	0.0
BA	1012.3	1017.2	0.0	0.0	912.6	249.4	658.3	
35	44087.9	54409.8	0.0	1.1	0.0	-10738.6	415.6	-10740.0
IT	10012.7	11942.3	0.0	147.6	12371.0	-798.5	11092.4	
40	3429.9	4359.0	0.0	0.0	0.0	-999.8	70.7	-1000.0
HR	573.2	1075.9	0.0	0.0	1521.6	236.1	782.9	
45	6093.0	7180.0	0.1	0.0	0.0	-1199.3	112.2	-1200.0
HU	1375.5	2128.1	178.6	-29.1	2402.6	26.0	1474.4	
50	11750.1	11426.0	0.0	0.0	0.0	0.1	324.0	0.0
GR	3126.1	5724.7	203.7	9.4	6663.2	125.7	3712.1	
55	5144.9	-4356.2	0.0	4.8	0.0	9366.2	130.1	9450.0
UX	487.7	622.8	0.0	12.6	2289.0	444.6	1696.7	
60	1940.2	2001.9	0.0	0.0	0.0	-100.0	38.2	-100.0
MK	762.8	752.3	-30.9	0.0	397.7	11.5	426.4	
65	1207.6	0.0	0.0	0.0	0.0	1200.0	7.6	1200.0
UA	-164.5	0.0	0.0	0.0	652.3	366.4	121.4	
70	13261.4	12110.2	0.0	90.2	0.0	800.2	260.8	800.0
RO	3119.0	4455.6	783.3	285.8	5601.5	-28.1	3224.0	
75	5050.5	2990.0	0.0	9.4	0.0	1970.3	80.8	1970.0
SI	1389.1	964.6	0.0	60.1	851.5	146.9	1069.0	
80	77661.6	77342.9	0.0	0.0	0.0	-800.0	1118.7	-800.0
TR	9834.3	11034.0	996.9	0.0	22660.7	-171.2	20635.5	
90	7768.0	8298.8	0.0	17.3	0.0	-749.8	201.8	-750.0
RS	2895.8	2986.6	0.0	73.3	1731.8	-663.6	2231.3	
91	864.5	938.0	0.5	2.1	0.0	-100.0	23.9	-100.0
ME	350.1	346.6	-34.6	11.4	237.1	51.6	212.2	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-320.3	0.0	0.0	0.0	40.0	-295.0	14.7	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	192993.2	189732.9	0.6	140.4	0.0	0.0	3119.2	80.0
	38641.5	47188.4	1892.3	752.4	62087.5	0.0	50881.1	



Figure 13.2.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario NPP Krsko 2 exports 1080 MW to Italy

Table 13.2.7: Changes in power flow greater than 200 MW in area of SEE in winter maximum 2020, scenario NPP Krsko 2 exports 1080 MW to Italy

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 200.0 MW:												
IN WORKING CASE					IN							
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
72	[XTU_KR11	400.00]	20147	[HTUMBR11	400.00]	1	410.2	-37.5	206.1	-7.8	-204.1	49.8
72	[XTU_KR11	400.00]	31415	[LKRSKO1	400.00]	1	-410.2	37.5	-206.1	7.8	204.1	49.8
73	[XTU_KR12	400.00]	20147	[HTUMBR11	400.00]	2	410.2	-37.5	206.1	-7.8	-204.1	49.8
73	[XTU_KR12	400.00]	31415	[LKRSKO1	400.00]	2	-410.2	37.5	-206.1	7.8	204.1	49.8
78	[XSA_MU11	400.00]	24157	[MSAJO 4	400.00]	1	-540.1	139.2	-26.0	50.6	514.1	95.2



LABEL	EVENTS
SINGLE 19	: OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	: OPEN LINE FROM BUS 10010 [AELBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 207	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [OPODG211 400.00] CKT 1
SINGLE 367	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 368	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 379	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 380	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 621	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 719	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 763	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1
SINGLE 819	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 820	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2

### 13.2.2. Export from NPP Krsko 2 to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

Table 13.2.10: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario NPP Krsko 2 exports 1080 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

DESIRED	FROM	TO	TO BUS	TO LINE	FROM	TO		
X-- AREA --X GENERATION	LOAD	SHUNT	SHUNT CHARGING	NET INT	LOSSES	NET INT		
10	1137.1	1491.9	0.0	0.0	0.0	-400.1	45.3	-400.0
AL	521.2	689.7	-196.1	0.0	448.6	64.5	411.6	
20	8813.2	7603.7	0.0	14.3	0.0	1000.1	195.0	1000.0
BG	3014.8	3045.8	-44.8	120.5	2982.6	333.8	2542.1	
30	3159.7	2610.1	0.0	0.0	0.0	490.4	59.2	490.0
BA	805.3	724.5	0.0	0.0	902.8	369.6	614.0	
35	40265.1	49222.0	0.0	1.1	0.0	-9399.9	441.9	-9400.0
IT	7057.2	10816.5	0.0	-156.9	12569.0	-525.6	9492.3	
40	3107.0	3483.0	0.0	0.0	0.0	-434.7	58.7	-435.0
HR	426.0	1074.2	0.0	0.0	1399.5	13.0	738.3	
45	5394.4	6500.0	0.1	0.0	0.0	-1199.9	94.3	-1200.0
HU	989.1	1926.6	178.0	-29.5	2420.8	98.6	1236.2	
50	10100.9	10371.1	0.0	0.0	0.0	-550.0	279.8	-550.0
GR	2275.5	5312.0	170.1	9.3	6589.2	188.2	3171.4	
55	4417.6	-4593.5	0.0	4.8	0.0	8904.4	101.9	8906.0
UX	30.4	637.5	0.0	12.8	2317.4	400.6	1297.0	
60	1304.6	1577.0	0.0	0.0	0.0	-300.0	27.6	-300.0
MK	459.8	573.6	-30.1	0.0	397.3	33.1	280.6	
65	1207.7	0.0	0.0	0.0	0.0	1200.0	7.7	1200.0
UA	-182.2	0.0	0.0	0.0	653.6	354.3	117.1	
70	10250.4	9416.9	0.0	88.3	0.0	545.0	200.1	545.0
RO	2539.5	4075.6	512.8	273.8	4614.5	-177.0	2468.8	
75	4087.0	2514.0	0.0	9.5	0.0	1503.9	59.6	1504.0
SI	1041.6	811.0	0.0	60.9	603.8	-2.8	776.3	

80	54594.2	54622.1	0.0	0.0	0.0	-800.0	772.2	-800.0
TR	4607.2	7792.0	1175.4	0.0	17195.0	-120.0	12954.8	
90	7427.6	7871.1	0.0	17.5	0.0	-659.5	198.4	-660.0
RS	2787.2	2853.5	0.0	75.5	1708.3	-627.7	2194.3	
91	434.3	805.2	0.5	1.8	0.0	-399.9	26.6	-400.0
ME	225.3	299.2	-33.8	10.5	230.6	-44.9	224.8	
95	501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK	-381.9	0.0	0.0	0.0	40.0	-357.7	15.8	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTALS	156202.3	153494.7	0.6	137.5	0.0	0.0	2569.6	0.0
	26216.1	40631.6	1731.5	376.8	55073.1	0.0	38535.6	

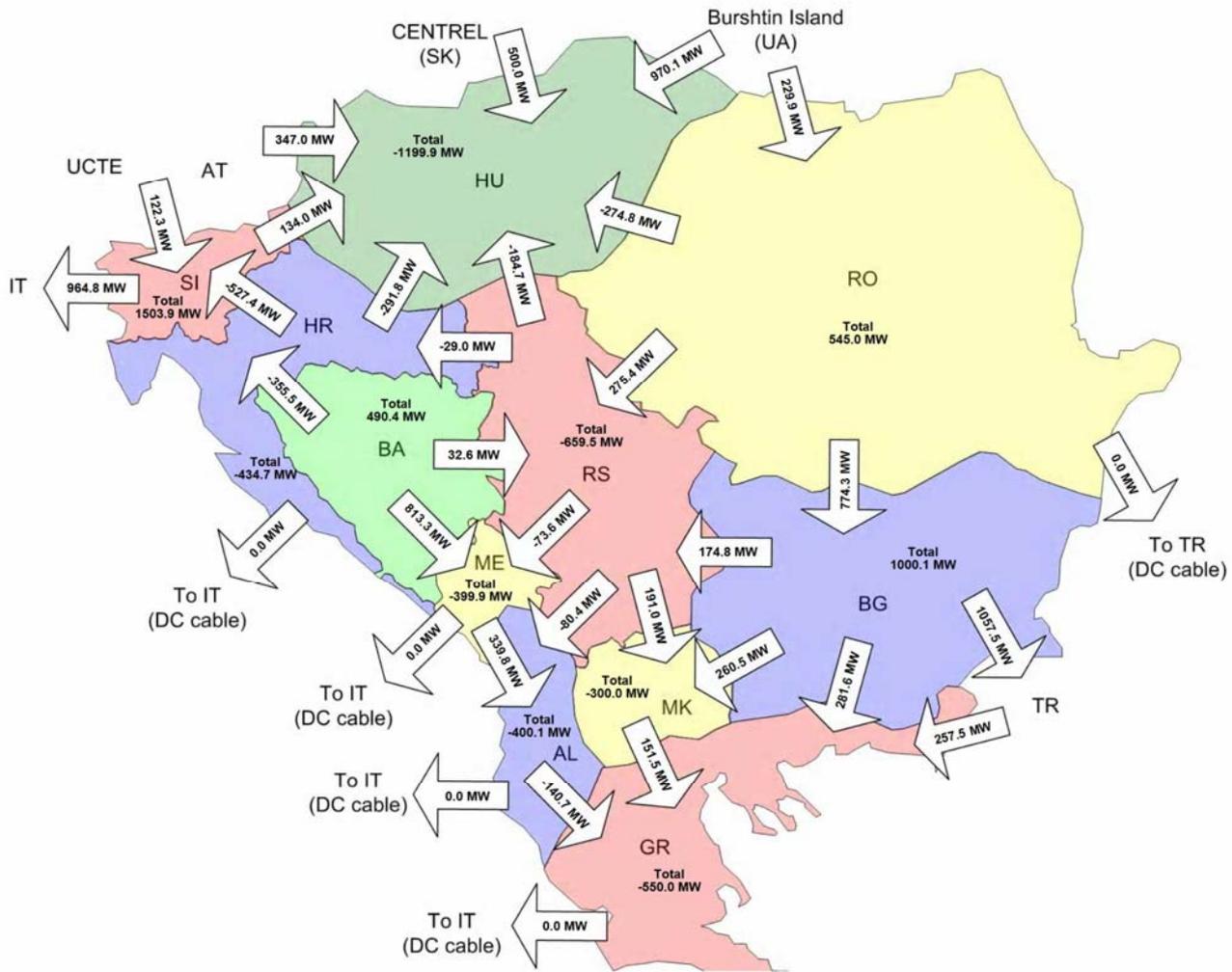


Figure 13.2.3: Aggregated border flows in area of SEE in winter maximum 2015, scenario NPP Krsko 2 exports 1080 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

Table 13.2.11: Changes in power flow in area of SEE in winter maximum 2015, scenario NPP Krsko 2 exports 1080 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	
13	[XTR_PG11	400.00]	14405	[WTREB11	400.00]	1	-483.3	-73.1	-279.0	-80.8	204.4	42.3
13	[XTR_PG11	400.00]	36005	[OPODG211	400.00]	1	483.3	73.1	279.0	80.8	-204.4	42.3
72	[XTU_KR11	400.00]	20147	[HTUMBR11	400.00]	1	476.5	-53.6	198.5	-13.8	-278.0	58.3
72	[XTU_KR11	400.00]	31415	[LKRSK01	400.00]	1	-476.5	53.6	-198.5	13.8	278.0	58.3
73	[XTU_KR12	400.00]	20147	[HTUMBR11	400.00]	2	476.5	-53.6	198.5	-13.8	-278.0	58.3
73	[XTU_KR12	400.00]	31415	[LKRSK01	400.00]	2	-476.5	53.6	-198.5	13.8	278.0	58.3
501	[XCI_PI11	400.00]	24076	[MHEVI 4	400.00]	1	134.0	-41.4	-68.7	-5.7	-202.7	151.3
501	[XCI_PI11	400.00]	31435	[LCIRKO11	400.00]	A	-134.0	41.4	68.7	5.7	202.7	151.3
20030	[HERNES11	400.00]	20166	[HZERJA11	400.00]	1	-43.2	-50.4	163.7	-75.9	207.0	478.7
20147	[HTUMBR11	400.00]	20166	[HZERJA11	400.00]	1	262.4	-103.1	-10.6	-51.8	-273.0	104.0
30010	[LNEK G2	24.000]	31415	[LKRSK01	400.00]	1	540.0	-25.6	OUT OF SERVICE		-540.0	100.0
30010	[LNEK G2	24.000]	31415	[LKRSK01	400.00]	2	540.0	-25.6	OUT OF SERVICE		-540.0	100.0
31415	[LKRSK01	400.00]	31435	[LCIRKO11	400.00]	1	585.7	-173.4	130.1	-103.6	-455.6	77.8
34040	[JRPMLA1	400.00]	34045	[JSMIT21	400.00]	1	278.5	-50.1	486.0	-62.6	207.4	74.5
36023	[OTPLJE21	220.00]	36511	[OTPLJEG1	15.750]	1	16.2	12.7	-203.3	-65.5	-219.5	999.9



Table 13.2.12: Changes in power flow greater then 0 MW through tie-lines in area of interest in winter maximum 2015, scenario NPP Krsko 2 exports 1080 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%
31049	[LHFORM5 110.00]	329	[XNE_F051 110.00]	1		43.8	1.1	40.0	2.1	-3.8	8.6	0.9	80.8
31050	[LILBIS5 110.00]	328	[XMA_IB51 110.00]	1		-26.1	-1.7	-30.9	0.7	-4.8	18.3	2.4	142.3
31067	[LKOPER5 110.00]	327	[XBU_K051 110.00]	1		-1.8	20.9	-5.1	21.8	-3.3	187.3	0.9	4.3
31201	[LPODLO2 220.00]	109	[XOB_PO21 220.00]	1		-139.2	-45.2	-152.9	-40.4	-13.8	9.9	4.8	10.6
31210	[LDIVAC2 220.00]	153	[XPE_DI21 220.00]	1		-133.5	5.8	-147.3	8.9	-13.8	10.3	3.0	51.7
31210	[LDIVAC2 220.00]	156	[XPA_DI21 220.00]	1		232.3	-41.2	230.8	-39.1	-1.5	0.6	2.1	5.0
31220	[LCIRKO2 220.00]	152	[XZE_CI21 220.00]	1		7.3	-21.8	-9.0	-18.9	-16.3	223.3	2.9	13.4
31410	[LDIVAC1 400.00]	71	[XME_DI11 400.00]	1		-400.8	-19.5	-446.1	-24.1	-45.2	11.3	-4.6	23.9
31410	[LDIVAC1 400.00]	80	[XRE_DI11 400.00]	1		735.6	212.5	732.5	225.8	-3.1	0.4	13.3	6.2
31415	[LKRSKO1 400.00]	72	[XTU_KR11 400.00]	1		477.7	-54.9	198.7	-25.2	-278.9	58.4	29.7	54.1
31415	[LKRSKO1 400.00]	73	[XTU_KR12 400.00]	2		477.7	-54.9	198.7	-25.2	-278.9	58.4	29.7	54.1
31420	[LMARIB1 400.00]	9	[XKA_MA11 400.00]	1		11.5	4.7	-82.9	29.6	-94.5	818.2	24.9	528.1
31435	[LCIRKO11 400.00]	501	[XCI_PI11 400.00]	A		134.2	-61.9	-68.7	-27.6	-202.9	151.2	34.3	55.4
31435	[LCIRKO11 400.00]	502	[XCI_PI12 400.00]	B		88.6	-29.1	27.5	-23.6	-61.1	68.9	5.5	18.8
31450	[LKOZJK1 400.00]	10	[XKA_KO11 400.00]	1		6.9	3.7	-49.7	18.4	-56.6	818.3	14.7	396.5

Table 13.2.13: Results of contingency (n-1) analysis in winter maximum 2015, scenario NPP Krsko 2 exports 1080 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%
116	XTR_PE21 220.00	36027*OHPERU21	220.00 1 SINGLE 196	301.0	312.3	103.2
316	*XTR_HN51 110.00	36050 OHNOVI51	110.00 1 SINGLE 196	89.6	123.1	142.9
316	*XTR_HN51 110.00	36050 OHNOVI51	110.00 1 SINGLE 198	89.6	100.7	115.3
31210	*LDIVAC2 220.00	156 XPA_DI21	220.00 1 SINGLE 707	320.1	553.6	167.7

MONITORED VOLTAGE REPORT:

SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
'HU220	RANGE BASE CASE	24025 MDETK 2	220.00	1.05000	1.05000	0.90000
'HU220	RANGE BASE CASE	24068 MGYOR 2	220.00	1.05649	1.05649	0.90000
'HU220	RANGE BASE CASE	24095 MMART 22	220.00	1.05076	1.05076	0.90000
'HU220	RANGE BASE CASE	24096 MMART 21	220.00	1.05071	1.05071	0.90000
'BG220	RANGE SINGLE 100	12252 VOCHIF2	220.00	0.81725	0.95761	0.90000
'BG220	RANGE SINGLE 124	12286 VUZUND2	220.00	0.89431	1.00351	0.90000
'GR400	RANGE SINGLE 432	22759 GTH_AG11	400.00	1.05101	1.02370	0.90000
'GR400	RANGE SINGLE 432	23123 GKPATR11	400.00	1.05089	1.03663	0.90000
'GR400	RANGE SINGLE 432	23125 GKPATC11	400.00	1.05098	1.03661	0.90000
'GR400	RANGE SINGLE 432	23126 GKPATC12	400.00	1.05092	1.03672	0.90000
'GR400	RANGE SINGLE 432	23173 GDISTO11	400.00	1.05184	1.03636	0.90000
'GR400	RANGE SINGLE 432	23174 GDISTO12	400.00	1.05145	1.03649	0.90000
'GR400	RANGE SINGLE 432	23180 GAXELO12	400.00	1.05108	1.03716	0.90000
'GR400	RANGE SINGLE 432	23181 GAXELO11	400.00	1.05104	1.03738	0.90000
'GR400	RANGE SINGLE 433	23064 GK_MEG13	400.00	1.05240	1.03967	0.90000
'GR400	RANGE SINGLE 433	23066 GK_MEG11	400.00	1.05240	1.03967	0.90000
'GR400	RANGE SINGLE 433	23123 GKPATR11	400.00	1.05175	1.03663	0.90000
'GR400	RANGE SINGLE 433	23125 GKPATC11	400.00	1.05184	1.03661	0.90000
'GR400	RANGE SINGLE 433	23126 GKPATC12	400.00	1.05179	1.03672	0.90000
'GR400	RANGE SINGLE 433	23173 GDISTO11	400.00	1.05247	1.03636	0.90000
'GR400	RANGE SINGLE 433	23174 GDISTO12	400.00	1.05229	1.03649	0.90000
'GR400	RANGE SINGLE 433	23180 GAXELO12	400.00	1.05195	1.03716	0.90000
'GR400	RANGE SINGLE 433	23181 GAXELO11	400.00	1.05202	1.03738	0.90000
'GR400	RANGE SINGLE 462	23036 GK_KOR13	400.00	1.06186	1.01618	0.90000
'GR400	RANGE SINGLE 462	23068 GK_MEG14	400.00	1.05946	1.02818	0.90000
'GR400	RANGE SINGLE 463	23037 GK_KOR14	400.00	1.06186	1.01618	0.90000
'GR400	RANGE SINGLE 463	23067 GK_MEG12	400.00	1.05946	1.02818	0.90000
'GR400	RANGE SINGLE 473	23126 GKPATC12	400.00	1.06698	1.03672	0.90000
'GR400	RANGE SINGLE 473	23180 GAXELO12	400.00	1.06697	1.03716	0.90000
'GR400	RANGE SINGLE 473	23181 GAXELO11	400.00	1.06678	1.03738	0.90000
'GR400	RANGE SINGLE 475	23180 GAXELO12	400.00	1.06642	1.03716	0.90000
'GR400	RANGE SINGLE 475	23181 GAXELO11	400.00	1.06624	1.03738	0.90000
'RO220	RANGE SINGLE 567	28043 RSTUPA2	220.00	0.89317	0.98051	0.90000
'RO220	RANGE SINGLE 637	28855 RMOSTI2	220.00	0.88220	1.04052	0.90000
'RO220	RANGE SINGLE 642	28907 RSTILP2	220.00	0.84379	0.98222	0.90000
'RO220	RANGE SINGLE 670	28095 RVETIS2	220.00	0.89609	1.02130	0.90000
'RS400	RANGE SINGLE 739	34085 JSOMB31	400.00	0.87892	0.99417	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 196	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [0PODG211 400.00] CKT 1
SINGLE 198	: OPEN LINE FROM BUS 116 [XTR_PE21 220.00] TO BUS 36027 [OHPERU21 220.00] CKT 1
SINGLE 707	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1

Table 13.2.14: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario NPP Krsko 2 exports 1080 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

DESIRED		FROM		TO		TO BUS		TO LINE		FROM		TO
X-- AREA --X	GENERATION	LOAD	SHUNT	SHUNT	CHARGING	NET INT	LOSSES	NET INT				
10	1422.1	1723.7	0.0	0.0	0.0	-349.9	48.2	-350.0				
AL	665.3	779.7	-200.0	0.0	466.1	92.0	459.7					
20	9667.4	8411.0	0.0	15.5	0.0	999.5	241.5	1000.0				
BG	3613.9	3357.9	0.0	180.7	3268.1	193.4	3149.9					
30	2950.1	2897.8	0.0	0.0	0.0	-1.0	53.4	0.0				
BA	1056.7	1017.2	0.0	0.0	908.9	280.5	667.9					
35	45060.1	54409.8	0.0	1.1	0.0	-9740.5	389.8	-9740.0				
IT	9609.5	11942.3	0.0	147.7	12392.9	-781.0	10693.4					
40	3430.6	4359.0	0.0	0.0	0.0	-1001.3	73.0	-1000.0				
HR	551.3	1075.9	0.0	0.0	1528.0	204.0	799.4					
45	6094.6	7180.0	0.1	0.0	0.0	-1200.7	115.2	-1200.0				
HU	1376.8	2128.1	178.6	-29.0	2403.9	4.4	1498.6					
50	11553.6	11426.0	0.0	0.0	0.0	-200.1	327.7	-200.0				
GR	3293.0	5724.7	203.8	9.3	6633.9	201.6	3773.9					
55	5230.2	-4356.2	0.0	4.8	0.0	9453.0	128.6	9450.0				
UX	356.0	622.8	0.0	12.7	2299.9	355.3	1665.1					
60	1737.1	2001.9	0.0	0.0	0.0	-300.1	35.2	-300.0				
MK	719.6	752.3	-30.6	0.0	392.8	-22.9	412.3					
65	1207.9	0.0	0.0	0.0	0.0	1200.0	8.0	1200.0				
UA	-159.2	0.0	0.0	0.0	652.2	367.5	125.6					
70	13251.6	12110.2	0.0	90.3	0.0	800.6	250.5	800.0				
RO	3093.5	4455.6	783.9	286.1	5607.3	44.0	3131.1					
75	5038.6	2990.0	0.0	9.6	0.0	1970.1	69.0	1970.0				
SI	1262.5	964.6	0.0	60.8	863.1	155.9	944.3					
80	77662.0	77342.9	0.0	0.0	0.0	-800.0	1119.1	-800.0				
TR	9852.3	11034.0	996.9	0.0	22660.3	-158.6	20640.4					
90	7488.7	8298.8	0.0	17.2	0.0	-1030.8	203.6	-1030.0				
RS	2969.8	2986.6	0.0	72.8	1718.4	-644.3	2273.1					
91	668.0	938.0	0.5	2.1	0.0	-298.6	25.9	-300.0				
ME	333.6	346.6	-34.0	11.2	232.8	12.6	229.9					
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0				
SK	-329.4	0.0	0.0	0.0	40.0	-304.4	14.9					
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	192963.9	189732.9	0.6	140.4	0.0	0.0	3089.8	0.0
	38265.2	47188.4	1898.5	752.4	62068.4	0.0	50479.6	

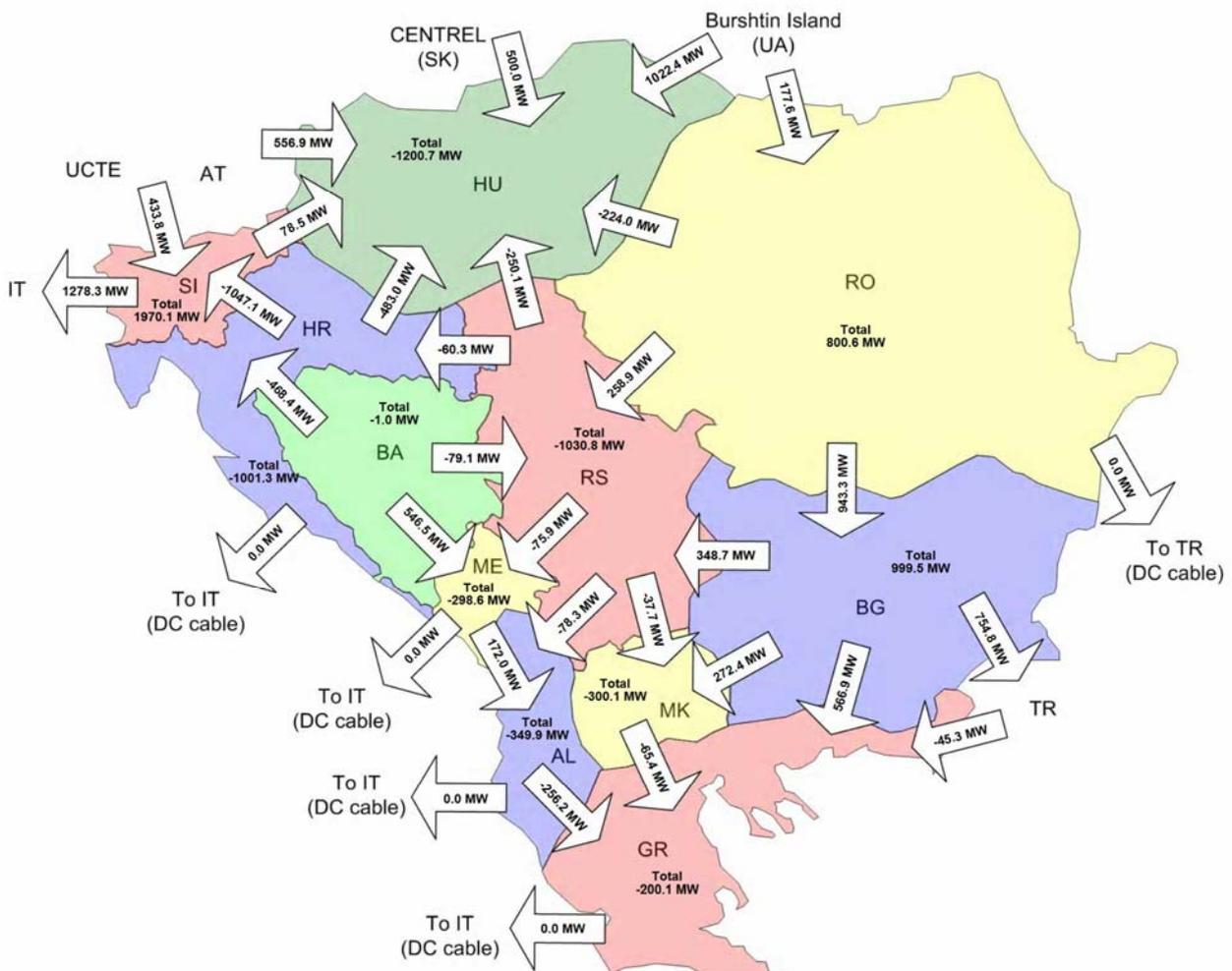


Figure 13.2.4: Aggregated border flows in area of SEE in winter maximum 2020, scenario NPP Krsko 2 exports 1080 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

Table 13.2.15: Changes in power flow in area of SEE in winter maximum 2020, scenario NPP Krsko 2 exports 1080 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
72	[XTU_KR11	400.00]	20147	[HTUMBR11	400.00]	1	427.1	-36.7	206.1	-7.8	-221.0	51.7
72	[XTU_KR11	400.00]	31415	[LKRSKO1	400.00]	1	-427.1	36.7	-206.1	7.8	221.0	51.7
73	[XTU_KR12	400.00]	20147	[HTUMBR11	400.00]	2	427.1	-36.7	206.1	-7.8	-221.0	51.7
73	[XTU_KR12	400.00]	31415	[LKRSKO1	400.00]	2	-427.1	36.7	-206.1	7.8	221.0	51.7
501	[XCI_PI11	400.00]	24076	[MHEVI 4	400.00]	1	78.5	-37.2	-128.0	-4.6	-206.5	263.1
501	[XCI_PI11	400.00]	31435	[LCIRKO11	400.00]	A	-78.5	37.2	128.0	4.6	206.5	263.1
20030	[HERNES11	400.00]	20166	[HZERJA11	400.00]	1	30.4	-76.8	234.8	-88.1	204.4	671.8
20147	[HTUMBR11	400.00]	20166	[HZERJA11	400.00]	1	149.5	-122.7	-90.1	-77.4	-239.5	160.3



26004 [YBITOL52	110.00]	26301 [YBT 2 G1	15.750]	1	20.0	12.7	-189.6	-54.4	-209.6	999.9
30010 [LNEK G2	24.000]	31415 [LKRSK01	400.00]	1	540.0	-18.8	OUT OF SERVICE		-540.0	100.0
30010 [LNEK G2	24.000]	31415 [LKRSK01	400.00]	2	540.0	-18.8	OUT OF SERVICE		-540.0	100.0
31415 [LKRSK01	400.00]	31435 [LCIRK011	400.00]	1	210.5	-125.7	-121.7	-63.2	-332.2	157.8
34040 [JRPMLA1	400.00]	34045 [JSMIT21	400.00]	1	315.7	-22.8	533.3	-23.6	217.5	68.9
34170 [JOBREN2	220.00]	34228 [JTENTA23	220.00]	1	25.2	20.7	-274.1	-68.0	-299.3	999.9
34228 [JTENTA23	220.00]	35023 [JTENTAG3	15.000]	3	25.2	20.9	-274.2	-68.5	-299.4	999.9

Table 13.2.16: Changes in power flow greater than 0 MW through tie-lines in area of interest in winter maximum 2020, scenario NPP Krsko 2 exports 1080 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

X-----	FROM BUS	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%
31049 [LHFORM5	110.00]	329 [XNE_F051	110.00]	1	77.7	-0.1	73.1	0.7	-4.6	5.9	0.8	691.9	
31050 [LILBIS5	110.00]	328 [XMA_IB51	110.00]	1	10.7	-8.7	4.7	-5.8	-6.1	56.5	2.8	32.7	
31067 [LKOPERS	110.00]	327 [XBU_K051	110.00]	1	68.1	18.0	63.0	18.5	-5.1	7.5	0.5	2.9	
31201 [LPDLO2	220.00]	109 [XOB_PO21	220.00]	1	-147.9	-46.3	-164.8	-40.5	-16.8	11.4	5.7	12.4	
31210 [LDIVAC2	220.00]	153 [XPE_DI21	220.00]	1	-44.9	-15.9	-62.6	-13.5	-17.7	39.3	2.4	15.1	
31210 [LDIVAC2	220.00]	156 [XPA_DI21	220.00]	1	131.2	-19.4	141.6	-20.0	10.4	7.9	-0.6	3.3	
31220 [LCIRK02	220.00]	152 [XZE_CI21	220.00]	1	14.7	-9.0	-0.1	-6.4	-14.9	100.9	2.7	29.4	
31405 [LKRROG1	400.00]	503 [XUD_OK11	400.00]	1	344.0	76.8	305.4	87.6	-38.6	11.2	10.8	14.1	
31410 [LDIVAC1	400.00]	71 [XME_DI11	400.00]	1	-103.4	-135.3	-210.3	-123.4	-106.9	103.3	11.8	8.8	
31410 [LDIVAC1	400.00]	80 [XRE_DI11	400.00]	1	516.1	225.9	512.9	237.2	-3.1	0.6	11.3	5.0	
31415 [LKRSK01	400.00]	72 [XTU_KR11	400.00]	1	428.0	-40.2	206.3	-18.8	-221.7	51.8	21.4	53.3	
31415 [LKRSK01	400.00]	73 [XTU_KR12	400.00]	2	428.0	-40.2	206.3	-18.8	-221.7	51.8	21.4	53.3	
31420 [LMARIB1	400.00]	9 [XKA_MA11	400.00]	1	-177.5	21.2	-258.3	42.0	-80.8	45.5	20.7	97.6	
31435 [LCIRK011	400.00]	501 [XCI_P111	400.00]	A	78.6	-58.4	-127.9	-25.2	-206.5	262.8	33.2	56.8	
31435 [LCIRK011	400.00]	502 [XCI_P112	400.00]	B	172.7	-54.4	100.8	-49.3	-71.9	41.6	5.1	9.3	
31445 [LHAVCE1	400.00]	504 [XUD_AV11	400.00]	1	290.2	94.7	263.6	103.5	-26.7	9.2	8.8	9.3	
31450 [LKOZJK1	400.00]	10 [XKA_K011	400.00]	1	-106.3	12.8	-154.8	24.4	-48.5	45.6	11.6	90.2	

Table 13.2.17: Results of contingency (n-1) analysis in winter maximum 2020, scenario NPP Krsko 2 exports 1080 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%	
316 XTR_HN51	110.00	36050*OHN0VI51	110.00 1	BASE CASE	89.6	95.7	108.3
24034*MDUME 2	220.00	24096 MMART 21	220.00 1	SINGLE 367	426.8	502.3	112.2
24094*MMART 4	400.00	24096 MMART 21	220.00 1	SINGLE 367	500.0	511.4	102.3
24034*MDUME 2	220.00	24095 MMART 22	220.00 1	SINGLE 368	426.8	505.9	113.0
24094*MMART 4	400.00	24095 MMART 22	220.00 1	SINGLE 368	500.0	515.0	103.0
24034*MDUME 2	220.00	24096 MMART 21	220.00 1	SINGLE 379	426.8	502.5	112.2
24094*MMART 4	400.00	24096 MMART 21	220.00 1	SINGLE 379	500.0	511.6	102.3
24034*MDUME 2	220.00	24095 MMART 22	220.00 1	SINGLE 380	426.8	506.1	113.1
24094*MMART 4	400.00	24095 MMART 22	220.00 1	SINGLE 380	500.0	515.3	103.1
28040*RL0TRU2	220.00	28366 RSIBIU2	220.00 1	SINGLE 621	333.4	393.1	112.2
28040*RL0TRU2	220.00	28100 RSIBIU21	220.00 1	SINGLE 622	333.4	393.1	112.2
28040*RL0TRU2	220.00	28366 RSIBIU2	220.00 1	SINGLE 719	333.4	392.8	111.6
28040*RL0TRU2	220.00	28100 RSIBIU21	220.00 1	SINGLE 720	333.4	392.8	111.6
34100*JBGD172	220.00	34111 JBGD8 22	220.00 2	SINGLE 819	445.8	467.0	105.9
34100*JBGD172	220.00	34111 JBGD8 22	220.00 1	SINGLE 820	445.8	467.0	105.9

MONITORED VOLTAGE REPORT:	SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
'HU220	'	RANGE BASE CASE	24025 MDETK 2	220.00	1.05000	1.05000	0.90000
'BG220	'	RANGE SINGLE 134	12286 VUZUND2	220.00	0.88721	1.00930	0.90000
'BG220	'	RANGE SINGLE 136	12282 VORFEJ2	220.00	1.10494	1.04215	1.10000
'HU220	'	RANGE SINGLE 356	24005 MALBF 22	220.00	0.89275	1.04262	1.05000
'HU220	'	RANGE SINGLE 357	24006 MALBF 21	220.00	0.89461	1.04267	1.05000
'HU220	'	RANGE SINGLE 367	24095 MMART 22	220.00	1.06794	1.04965	1.05000
'HU220	'	RANGE SINGLE 368	24096 MMART 21	220.00	1.06789	1.04963	1.05000
'RO220	'	RANGE SINGLE 691	28855 RMOSTI2	220.00	0.82221	1.01514	1.10000
'RS400	'	RANGE SINGLE 796	34085 JSOMB31	400.00	0.86080	0.98876	1.05000
'RS220	'	RANGE SINGLE 844	34200 JSABA32	220.00	0.88359	1.01369	1.10000

CONTINGENCY LEGEND:	LABEL	EVENTS
SINGLE 367	:	OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 368	:	OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 379	:	OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 380	:	OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 621	:	OPEN LINE FROM BUS 28040 [RL0TRU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	:	OPEN LINE FROM BUS 28040 [RL0TRU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 719	:	OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	:	OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 819	:	OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 820	:	OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2

### 13.3. Impact of the Kozjak PSHPP construction on SEE transmission system

#### 13.3.1. Export from PSHPP Kozjak to Italy

Table 13.3.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario PSHPP Kozjak exports 440 MW to Italy

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	AL		1338.4 476.1	1491.9 689.7	0.0 -199.8	0.0 0.0	0.0 458.9	-200.0 27.5	46.5 417.6	-200.0
20	BG		8805.4 2902.4	7603.7 3045.8	0.0 -44.9	14.4 120.9	0.0 2996.2	1000.0 320.8	187.2 2455.9	1000.0
30	BA		3147.7 700.8	2610.1 724.5	0.0 0.0	0.0 0.0	0.0 911.0	490.0 323.6	47.6 563.7	490.0
35	IT		39838.6 7206.3	49222.0 10816.5	0.0 0.0	1.1 -156.9	0.0 12557.6	-9840.0 -536.9	455.5 9641.3	-9840.0
40	HR		3100.9 376.6	3483.0 1074.2	0.0 0.0	0.0 0.0	0.0 1406.6	-435.0 21.3	52.9 687.7	-435.0
45	HU		5391.4 954.6	6500.0 1926.6	0.1 178.2	0.0 -29.6	0.0 2424.2	-1200.0 92.9	91.3 1210.8	-1200.0
50	GR		10298.1 2144.7	10371.1 5312.0	0.0 170.2	0.0 9.3	0.0 6613.0	-350.0 112.0	277.0 3140.4	-350.0
55	UX		4401.6 64.8	-4593.5 637.5	0.0 0.0	4.8 12.7	0.0 2316.7	8886.0 384.5	104.3 1346.8	8886.0
60	MK		1501.6 453.3	1577.0 573.6	0.0 -31.4	0.0 0.0	0.0 403.6	-100.0 49.4	24.6 265.2	-100.0
65	UA		1207.1 -196.4	0.0 0.0	0.0 0.0	0.0 0.0	0.0 653.8	1200.0 345.5	7.1 111.9	1200.0
70	RO		10254.0 2511.3	9416.9 4075.6	0.0 512.9	88.4 273.9	0.0 4616.8	545.0 -233.6	203.7 2499.3	545.0
75	SI		3440.9 1075.3	2514.0 811.0	0.0 0.0	8.8 53.9	0.0 607.1	864.0 168.4	54.1 649.2	864.0
80	TR		54592.8 4578.6	54622.1 7792.0	0.0 1175.4	0.0 0.0	0.0 17195.6	-800.0 -131.6	770.7 12938.3	-800.0
90	RS		7713.3 2620.6	7871.1 2853.5	0.0 0.0	17.8 76.6	0.0 1729.8	-360.0 -643.0	184.5 2063.3	-360.0
91	ME		628.5 298.2	805.2 299.2	0.5 -35.0	1.9 10.9	0.0 239.5	-200.0 60.7	20.9 201.9	-200.0
95	SK		501.4 -385.8	0.0 0.0	0.0 0.0	0.0 0.0	0.0 40.0	500.0 -361.6	1.4 15.9	500.0
101	XX (IT-GR)		0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0

102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	156161.7	153494.7	0.6	137.2	0.0	0.0	2529.3	0.0
	25781.5	40631.6	1725.5	371.8	55170.5	0.0	38209.2	

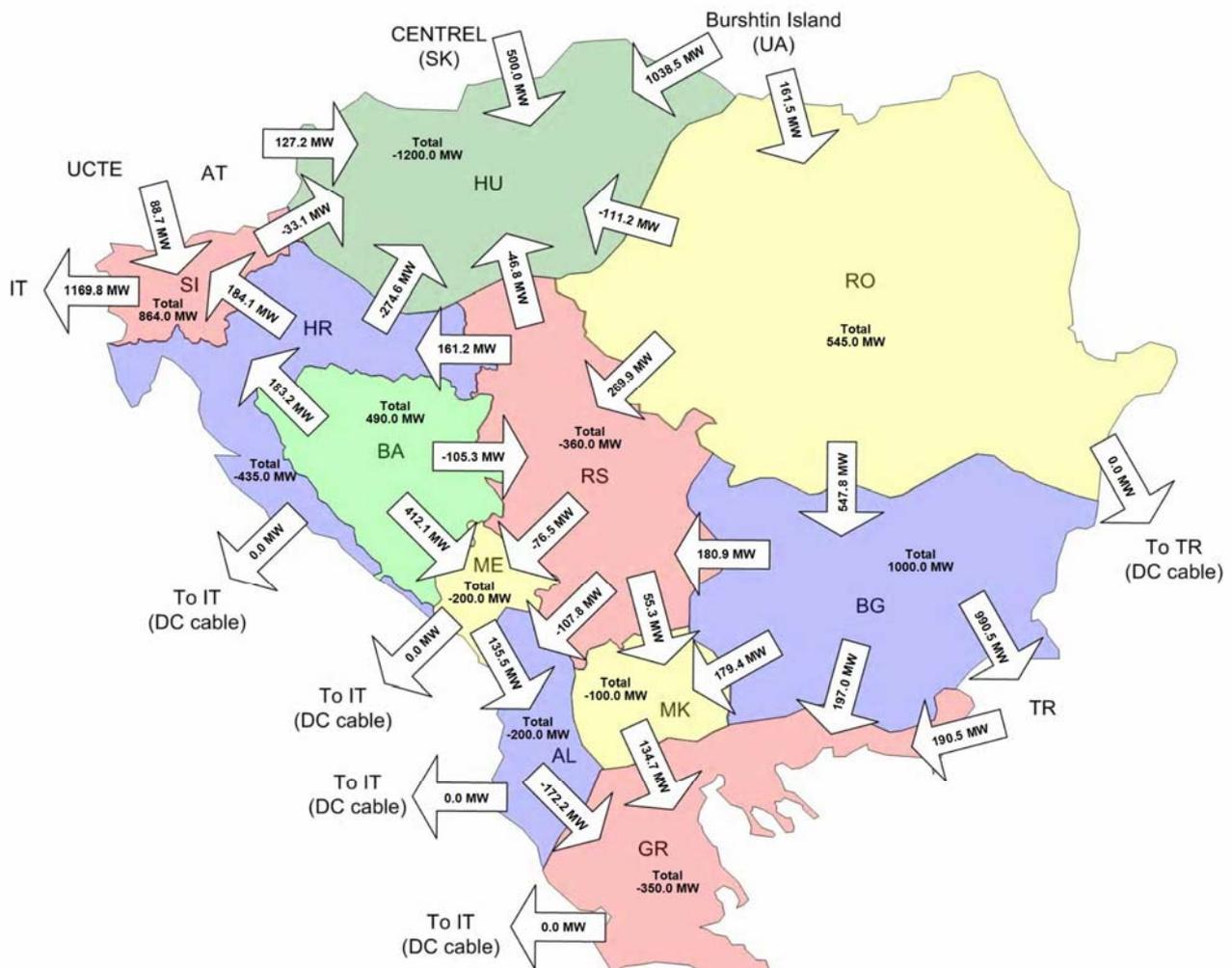


Figure 13.3.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario PSHP Kozjak exports 440 MW to Italy

Table 13.3.2: Changes in power flow in area of SEE in winter maximum 2015, scenario PSHP Kozjak exports 440 MW to Italy

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
9	[XKA_MA11	400.00]	31420	[LMARIB1	400.00]	1	-32.9	-50.8	83.0	-45.4	115.8	352.2
9	[XKA_MA11	400.00]	50004	[OKAINA1	400.00]	1	32.9	50.8	-83.0	45.4	-115.8	352.2



'GR400	'	RANGE SINGLE 432	23181	GAXELO11	400.00	1.05234	1.03898	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23064	GK_MEG13	400.00	1.05388	1.04119	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23066	GK_MEG11	400.00	1.05388	1.04119	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23123	GKPATR11	400.00	1.05332	1.03822	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23125	GKPATC11	400.00	1.05341	1.03820	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23126	GKPATC12	400.00	1.05335	1.03831	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23173	GDISTO11	400.00	1.05404	1.03795	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23174	GDISTO12	400.00	1.05385	1.03808	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23180	GAXELO12	400.00	1.05353	1.03876	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23181	GAXELO11	400.00	1.05359	1.03898	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23036	GK_KOR13	400.00	1.06328	1.01751	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23068	GK_MEG14	400.00	1.06089	1.02953	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23037	GK_KOR14	400.00	1.06328	1.01751	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23067	GK_MEG12	400.00	1.06089	1.02953	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23126	GKPATC12	400.00	1.06904	1.03831	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23180	GAXELO12	400.00	1.06903	1.03876	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23181	GAXELO11	400.00	1.06884	1.03898	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23180	GAXELO12	400.00	1.06848	1.03876	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23181	GAXELO11	400.00	1.06830	1.03898	1.05000	0.90000
'RO220	'	RANGE SINGLE 567	28043	RSTUPA2	220.00	0.89295	0.98034	1.10000	0.90000
'RO220	'	RANGE SINGLE 637	28855	RMOSTI2	220.00	0.88209	1.04051	1.10000	0.90000
'RO220	'	RANGE SINGLE 642	28907	RSTILP2	220.00	0.84371	0.98216	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28095	RVTIS2	220.00	0.89844	1.02194	1.10000	0.90000
'RS400	'	RANGE SINGLE 739	34085	JSOMB31	400.00	0.87981	0.99511	1.05000	0.90000

CONTINGENCY LEGEND:  
 LABEL           EVENTS

SINGLE 196	:	OPEN LINE FROM BUS 13 [XTR_PG11	400.00]	TO BUS 36005 [0PODG211	400.00]	CKT 1
SINGLE 269	:	OPEN LINE FROM BUS 71 [XME_DI11	400.00]	TO BUS 31410 [LDIVAC1	400.00]	CKT 1
SINGLE 344	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 345	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 356	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 357	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 707	:	OPEN LINE FROM BUS 31410 [LDIVAC1	400.00]	TO BUS 80 [XRE_DI11	400.00]	CKT 1

Table 13.3.5: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario PSHPP Kozjak exports 440 MW to Italy

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1622.1	1723.7	0.0	0.0	0.0	-150.0	48.4	-150.0
AL	668.5	779.7	-204.7	0.0	475.2	99.8	468.9	
20	9659.9	8411.0	0.0	15.5	0.0	1000.0	233.4	1000.0
BG	3519.6	3357.9	0.0	181.2	3279.6	197.8	3062.2	
30	2950.0	2897.8	0.0	0.0	0.0	0.0	52.2	0.0
BA	1004.3	1017.2	0.0	0.0	913.6	241.6	659.1	
35	44628.0	54409.8	0.0	1.1	0.0	-10180.0	397.2	-10180.0
IT	9677.9	11942.3	0.0	147.7	12390.4	-814.2	10792.6	
40	3428.6	4359.0	0.0	0.0	0.0	-1000.0	69.5	-1000.0
HR	514.5	1075.9	0.0	0.0	1533.1	205.2	766.6	
45	6093.0	7180.0	0.1	0.0	0.0	-1200.0	112.8	-1200.0
HU	1350.2	2128.1	178.6	-29.1	2405.9	-1.0	1479.5	
50	11750.1	11426.0	0.0	0.0	0.0	0.0	324.0	0.0
GR	3126.3	5724.7	203.7	9.4	6663.1	125.6	3712.2	
55	5229.0	-4356.2	0.0	4.8	0.0	9449.7	130.7	9450.0
UX	399.2	622.8	0.0	12.7	2298.8	346.8	1715.6	
60	1940.2	2001.9	0.0	0.0	0.0	-100.0	38.2	-100.0
MK	762.9	752.3	-30.9	0.0	397.7	11.4	426.5	
65	1207.6	0.0	0.0	0.0	0.0	1200.0	7.6	1200.0

UA	-165.8	0.0	0.0	0.0	652.4	365.1	121.5	
70	13261.0	12110.2	0.0	90.2	0.0	800.1	260.5	800.0
RO	3117.2	4455.6	783.3	285.8	5601.9	-26.9	3221.2	
75	4396.5	2990.0	0.0	8.9	0.0	1330.0	67.6	1330.0
SI	1345.7	964.6	0.0	53.7	866.7	341.9	852.2	
80	77661.6	77342.9	0.0	0.0	0.0	-800.0	1118.7	-800.0
TR	9834.5	11034.0	996.9	0.0	22660.7	-171.2	20635.5	
90	7767.9	8298.8	0.0	17.3	0.0	-749.9	201.8	-750.0
RS	2893.0	2986.6	0.0	73.4	1732.0	-666.9	2231.9	
91	864.5	938.0	0.5	2.1	0.0	-100.0	23.9	-100.0
ME	349.9	346.6	-34.6	11.4	237.2	51.4	212.2	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-331.6	0.0	0.0	0.0	40.0	-306.5	14.9	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTALS	192961.3	189732.9	0.6	139.9	0.0	0.0	3087.8	0.0
	38066.3	47188.4	1892.4	746.2	62148.3	0.0	50372.8	

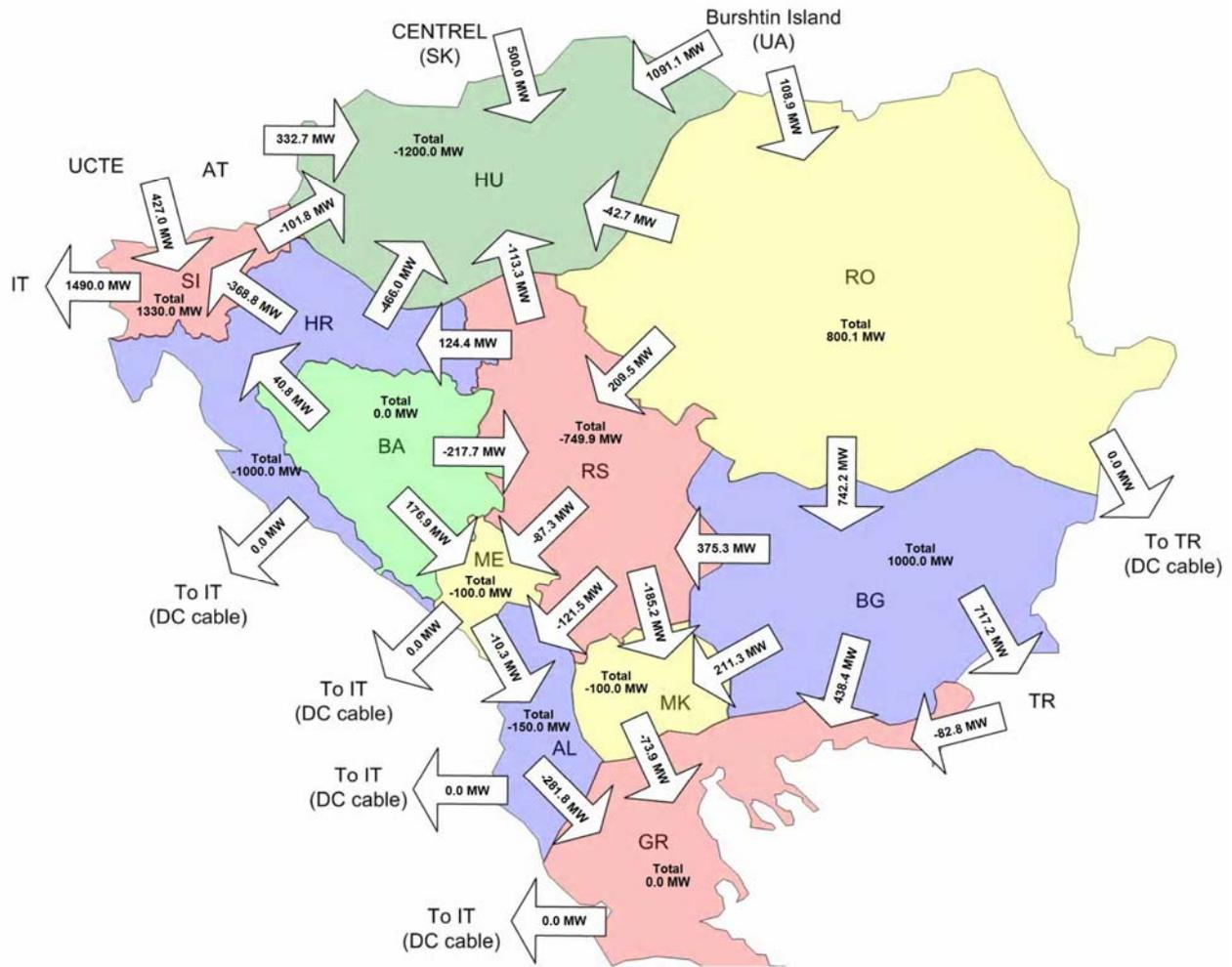


Figure 13.3.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario PSHP Kozjak exports 440 MW to Italy

Table 13.3.6: Changes in power flow in area of SEE in area of SEE in winter maximum 2020, scenario PSHP Kozjak exports 440 MW to Italy

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	
80	[XRE_DI11	400.00]	31410	[LDIVAC1	400.00]	1	-623.8	-235.1	-511.6	-235.9	112.2	18.0
80	[XRE_DI11	400.00]	53357	[IRDPV11	400.00]	1	623.8	235.1	511.6	235.9	-112.2	18.0
30070	[LKOZJAG1	13.800]	31420	[LMARIB1	400.00]	1	220.0	51.3	0.0	0.0	-220.0	100.0
30071	[LKOZJAG2	13.800]	31420	[LMARIB1	400.00]	2	220.0	51.3	0.0	0.0	-220.0	100.0
31420	[LMARIB1	400.00]	31435	[LCIRKO11	400.00]	1	213.2	-4.3	81.3	-24.6	-131.9	61.9
31420	[LMARIB1	400.00]	31435	[LCIRKO11	400.00]	2	229.9	-4.5	87.7	-26.5	-142.2	61.9
52049	[ICRDV111	400.00]	52271	[IVEZV111	400.00]	1	727.8	-95.6	590.2	-74.9	-137.6	18.9
52049	[ICRDV111	400.00]	53122	[II12V111	400.00]	1	1233.6	119.4	1107.6	113.1	-126.0	10.2
52049	[ICRDV111	400.00]	53531	[IUDOV11	400.00]	1	-161.5	-169.7	-44.4	-162.0	117.2	72.5
52059	[IDOLV111	400.00]	52271	[IVEZV111	400.00]	1	-256.2	96.4	-126.0	67.0	130.2	50.8
52059	[IDOLV111	400.00]	52271	[IVEZV111	400.00]	2	-252.0	103.4	-123.3	70.3	128.7	51.1
52060	[IDUGV111	400.00]	52165	[IOSTM111	400.00]	1	-689.8	-329.2	-840.2	-290.8	-150.3	21.8
52060	[IDUGV111	400.00]	53160	[II49V111	400.00]	1	44.4	224.3	168.9	188.3	124.5	280.3
52137	[ILATR111	400.00]	52196	[IRMSR111	400.00]	1	141.5	-13.5	246.3	-8.0	104.9	74.1
52137	[ILATR111	400.00]	52276	[IVLMR111	400.00]	1	147.6	-98.4	292.0	-92.1	144.4	97.8
52137	[ILATR111	400.00]	53121	[II11R111	400.00]	1	423.0	-10.7	-10.4	-7.7	-433.4	102.5
52165	[IOSTM111	400.00]	53431	[ISMDM111	400.00]	1	376.8	-222.1	258.5	-216.1	-118.4	31.4
52179	[IPLNV111	400.00]	52226	[ISLGV111	400.00]	1	663.3	13.3	526.6	11.3	-136.7	20.6
52226	[ISLGV111	400.00]	52271	[IVEZV111	400.00]	1	134.6	-66.6	12.3	-50.3	-122.3	90.8
52231	[ISNGV111	400.00]	53122	[II12V111	400.00]	1	-898.2	104.4	-773.7	70.4	124.5	13.9
52231	[ISNGV111	400.00]	53160	[II49V111	400.00]	1	203.0	-197.3	78.5	-163.3	-124.5	61.3
53120	[II10C111	400.00]	53121	[II11R111	400.00]	1	-423.0	10.0	10.4	6.4	433.4	102.5

Table 13.3.7: Changes in power flow greater than 0 MW through tie-lines in area of interest in winter maximum 2020, scenario PSHP Kozjak exports 440 MW to Italy

X-----	FROM BUS	-----X X-----	TO BUS	-----X CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%	
31049	[LHFORM5	110.00]	329 [XNE_F051	110.00]	1	76.1	0.7	73.1	0.7	-3.0	4.0	0.0	4.8
31050	[LILBIS5	110.00]	328 [XMA_IB51	110.00]	1	3.6	-5.6	4.7	-5.8	1.0	29.0	-0.3	4.9
31067	[LKOPER5	110.00]	327 [XBU_K051	110.00]	1	60.8	19.1	63.0	18.5	2.2	3.6	-0.6	2.9
31201	[LPODLO2	220.00]	109 [XOB_PO21	220.00]	1	-155.7	-42.8	-164.8	-40.5	-9.1	5.8	2.2	5.2
31210	[LDIVAC2	220.00]	153 [XPE_DI21	220.00]	1	-75.0	-12.8	-62.6	-13.5	12.4	16.5	-0.7	5.1
31210	[LDIVAC2	220.00]	156 [XPA_DI21	220.00]	1	160.2	-20.7	141.6	-20.0	-18.6	11.6	0.7	3.5
31220	[LCIRKO2	220.00]	152 [XZE_CI21	220.00]	1	4.2	-6.2	-0.1	-6.4	-4.3	103.1	-0.1	2.2
31405	[LOKROG1	400.00]	503 [XUD_OK11	400.00]	1	384.1	92.4	305.4	87.6	-78.7	20.5	-4.8	5.2
31410	[LDIVAC1	400.00]	71 [XME_DI11	400.00]	1	-247.4	-127.6	-210.3	-123.4	37.1	15.0	4.1	3.2
31410	[LDIVAC1	400.00]	80 [XRE_DI11	400.00]	1	625.6	243.0	512.9	237.2	-112.7	18.0	-5.8	2.4
31415	[LKRSKO1	400.00]	72 [XTU_KR11	400.00]	1	211.0	-19.3	206.3	-18.8	-4.7	2.2	0.5	2.6
31415	[LKRSKO1	400.00]	73 [XTU_KR12	400.00]	2	211.0	-19.3	206.3	-18.8	-4.7	2.2	0.5	2.6
31420	[LMARIB1	400.00]	9 [XKA_MA11	400.00]	1	-168.3	45.6	-258.3	42.0	-90.0	53.5	-3.7	8.1
31435	[LCIRKO11	400.00]	501 [XCI_P111	400.00]	A	-101.7	-24.4	-127.9	-25.2	-26.2	25.7	-0.8	3.4
31435	[LCIRKO11	400.00]	502 [XCI_P112	400.00]	B	127.8	-45.7	100.8	-49.3	-27.0	21.1	-3.6	7.9
31445	[LHAVCE1	400.00]	504 [XUD_AV11	400.00]	1	324.4	104.1	263.6	103.5	-60.8	18.7	-0.6	0.6
31450	[LKOZJK1	400.00]	10 [XKA_KO11	400.00]	1	-100.8	27.5	-154.8	24.4	-54.0	53.5	-3.1	11.3

Table 13.3.8: Results of contingency (n-1) analysis in winter maximum 2020, scenario PSHP Kozjak exports 440 MW to Italy

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%			
10010*	AELBS22	220.00	10125 ACEKIN2	220.00	1	SINGLE 19	370.0	386.3	102.9
10009*	AELBS12	220.00	10125 ACEKIN2	220.00	1	SINGLE 22	370.0	384.3	102.6
316	XTR_HN51	110.00	36050*OHNOVI51	110.00	1	SINGLE 207	89.6	95.6	108.0
24034*	MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE 367	426.8	517.2	115.5
24094*	MMART 4	400.00	24096 MMART 21	220.00	1	SINGLE 367	500.0	526.5	105.3
24034*	MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE 368	426.8	520.9	116.4
24094*	MMART 4	400.00	24095 MMART 22	220.00	1	SINGLE 368	500.0	530.3	106.1
24034*	MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE 379	426.8	517.4	115.6
24094*	MMART 4	400.00	24096 MMART 21	220.00	1	SINGLE 379	500.0	526.7	105.3
24034*	MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE 380	426.8	521.2	116.4
24094*	MMART 4	400.00	24095 MMART 22	220.00	1	SINGLE 380	500.0	530.5	106.1
28040*	RLOTRU2	220.00	28366 RSIBIU2	220.00	1	SINGLE 621	333.4	393.1	112.2
28040*	RLOTRU2	220.00	28100 RSIBIU21	220.00	1	SINGLE 622	333.4	393.1	112.2
8040*	RLOTRU2	220.00	28366 RSIBIU2	220.00	1	SINGLE 719	333.4	392.8	111.6
28040*	RLOTRU2	220.00	28100 RSIBIU21	220.00	1	SINGLE 720	333.4	392.8	111.6
34100*	JBGD172	220.00	34111 JBGD8 22	220.00	2	SINGLE 819	445.8	466.9	105.6
34100*	JBGD172	220.00	34111 JBGD8 22	220.00	1	SINGLE 820	445.8	466.9	105.6

MONITORED VOLTAGE REPORT:	SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN	
'HU220	'	RANGE BASE CASE	24025 MDETK 2	220.00	1.05000	1.05000	1.05000	0.90000
'BG400	'	RANGE SINGLE 80	12473 VMI3 12	400.00	1.05024	1.03248	1.05000	0.90000
'BG220	'	RANGE SINGLE 134	12286 VUZUND2	220.00	0.88898	1.01045	1.10000	0.90000
'BG220	'	RANGE SINGLE 136	12282 VORFEJ2	220.00	1.10518	1.04423	1.10000	0.90000
'HR400	'	RANGE SINGLE 291	20260 HTEFLO	400.00	1.05282	1.03944	1.05000	0.90000
'HU220	'	RANGE SINGLE 356	24005 MALBF 22	220.00	0.89275	1.04262	1.05000	0.90000
'HU220	'	RANGE SINGLE 357	24006 MALBF 21	220.00	0.89461	1.04267	1.05000	0.90000
'HU220	'	RANGE SINGLE 367	24095 MMART 22	220.00	1.06781	1.04954	1.05000	0.90000
'HU220	'	RANGE SINGLE 368	24096 MMART 21	220.00	1.06776	1.04951	1.05000	0.90000
'RO220	'	RANGE SINGLE 691	28855 RMOSTI2	220.00	0.82145	1.01448	1.10000	0.90000
'RS400	'	RANGE SINGLE 796	34085 JSOMB31	400.00	0.86321	0.99030	1.05000	0.90000
'RS220	'	RANGE SINGLE 844	34200 JSABA32	220.00	0.88362	1.01945	1.10000	0.90000

CONTINGENCY LEGEND:	LABEL	EVENTS
SINGLE 19	:	OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	:	OPEN LINE FROM BUS 10010 [AELBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 207	:	OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [OPDGD211 400.00] CKT 1
SINGLE 367	:	OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 368	:	OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 379	:	OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 380	:	OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 621	:	OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	:	OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 719	:	OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	:	OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 819	:	OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 820	:	OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2

### 13.3.2. Export from PSHPP Kozjak to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

Table 13.3.9: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario PSHPP Kozjak exports 440 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1288.2	1491.9	0.0	0.0	0.0	-250.0	46.3	-250.0
AL			485.6	689.7	-199.3	0.0	457.3	38.4	414.1	
20			8807.9	7603.7	0.0	14.4	0.0	999.9	189.8	1000.0
BG			2928.8	3045.8	-44.9	120.8	2993.1	316.2	2484.0	
30			3149.6	2610.1	0.0	0.0	0.0	489.9	49.6	490.0
BA			710.4	724.5	0.0	0.0	910.6	329.0	567.5	
35			40265.1	49222.0	0.0	1.1	0.0	-9400.1	442.1	-9400.0
IT			7034.1	10816.5	0.0	-157.0	12570.4	-548.8	9493.7	
40			3098.3	3483.0	0.0	0.0	0.0	-435.0	50.3	-435.0
HR			345.4	1074.2	0.0	0.0	1410.6	18.0	663.8	
45			5391.7	6500.0	0.1	0.0	0.0	-1200.0	91.6	-1200.0
HU			933.1	1926.6	178.1	-29.6	2425.0	70.9	1212.1	
50			10199.4	10371.1	0.0	0.0	0.0	-450.0	278.3	-450.0
GR			2181.2	5312.0	170.0	9.3	6604.3	124.6	3155.8	
55			4398.7	-4593.5	0.0	4.8	0.0	8886.4	100.9	8886.0
UX			-17.2	637.5	0.0	12.8	2323.1	366.5	1289.1	
60			1400.9	1577.0	0.0	0.0	0.0	-200.0	23.9	-200.0
MK			451.4	573.6	-31.3	0.0	403.1	64.6	247.7	
65			1207.3	0.0	0.0	0.0	0.0	1200.0	7.3	1200.0
UA			-193.3	0.0	0.0	0.0	653.8	346.8	113.7	
70			10252.0	9416.9	0.0	88.4	0.0	545.0	201.6	545.0
RO			2506.7	4075.6	512.9	274.0	4618.0	-218.6	2480.7	
75			3435.7	2514.0	0.0	8.9	0.0	864.0	48.8	864.0
SI			1022.5	811.0	0.0	54.2	610.2	167.1	600.4	
80			54593.3	54622.1	0.0	0.0	0.0	-800.0	771.3	-800.0
TR			4587.4	7792.0	1175.4	0.0	17195.4	-129.4	12944.8	
90			7573.1	7871.1	0.0	17.8	0.0	-500.1	184.2	-500.0
RS			2613.9	2853.5	0.0	76.5	1728.5	-625.0	2037.5	
91			581.0	805.2	0.5	1.9	0.0	-250.2	23.5	-250.0
ME			304.1	299.2	-34.7	10.9	238.0	43.9	222.8	
95			501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK			-388.5	0.0	0.0	0.0	40.0	-364.4	16.0	
101			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	156143.3	153494.7	0.6	137.3	0.0	0.0	2510.9	0.0
	25505.7	40631.6	1726.2	371.9	55181.5	0.0	37943.6	



Figure 13.3.3: Aggregated border flows in area of SEE in winter maximum 2015, scenario PSHP Kozjak exports 440 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

Table 13.3.10: Changes in power flow in area of SEE in winter maximum 2015, scenario PSHP Kozjak exports 440 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
501	[XCI_PI11	400.00]	24076	[MHEVI 4	400.00]	1	34.1	-10.3	-68.7	-5.7	-102.8	301.6
501	[XCI_PI11	400.00]	31435	[LCIRKO11	400.00]	A	-34.1	10.3	68.7	5.7	102.8	301.6
26005	[YBITOL1	400.00]	26303	[YBT 2 93	15.750]	2	-93.8	-62.3	-194.2	-52.3	-100.4	107.0
30070	[LKOZJAG1	13.800]	31420	[LMARIB1	400.00]	1	220.0	34.4	0.0	0.0	-220.0	100.0
30071	[LKOZJAG2	13.800]	31420	[LMARIB1	400.00]	2	220.0	34.4	0.0	0.0	-220.0	100.0
31420	[LMARIB1	400.00]	31435	[LCIRKO11	400.00]	1	103.4	-0.2	-41.7	-4.4	-145.1	140.4
31420	[LMARIB1	400.00]	31435	[LCIRKO11	400.00]	2	111.5	-0.2	-45.0	-4.7	-156.5	140.4
34040	[JRPMLA1	400.00]	34045	[JSMIT21	400.00]	1	373.9	-60.8	486.0	-62.6	112.1	30.0



34040 [JRPMLA1	400.00]	34065 [JTENTB11	400.00]	1	-460.7	-105.1	-601.0	-90.6	-140.3	30.5
34065 [JTENTB11	400.00]	35031 [JTENTBG1	21.000]	1	-461.0	-104.0	-601.6	-92.0	-140.6	30.5

Table 13.3.11: Changes in power flow greater than 0 MW through tie-lines in area of interest in winter maximum 2015, scenario PSHP Kozjak exports 440 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%
31049	[LHFORM5	110.00]	329 [XNE_F051	110.00]	1	46.8	1.0	40.0	2.1	-6.7	14.4	1.1	111.3
31050	[LILBIS5	110.00]	328 [XMA_IB51	110.00]	1	-28.1	-0.6	-30.9	0.7	-2.8	10.0	1.3	215.3
31067	[LKOPER5	110.00]	327 [XBU_K051	110.00]	1	-2.7	20.9	-5.1	21.8	-2.4	87.1	0.9	4.1
31201	[LPODLO2	220.00]	109 [XOB_PO21	220.00]	1	-151.9	-40.4	-152.9	-40.4	-1.1	0.7	0.0	0.1
31210	[LDIVAC2	220.00]	153 [XPE_DI21	220.00]	1	-137.2	6.4	-147.3	8.9	-10.1	7.3	2.5	38.3
31210	[LDIVAC2	220.00]	156 [XPA_DI21	220.00]	1	227.7	-38.0	230.8	-39.1	3.1	1.4	-1.1	3.0
31220	[LCIRKO2	220.00]	152 [XZE_CI21	220.00]	1	4.1	-21.3	-9.0	-18.9	-13.1	317.2	2.4	11.4
31410	[LDIVAC1	400.00]	71 [XME_DI11	400.00]	1	-400.0	-32.3	-446.1	-24.1	-46.1	11.5	8.2	25.3
31410	[LDIVAC1	400.00]	80 [XRE_DI11	400.00]	1	717.3	229.7	732.5	225.8	15.2	2.1	-3.9	1.7
31415	[LKRSKO1	400.00]	72 [XTU_KR11	400.00]	1	240.9	-26.9	198.7	-25.2	-42.2	17.5	1.8	6.6
31415	[LKRSKO1	400.00]	73 [XTU_KR12	400.00]	2	240.9	-26.9	198.7	-25.2	-42.2	17.5	1.8	6.6
31420	[LMARIB1	400.00]	9 [XKA_MAI1	400.00]	1	-11.4	33.8	-82.9	29.6	-71.6	630.4	-4.2	12.5
31435	[LCIRKO11	400.00]	501 [XCI_P111	400.00]	A	34.1	-32.6	-68.7	-27.6	-102.8	301.4	5.0	15.5
31435	[LCIRKO11	400.00]	502 [XCI_P112	400.00]	B	98.8	-25.3	27.5	-23.6	-71.3	72.2	1.8	6.9
31450	[LKOZJK1	400.00]	10 [XKA_KO11	400.00]	1	-6.8	21.1	-49.7	18.4	-42.9	629.8	-2.7	12.8

Table 13.3.12: Results of contingency (n-1) analysis in winter maximum 2015, scenario PSHP Kozjak exports 440 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

<-----	MONITORED BRANCH	>-----	CONTINGENCY	RATING	FLOW	%
316*XTR_HN51	110.00	36050 OHNOVI51	110.00 1 SINGLE 196	89.6	104.1	118.7
316*XTR_HN51	110.00	36050 OHNOVI51	110.00 1 SINGLE 198	89.6	88.5	100.2
31210*LDIVAC2	220.00	156 XPA_DI21	220.00 1 SINGLE 707	320.1	541.3	163.5

MONITORED VOLTAGE REPORT:		CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
'HU220	'	RANGE BASE CASE	24025 MDETK 2	220.00	1.05000	1.05000	0.90000
'HU220	'	RANGE BASE CASE	24068 MGYOR 2	220.00	1.05775	1.05775	0.90000
'HU220	'	RANGE BASE CASE	24095 MMART 22	220.00	1.05077	1.05077	0.90000
'HU220	'	RANGE BASE CASE	24096 MMART 21	220.00	1.05072	1.05072	0.90000
'BG220	'	RANGE SINGLE 100	12252 VOCHIF2	220.00	0.81846	0.95848	1.10000
'BG220	'	RANGE SINGLE 124	12286 VUZUND2	220.00	0.89554	1.00434	0.90000
'GR400	'	RANGE SINGLE 432	22759 GTH_AGL1	400.00	1.05143	1.02450	0.90000
'GR400	'	RANGE SINGLE 432	23123 GKPATR11	400.00	1.05143	1.03733	0.90000
'GR400	'	RANGE SINGLE 432	23125 GKPATC11	400.00	1.05152	1.03731	0.90000
'GR400	'	RANGE SINGLE 432	23126 GKPATC12	400.00	1.05146	1.03742	0.90000
'GR400	'	RANGE SINGLE 432	23173 GDISTO11	400.00	1.05237	1.03708	0.90000
'GR400	'	RANGE SINGLE 432	23174 GDISTO12	400.00	1.05199	1.03720	0.90000
'GR400	'	RANGE SINGLE 432	23180 GAXELO12	400.00	1.05162	1.03786	0.90000
'GR400	'	RANGE SINGLE 432	23181 GAXELO11	400.00	1.05156	1.03805	0.90000
'GR400	'	RANGE SINGLE 433	23064 GK_MEG13	400.00	1.05296	1.04037	0.90000
'GR400	'	RANGE SINGLE 433	23066 GK_MEG11	400.00	1.05296	1.04037	0.90000
'GR400	'	RANGE SINGLE 433	23123 GKPATR11	400.00	1.05232	1.03733	0.90000
'GR400	'	RANGE SINGLE 433	23125 GKPATC11	400.00	1.05241	1.03731	0.90000
'GR400	'	RANGE SINGLE 433	23126 GKPATC12	400.00	1.05236	1.03742	0.90000
'GR400	'	RANGE SINGLE 433	23173 GDISTO11	400.00	1.05304	1.03708	0.90000
'GR400	'	RANGE SINGLE 433	23174 GDISTO12	400.00	1.05286	1.03720	0.90000
'GR400	'	RANGE SINGLE 433	23180 GAXELO12	400.00	1.05253	1.03786	0.90000
'GR400	'	RANGE SINGLE 433	23181 GAXELO11	400.00	1.05257	1.03805	0.90000
'GR400	'	RANGE SINGLE 462	23036 GK_KOR13	400.00	1.06255	1.01687	0.90000
'GR400	'	RANGE SINGLE 462	23068 GK_MEG14	400.00	1.06015	1.02887	0.90000
'GR400	'	RANGE SINGLE 463	23037 GK_KOR14	400.00	1.06255	1.01687	0.90000
'GR400	'	RANGE SINGLE 463	23067 GK_MEG12	400.00	1.06015	1.02887	0.90000
'GR400	'	RANGE SINGLE 473	23126 GKPATC12	400.00	1.06735	1.03742	0.90000
'GR400	'	RANGE SINGLE 473	23180 GAXELO12	400.00	1.06735	1.03786	0.90000
'GR400	'	RANGE SINGLE 473	23181 GAXELO11	400.00	1.06716	1.03805	0.90000
'GR400	'	RANGE SINGLE 475	23180 GAXELO12	400.00	1.06680	1.03786	0.90000
'GR400	'	RANGE SINGLE 475	23181 GAXELO11	400.00	1.06661	1.03805	0.90000
'RO220	'	RANGE SINGLE 567	28043 RSTUPA2	220.00	0.89336	0.98066	1.10000
'RO220	'	RANGE SINGLE 637	28855 RMOSTI2	220.00	0.88227	1.04063	0.90000
'RO220	'	RANGE SINGLE 642	28907 RSTILP2	220.00	0.84391	0.98230	1.10000
'RO220	'	RANGE SINGLE 670	28095 RVETIS2	220.00	0.89809	1.02200	1.10000
'RS400	'	RANGE SINGLE 739	34085 JSOMB31	400.00	0.88071	0.99566	0.90000

CONTINGENCY LEGEND:	
LABEL	EVENTS
SINGLE 196	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [0PODG211 400.00] CKT 1
SINGLE 198	: OPEN LINE FROM BUS 116 [XTR_PE21 220.00] TO BUS 36027 [0HPERU21 220.00] CKT 1
SINGLE 707	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1

Table 13.3.13: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario PSHP Kozjak exports 440 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	AL		1522.3 698.3	1723.7 779.7	0.0 -204.1	0.0 0.0	0.0 473.8	-249.9 110.1	48.6 486.4	-250.0
20	BG		9664.7 3550.2	8411.0 3357.9	0.0 0.0	15.5 181.0	0.0 3276.1	1001.3 188.2	236.9 3099.2	1000.0
30	BA		2949.7 1007.5	2897.8 1017.2	0.0 0.0	0.0 0.0	0.0 913.7	0.1 248.8	51.7 655.2	0.0
35	IT		45060.8 9579.9	54409.8 11942.3	0.0 0.0	1.1 147.8	0.0 12394.6	-9740.7 -818.8	390.6 10703.3	-9740.0
40	HR		3426.9 491.1	4359.0 1075.9	0.0 0.0	0.0 0.0	0.0 1537.5	-999.9 201.1	67.8 751.6	-1000.0
45	HU		6092.6 1335.1	7180.0 2128.1	0.1 178.7	0.0 -29.1	0.0 2407.4	-1200.3 -13.3	112.9 1478.1	-1200.0
50	GR		11653.2 3179.4	11426.0 5724.7	0.0 203.5	0.0 9.4	0.0 6653.8	-99.7 132.3	326.9 3749.5	-100.0
55	UX		5222.1 323.6	-4356.2 622.8	0.0 0.0	4.8 12.7	0.0 2304.6	9445.3 322.3	128.2 1670.3	9450.0
60	MK		1838.8 759.0	2001.9 752.3	0.0 -30.9	0.0 0.0	0.0 397.5	-199.8 32.2	36.6 401.6	-200.0
65	UA		1207.6 -166.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 652.4	1199.9 363.6	7.7 122.8	1200.0
70	RO		13259.0 3095.3	12110.2 4455.6	0.0 783.8	90.3 286.1	0.0 5606.3	802.9 -1.2	255.6 3177.3	800.0
75	SI		4392.4 1292.5	2990.0 964.6	0.0 0.0	8.9 54.0	0.0 871.6	1330.1 337.3	63.4 808.2	1330.0
80	TR		77661.8 9840.5	77342.9 11034.0	0.0 996.9	0.0 0.0	0.0 22660.6	-800.0 -167.6	1118.9 20637.8	-800.0
90	RS		7678.7 2884.7	8298.8 2986.6	0.0 0.0	17.3 73.3	0.0 1731.1	-839.1 -661.9	201.8 2217.7	-840.0
91	ME		816.2 356.6	938.0 346.6	0.5 -34.4	2.1 11.4	0.0 236.1	-150.2 39.6	25.8 229.4	-150.0
95	SK		501.3 -337.8	0.0 0.0	0.0 0.0	0.0 0.0	0.0 40.0	500.0 -312.9	1.3 15.1	500.0
101	XX (IT-GR)		0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0
102	XX (IT-HR)		0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0
103	XX (IT-ME)		0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0

104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	192948.2	189732.9	0.6	140.0	0.0	0.0	3074.7	0.0
	37889.7	47188.4	1893.4	746.5	62156.9	0.0	50203.5	

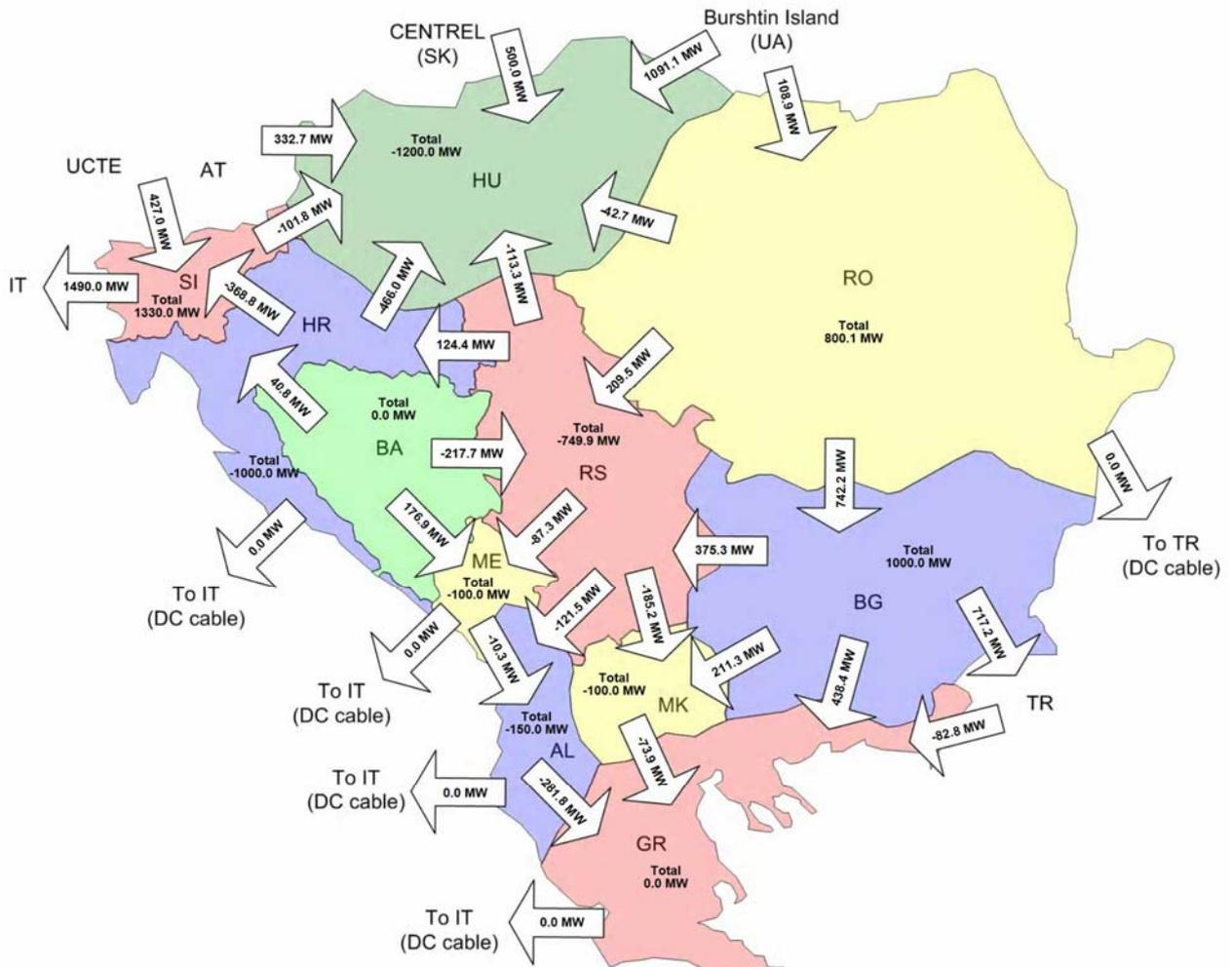


Figure 13.3.4: Aggregated border flows in area of SEE in winter maximum 2020, scenario PSHP Kozjak exports 440 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

Table 13.3.14: Changes in power flow in area of SEE in winter maximum 2020, scenario PSHP Kozjak exports 440 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
10006	[AVDEJA2	220.00]	10521	[AVDEJA9	10.500]	1	79.4	-15.7	-21.0	-20.3	-100.4	126.4
26005	[YBITOL1	400.00]	26303	[YBT 2 G3	15.750]	2	-88.7	-76.2	-189.8	-65.6	-101.1	113.9
30070	[LKOZJAG1	13.800]	31420	[LMARIB1	400.00]	1	220.0	47.6	0.0	0.0	-220.0	100.0
30071	[LKOZJAG2	13.800]	31420	[LMARIB1	400.00]	2	220.0	47.6	0.0	0.0	-220.0	100.0
31420	[LMARIB1	400.00]	31435	[LCIRKO11	400.00]	1	229.7	-9.2	81.3	-24.6	-148.4	64.6
31420	[LMARIB1	400.00]	31435	[LCIRKO11	400.00]	2	247.6	-9.7	87.7	-26.5	-160.0	64.6

Table 13.3.15: Changes in power flow greater then 0 MW through tie-lines in area of interest in winter maximum 2020, scenario PSHPP Kozjak exports 440 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%
31049	[LHFORM5 110.00]	329	[XNE_FO51 110.00]	1		79.4	0.3	73.1	0.7	-6.3	7.9	0.4	122.5
31050	[LILBIS5 110.00]	328	[XMA_IB51 110.00]	1		7.5	-7.1	4.7	-5.8	-2.8	37.5	1.2	17.6
31067	[LKOPER5 110.00]	327	[XBU_KO51 110.00]	1		65.5	17.7	63.0	18.5	-2.6	3.9	0.8	4.7
31201	[LPODLO2 220.00]	109	[XOB_PO21 220.00]	1		-162.3	-41.0	-164.8	-40.5	-2.4	1.5	0.5	1.1
31210	[LDIVAC2 220.00]	153	[XPE_DI21 220.00]	1		-53.4	-15.4	-62.6	-13.5	-9.2	17.3	1.9	12.5
31210	[LDIVAC2 220.00]	156	[XPA_DI21 220.00]	1		134.8	-18.3	141.6	-20.0	6.8	5.0	-1.7	9.2
31220	[LCIRKO2 220.00]	152	[XZE_CI21 220.00]	1		11.7	-7.8	-0.1	-6.4	-11.8	101.1	1.4	18.3
31405	[LOKROG1 400.00]	503	[XUD_OK11 400.00]	1		313.3	90.1	305.4	87.6	-8.0	2.5	-2.5	2.7
31410	[LDIVAC1 400.00]	71	[XME_DI11 400.00]	1		-155.8	-130.5	-210.3	-123.4	-54.5	35.0	7.1	5.4
31410	[LDIVAC1 400.00]	80	[XRE_DI11 400.00]	1		500.6	241.9	512.9	237.2	12.3	2.5	-4.7	1.9
31415	[LKRSKO1 400.00]	72	[XTU_KR11 400.00]	1		246.9	-21.0	206.3	-18.8	-40.6	16.4	2.2	10.4
31415	[LKRSKO1 400.00]	73	[XTU_KR12 400.00]	2		246.9	-21.0	206.3	-18.8	-40.6	16.4	2.2	10.4
31420	[LMARIB1 400.00]	9	[XKA_MA11 400.00]	1		-190.2	46.5	-258.3	42.0	-68.1	35.8	-4.5	9.7
31435	[LCIRKO11 400.00]	501	[XCI_PI11 400.00]	A		-28.4	-30.6	-127.9	-25.2	-99.5	350.9	5.4	17.6
31435	[LCIRKO11 400.00]	502	[XCI_PI12 400.00]	B		168.0	-48.5	100.8	-49.3	-67.2	40.0	-0.8	1.7
31445	[LHAVCE1 400.00]	504	[XUD_AV11 400.00]	1		268.3	105.1	263.6	103.5	-4.7	1.8	-1.6	1.6
31450	[LKOZJK1 400.00]	10	[XKA_KO11 400.00]	1		-114.0	27.8	-154.8	24.4	-40.8	35.8	-3.4	12.3

Table 13.3.16: Results of contingency (n-1) analysis in winter maximum 2020, scenario PSHPP Kozjak exports 440 MW to Montenegro, Albania, Macedonia, Serbia, UNMIK and Greece

<-----	MONITORED BRANCH	>-----	CONTINGENCY	RATING	FLOW	%
10010	*AELBS22 220.00	10125	ACEKIN2 220.00 1 SINGLE 19	370.0	386.6	103.2
10009	*AELBS12 220.00	10125	ACEKIN2 220.00 1 SINGLE 22	370.0	384.6	102.8
316	XTR_HN51 110.00	36050	*OHNOVI51 110.00 1 SINGLE 207	89.6	106.0	120.4
24034	*MDUME 2 220.00	24096	MMART 21 220.00 1 SINGLE 367	426.8	510.5	114.0
24094	*MMART 4 400.00	24096	MMART 21 220.00 1 SINGLE 367	500.0	519.9	104.0
24034	*MDUME 2 220.00	24095	MMART 22 220.00 1 SINGLE 368	426.8	514.2	114.9
24094	*MMART 4 400.00	24095	MMART 22 220.00 1 SINGLE 368	500.0	523.6	104.7
24034	*MDUME 2 220.00	24096	MMART 21 220.00 1 SINGLE 379	426.8	510.6	114.1
24094	*MMART 4 400.00	24096	MMART 21 220.00 1 SINGLE 379	500.0	520.1	104.0
24034	*MDUME 2 220.00	24095	MMART 22 220.00 1 SINGLE 380	426.8	514.4	114.9
24094	*MMART 4 400.00	24095	MMART 22 220.00 1 SINGLE 380	500.0	523.8	104.8
28040	*RLOTU2 220.00	28366	RSIBIU2 220.00 1 SINGLE 621	333.4	393.1	112.2
28040	*RLOTU2 220.00	28100	RSIBIU21 220.00 1 SINGLE 622	333.4	393.1	112.2
28040	*RLOTU2 220.00	28366	RSIBIU2 220.00 1 SINGLE 719	333.4	392.9	111.6
28040	*RLOTU2 220.00	28100	RSIBIU21 220.00 1 SINGLE 720	333.4	392.9	111.6
34100	*JBGD172 220.00	34111	JBGD8 22 220.00 2 SINGLE 819	445.8	466.8	105.5
34100	*JBGD172 220.00	34111	JBGD8 22 220.00 1 SINGLE 820	445.8	466.8	105.5

MONITORED VOLTAGE REPORT:	SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
'HU220	'	RANGE BASE CASE	24025 MDETK 2 220.00	1.05000	1.05000	1.05000	0.90000
'BG220	'	RANGE SINGLE 134	12286 VUZUND2 220.00	0.88841	1.01006	1.10000	0.90000
'BG220	'	RANGE SINGLE 136	12282 VORFEJ2 220.00	1.10512	1.04361	1.10000	0.90000
'HR220	'	RANGE SINGLE 257	20045 HE SENJ 220.00	1.10060	1.08323	1.10000	0.90000
'HR220	'	RANGE SINGLE 258	20008 HBRINJ21 220.00	1.10001	1.07727	1.10000	0.90000
'HR220	'	RANGE SINGLE 258	20045 HE SENJ 220.00	1.10026	1.08323	1.10000	0.90000
'HU220	'	RANGE SINGLE 356	24005 MALBF 22 220.00	0.89275	1.04262	1.05000	0.90000
'HU220	'	RANGE SINGLE 357	24006 MALBF 21 220.00	0.89461	1.04267	1.05000	0.90000
'HU220	'	RANGE SINGLE 367	24095 MMART 22 220.00	1.06827	1.04966	1.05000	0.90000
'HU220	'	RANGE SINGLE 368	24096 MMART 21 220.00	1.06822	1.04963	1.05000	0.90000
'RO220	'	RANGE SINGLE 691	28855 RMOSTI2 220.00	0.82234	1.01490	1.10000	0.90000
'RS400	'	RANGE SINGLE 796	34085 JSOMB31 400.00	0.86403	0.99074	1.05000	0.90000
'RS220	'	RANGE SINGLE 844	34200 JSABA32 220.00	0.88492	1.01993	1.10000	0.90000

CONTINGENCY LEGEND:	LABEL	EVENTS
SINGLE 19	:	OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	:	OPEN LINE FROM BUS 10010 [AELBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 207	:	OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [OPDGT211 400.00] CKT 1
SINGLE 367	:	OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 368	:	OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 379	:	OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 380	:	OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 621	:	OPEN LINE FROM BUS 28040 [RLOTU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	:	OPEN LINE FROM BUS 28040 [RLOTU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 719	:	OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	:	OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 819	:	OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 820	:	OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2

## 13.4. Impact of possible large penetration of Wind power plants

### 13.4.1. Export to Italy, Turkey and CENTREL

Table 13.4.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario WPPs export 4600 MW to Italy, Turkey and CENTREL

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1338.4	1491.9	0.0	0.0	0.0	-200.0	46.5	-200.0
AL			475.0	689.7	-199.8	0.0	458.8	26.6	417.3	
20			10481.0	7603.7	0.0	13.9	0.0	2500.0	363.4	2500.0
BG			3970.1	3045.8	-42.1	116.7	2899.1	45.3	3703.5	
30			3684.2	2610.1	0.0	0.0	0.0	990.0	84.0	990.0
BA			977.9	724.5	0.0	0.0	897.3	230.2	920.4	
35			40251.8	49222.0	0.0	1.1	0.0	-9400.0	428.8	-9400.0
IT			7217.1	10816.5	0.0	-156.7	12562.1	-497.1	9616.4	
40			4165.1	3483.0	0.0	0.0	0.0	565.0	117.1	565.0
HR			910.8	1074.2	0.0	0.0	1360.4	-314.2	1511.3	
45			5435.1	6500.0	0.1	0.0	0.0	-1200.0	134.9	-1200.0
HU			1397.0	1926.6	176.8	-29.6	2399.1	81.8	1640.6	
50			10302.4	10371.1	0.0	0.0	0.0	-350.0	281.3	-350.0
GR			2247.8	5312.0	170.9	9.3	6592.1	138.7	3195.3	
55			1252.4	-4593.5	0.0	4.9	0.0	5785.9	55.1	5786.0
UX			-189.3	637.5	0.0	12.9	2338.1	863.3	635.0	
60			1502.8	1577.0	0.0	0.0	0.0	-100.0	25.8	-100.0
MK			479.7	573.6	-31.2	0.0	400.5	58.4	279.5	
65			1207.1	0.0	0.0	0.0	0.0	1200.0	7.1	1200.0
UA			-144.9	0.0	0.0	0.0	652.6	395.1	112.7	
70			11303.6	9416.9	0.0	86.6	0.0	1545.0	255.0	1545.0
RO			3033.8	4075.6	497.6	269.0	4522.3	-324.6	3038.5	
75			3027.0	2514.0	0.0	8.6	0.0	424.0	80.4	424.0
SI			1253.1	811.0	0.0	52.6	591.0	143.2	837.3	
80			53168.9	54622.1	0.0	0.0	0.0	-2300.0	846.9	-2300.0
TR			5585.9	7792.0	1176.0	0.0	17163.1	7.6	13773.5	
90			8246.4	7871.1	0.0	17.7	0.0	140.0	217.6	140.0
RS			2871.1	2853.5	0.0	76.2	1715.5	-689.6	2346.7	
91			727.5	805.2	0.6	2.0	0.0	-100.0	19.8	-100.0
ME			324.0	299.2	-35.2	11.8	240.0	100.7	187.6	
95			501.2	0.0	0.0	0.0	0.0	500.0	1.2	500.0
SK			-291.3	0.0	0.0	0.0	39.9	-265.3	14.0	
101			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX		(IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	156594.9	153494.7	0.6	134.8	0.0	0.0	2964.8	0.0
	30117.9	40631.6	1713.0	362.1	54832.1	0.0	42229.6	

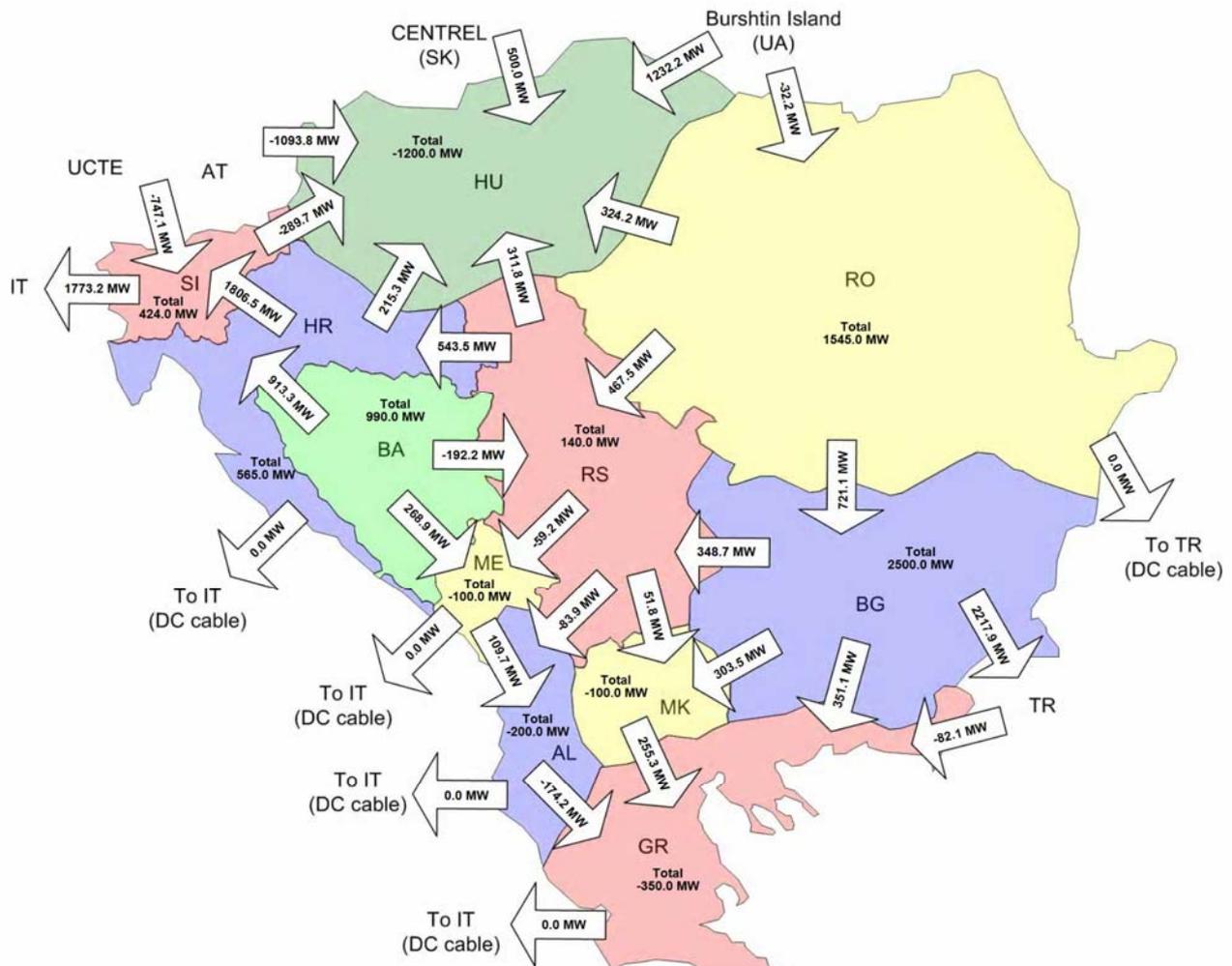


Figure 13.4.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario WPPs export 4600 MW to Italy, Turkey and CENTREL



Table 13.4.4: Results of contingency (n-1) analysis in winter maximum 2015, scenario WPPs export 4600 MW to Italy, Turkey and CENTREL

<----- MONITORED BRANCH ----->				CONTINGENCY	RATING	FLOW	%
328*XMA_IB51	110.00	31050 LILBIS5	110.00	1 BASE CASE	65.0	68.8	102.8
31210*LDIVAC2	220.00	156 XPA_DI21	220.00	1 BASE CASE	320.1	403.9	124.2
12260 VDOBRU2	220.00	12261*VMADAR2	220.00	2 SINGLE 109	360.1	377.3	110.7
12260 VDOBRU2	220.00	12261*VMADAR2	220.00	2 SINGLE 111	360.1	385.2	116.1
197*XMI_BA11	400.00	60037 TBABA21F	400.00	1 SINGLE 147	1431.0	1814.6	134.1
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 234	1053.1	1046.8	101.0
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 235	1053.1	1186.9	115.0
20101 HPEHLI21	220.00	20138*HTEPLO21	220.00	1 SINGLE 252	362.0	369.4	102.0
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 256	1053.1	1046.6	101.0
153*XPE_DI21	220.00	31210 LDIVAC2	220.00	1 SINGLE 264	320.1	326.7	100.8
153*XPE_DI21	220.00	31210 LDIVAC2	220.00	1 SINGLE 265	320.1	325.6	100.4
153*XPE_DI21	220.00	20101 HPEHLI21	220.00	1 SINGLE 269	362.0	514.6	142.3
153*XPE_DI21	220.00	31210 LDIVAC2	220.00	1 SINGLE 269	320.1	514.6	160.9
327*XBU_KO51	110.00	31067 LKOPER5	110.00	1 SINGLE 269	101.0	128.9	126.4
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 272	1053.1	1045.7	101.0
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 278	1053.1	1046.9	101.0
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 279	1053.1	1186.5	115.0
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 291	1053.1	1056.7	102.0
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 292	1053.1	1061.2	102.4
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 294	1053.1	1061.9	102.5
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 295	1053.1	1062.2	102.6
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 301	1053.1	1061.3	102.5
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 316	1053.1	1066.9	103.4
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 318	1053.1	1047.7	101.2
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 321	1053.1	1053.2	101.8
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 324	1053.1	1057.9	102.3
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 329	1053.1	1049.8	101.5
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 332	1053.1	1049.0	101.3
24034*MDUME 2	220.00	24096 MMART 21	220.00	1 SINGLE 344	426.8	514.2	114.9
24094*MMART 4	400.00	24096 MMART 21	220.00	1 SINGLE 344	500.0	522.0	104.4
24034*MDUME 2	220.00	24095 MMART 22	220.00	1 SINGLE 345	426.8	517.9	115.7
24094*MMART 4	400.00	24095 MMART 22	220.00	1 SINGLE 345	500.0	525.8	105.2
24034*MDUME 2	220.00	24096 MMART 21	220.00	1 SINGLE 356	426.8	514.9	115.0
24094*MMART 4	400.00	24096 MMART 21	220.00	1 SINGLE 356	500.0	522.8	104.6
24034*MDUME 2	220.00	24095 MMART 22	220.00	1 SINGLE 357	426.8	518.7	115.9
24094*MMART 4	400.00	24095 MMART 22	220.00	1 SINGLE 357	500.0	526.6	105.3
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 362	1053.1	1047.3	101.1
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 367	1053.1	1049.6	101.4
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 371	1053.1	1045.9	101.0
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 372	1053.1	1050.1	101.4
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 374	1053.1	1091.8	105.9
28023 RFOCSA2	220.00	28076*RBARBO2	220.00	1 SINGLE 544	304.0	318.1	105.8
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 684	1053.1	1136.5	110.9
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 685	1053.1	1112.4	107.7
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 689	1053.1	1162.9	113.0
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 704	1053.1	1113.8	108.0
153*XPE_DI21	220.00	20101 HPEHLI21	220.00	1 SINGLE 707	362.0	447.0	123.2
153*XPE_DI21	220.00	31210 LDIVAC2	220.00	1 SINGLE 707	320.1	447.0	139.4
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 710	1053.1	1054.5	101.9
71*XME_DI11	400.00	31410 LDIVAC1	400.00	1 SINGLE 727	1053.1	1054.9	102.0

MONITORED VOLTAGE REPORT:		CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
SYSTEM							
'HU220	'	RANGE BASE CASE	24025 MDET K 2	220.00	1.05000	1.05000	0.90000
'HU220	'	RANGE BASE CASE	24068 MGYOR 2	220.00	1.05603	1.05603	0.90000
'BG220	'	RANGE SINGLE 100	12252 VOCHIF2	220.00	0.77623	0.93339	1.10000
'BG220	'	RANGE SINGLE 124	12286 VUZUND2	220.00	0.86382	0.97822	1.10000
'HU220	'	RANGE SINGLE 344	24095 MMART 22	220.00	1.06499	1.04910	1.05000
'HU220	'	RANGE SINGLE 345	24096 MMART 21	220.00	1.06496	1.04908	1.05000
'GR400	'	RANGE SINGLE 432	22759 GTH_AG11	400.00	1.05158	1.02459	1.05000
'GR400	'	RANGE SINGLE 432	23123 GKPATR11	400.00	1.05161	1.03752	1.05000
'GR400	'	RANGE SINGLE 432	23125 GKPATC11	400.00	1.05171	1.03750	1.05000
'GR400	'	RANGE SINGLE 432	23126 GKPATC12	400.00	1.05165	1.03761	1.05000
'GR400	'	RANGE SINGLE 432	23173 GDISTO11	400.00	1.05255	1.03725	1.05000
'GR400	'	RANGE SINGLE 432	23174 GDISTO12	400.00	1.05217	1.03738	1.05000
'GR400	'	RANGE SINGLE 432	23180 GAXELO12	400.00	1.05181	1.03805	1.05000
'GR400	'	RANGE SINGLE 432	23181 GAXELO11	400.00	1.05177	1.03827	1.05000
'GR400	'	RANGE SINGLE 433	23064 GK_MEG13	400.00	1.05323	1.04052	1.05000
'GR400	'	RANGE SINGLE 433	23066 GK_MEG11	400.00	1.05323	1.04052	1.05000
'GR400	'	RANGE SINGLE 433	23123 GKPATR11	400.00	1.05264	1.03752	1.05000
'GR400	'	RANGE SINGLE 433	23125 GKPATC11	400.00	1.05273	1.03750	1.05000
'GR400	'	RANGE SINGLE 433	23126 GKPATC12	400.00	1.05267	1.03761	1.05000



'GR400	'	RANGE SINGLE	433	23173	GDISTO11	400.00	1.05336	1.03725	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23174	GDISTO12	400.00	1.05317	1.03738	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23180	GAXELO12	400.00	1.05285	1.03805	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23181	GAXELO11	400.00	1.05291	1.03827	1.05000	0.90000
'GR400	'	RANGE SINGLE	462	23036	GK_KOR13	400.00	1.06266	1.01690	1.05000	0.90000
'GR400	'	RANGE SINGLE	462	23068	GK_MEG14	400.00	1.06026	1.02892	1.05000	0.90000
'GR400	'	RANGE SINGLE	463	23037	GK_KOR14	400.00	1.06266	1.01690	1.05000	0.90000
'GR400	'	RANGE SINGLE	463	23067	GK_MEG12	400.00	1.06026	1.02892	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23126	GKPATC12	400.00	1.06811	1.03761	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23180	GAXELO12	400.00	1.06810	1.03805	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23181	GAXELO11	400.00	1.06791	1.03827	1.05000	0.90000
'GR400	'	RANGE SINGLE	475	23180	GAXELO12	400.00	1.06755	1.03805	1.05000	0.90000
'GR400	'	RANGE SINGLE	475	23181	GAXELO11	400.00	1.06737	1.03827	1.05000	0.90000
'RO220	'	RANGE SINGLE	567	28042	RRIURE2	220.00	0.88993	0.97270	1.10000	0.90000
'RO220	'	RANGE SINGLE	567	28043	RSTUPA2	220.00	0.88128	0.97117	1.10000	0.90000
'RO220	'	RANGE SINGLE	637	28855	RMOSTI2	220.00	0.85692	1.03069	1.10000	0.90000
'RO220	'	RANGE SINGLE	642	28907	RSTILP2	220.00	0.85253	0.97608	1.10000	0.90000
'RO220	'	RANGE SINGLE	670	28093	RBAIA 2	220.00	0.89796	1.01358	1.10000	0.90000
'RO220	'	RANGE SINGLE	670	28094	RROSIO2	220.00	0.89448	1.02563	1.10000	0.90000
'RO220	'	RANGE SINGLE	670	28095	RVETIS2	220.00	0.88545	1.01301	1.10000	0.90000
'RS400	'	RANGE SINGLE	739	34085	JSOMB31	400.00	0.86690	0.98502	1.05000	0.90000
'RS220	'	RANGE SINGLE	785	34200	JSABA32	220.00	0.89248	1.02245	1.10000	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 109	: OPEN LINE FROM BUS 12260 [VDOBRU2 220.00] TO BUS 12263 [VVARNA2 220.00] CKT 1
SINGLE 111	: OPEN LINE FROM BUS 12261 [VMADAR2 220.00] TO BUS 12263 [VVARNA2 220.00] CKT 1
SINGLE 147	: OPEN LINE FROM BUS 198 [XMI_HA11 400.00] TO BUS 60009 [THAMIT1 400.00] CKT 1
SINGLE 234	: OPEN LINE FROM BUS 152 [XZE_CI21 220.00] TO BUS 20165 [HZERJA21 220.00] CKT 1
SINGLE 235	: OPEN LINE FROM BUS 153 [XPE_DI21 220.00] TO BUS 20101 [HPEHLI21 220.00] CKT 1
SINGLE 252	: OPEN LINE FROM BUS 20077 [HMELIN21 220.00] TO BUS 20138 [HTEPLO21 220.00] CKT 1
SINGLE 256	: OPEN LINE FROM BUS 20082 [HMRACL21 220.00] TO BUS 20165 [HZERJA21 220.00] CKT 1
SINGLE 264	: OPEN LINE FROM BUS 20078 [HMELIN11 400.00] TO BUS 20077 [HMELIN21 220.00] CKT 1
SINGLE 265	: OPEN LINE FROM BUS 20078 [HMELIN11 400.00] TO BUS 20077 [HMELIN21 220.00] CKT 2
SINGLE 269	: OPEN LINE FROM BUS 71 [XME_DI11 400.00] TO BUS 31410 [LDIVAC1 400.00] CKT 1
SINGLE 272	: OPEN LINE FROM BUS 74 [XER_SM11 400.00] TO BUS 34045 [JSMIT21 400.00] CKT 1
SINGLE 278	: OPEN LINE FROM BUS 152 [XZE_CI21 220.00] TO BUS 31220 [LCIRKO2 220.00] CKT 1
SINGLE 279	: OPEN LINE FROM BUS 153 [XPE_DI21 220.00] TO BUS 31210 [LDIVAC2 220.00] CKT 1
SINGLE 291	: OPEN LINE FROM BUS 327 [XBU_KO51 110.00] TO BUS 31067 [LKOPER5 110.00] CKT 1
SINGLE 292	: OPEN LINE FROM BUS 328 [XMA_IB51 110.00] TO BUS 31050 [LILBIS5 110.00] CKT 1
SINGLE 294	: OPEN LINE FROM BUS 502 [XCI_PI12 400.00] TO BUS 204 [XZE_HE11 400.00] CKT 1
SINGLE 295	: OPEN LINE FROM BUS 502 [XCI_PI12 400.00] TO BUS 31435 [LCIRKO11 400.00] CKT B
SINGLE 301	: OPEN LINE FROM BUS 20166 [HZERJA11 400.00] TO BUS 204 [XZE_HE11 400.00] CKT 1
SINGLE 316	: OPEN LINE FROM BUS 24067 [MGYOR 4 400.00] TO BUS 24763 [MGONU1 400.00] CKT 1
SINGLE 318	: OPEN LINE FROM BUS 24076 [MHEVI 4 400.00] TO BUS 24182 [MTOPN 4 400.00] CKT 1
SINGLE 321	: OPEN LINE FROM BUS 24087 [MLITR 4 400.00] TO BUS 24122 [MPAKS 4 400.00] CKT 1
SINGLE 324	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24766 [METYEK1 400.00] CKT 1
SINGLE 329	: OPEN LINE FROM BUS 24122 [MPAKS 4 400.00] TO BUS 24182 [MTOPN 4 400.00] CKT 1
SINGLE 332	: OPEN LINE FROM BUS 24765 [MOROE 11 400.00] TO BUS 24766 [METYEK1 400.00] CKT 1
SINGLE 344	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 345	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 356	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 357	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 362	: OPEN LINE FROM BUS 79 [XSA_SU11 400.00] TO BUS 34050 [JSUBO31 400.00] CKT 1
SINGLE 367	: OPEN LINE FROM BUS 196 [XAL_ZA01 750.00] TO BUS 65003 [UZUKRA01 750.00] CKT 1
SINGLE 371	: OPEN LINE FROM BUS 350 [XWI_SZ11 400.00] TO BUS 50010 [OWIEN 1 400.00] CKT 1
SINGLE 372	: OPEN LINE FROM BUS 501 [XCI_PI11 400.00] TO BUS 31435 [LCIRKO11 400.00] CKT A
SINGLE 374	: OPEN LINE FROM BUS 24067 [MGYOR 4 400.00] TO BUS 8 [XWI_GY11 400.00] CKT 1
SINGLE 544	: OPEN LINE FROM BUS 28022 [RSMIRD1 400.00] TO BUS 28024 [RGUTIN1 400.00] CKT 1
SINGLE 684	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 31430 [LBERIC1 400.00] CKT 1
SINGLE 685	: OPEN LINE FROM BUS 31415 [LKRSCO1 400.00] TO BUS 31435 [LCIRKO11 400.00] CKT 1
SINGLE 689	: OPEN LINE FROM BUS 31425 [LPDOL01 400.00] TO BUS 31430 [LBERIC1 400.00] CKT 1
SINGLE 704	: OPEN LINE FROM BUS 31210 [LDIVAC2 220.00] TO BUS 156 [XPA_DI21 220.00] CKT 1
SINGLE 707	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1
SINGLE 710	: OPEN LINE FROM BUS 31420 [LMARIB1 400.00] TO BUS 9 [XKA_MA11 400.00] CKT 1
SINGLE 727	: OPEN LINE FROM BUS 34025 [JNSAD31 400.00] TO BUS 34050 [JSUBO31 400.00] CKT 1

Table 13.4.5: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario WPPs export 4600 MW to Italy, Turkey and CENTREL

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1622.3	1723.7	0.0	0.0	0.0	-150.0	48.6	-150.0

AL	671.3	779.7	-204.4	0.0	474.3	99.7	470.6	
20	11308.7	8411.0	0.0	14.9	0.0	2500.2	382.6	2500.0
BG	4674.4	3357.9	0.0	175.4	3157.0	-85.7	4383.8	
30	3467.8	2897.8	0.0	0.0	0.0	500.2	69.8	500.0
BA	1195.8	1017.2	0.0	0.0	903.1	234.8	847.0	
35	45051.1	54409.8	0.0	1.1	0.0	-9739.9	380.2	-9740.0
IT	9594.7	11942.3	0.0	147.8	12396.9	-621.0	10522.6	
40	4493.0	4359.0	0.0	0.0	0.0	0.7	133.3	0.0
HR	955.5	1075.9	0.0	0.0	1488.8	-206.3	1574.7	
45	6139.2	7180.0	0.1	0.0	0.0	-1199.3	158.4	-1200.0
HU	1771.6	2128.1	176.5	-29.1	2374.8	-54.2	1925.0	
50	11753.5	11426.0	0.0	0.0	0.0	0.0	327.5	0.0
GR	3275.1	5724.7	204.5	9.3	6642.8	203.0	3762.6	
55	2050.5	-4356.2	0.0	4.8	0.0	6346.1	55.8	6350.0
UX	-259.1	622.8	0.0	12.8	2305.3	714.0	696.5	
60	1941.2	2001.9	0.0	0.0	0.0	-99.9	39.2	-100.0
MK	794.5	752.3	-30.7	0.0	393.3	27.1	437.8	
65	1208.0	0.0	0.0	0.0	0.0	1200.0	7.9	1200.0
UA	-85.9	0.0	0.0	0.0	650.7	438.7	126.1	
70	14347.2	12110.2	0.0	87.6	0.0	1801.2	348.2	1800.0
RO	4227.6	4455.6	753.3	277.7	5439.0	-289.7	4469.6	
75	3969.2	2990.0	0.0	8.7	0.0	890.2	80.3	890.0
SI	1425.2	964.6	0.0	52.7	849.4	310.4	946.9	
80	76103.1	77342.9	0.0	0.0	0.0	-2300.0	1060.2	-2300.0
TR	9361.6	11034.0	999.9	0.0	22696.7	-6.5	20031.0	
90	8300.7	8298.8	0.0	17.1	0.0	-249.6	234.4	-250.0
RS	3278.1	2986.6	0.0	72.6	1706.6	-661.6	2587.1	
91	964.8	938.0	0.5	2.2	0.0	0.0	24.1	0.0
ME	366.2	346.6	-34.7	12.0	237.2	68.8	210.7	
95	501.1	0.0	0.0	0.0	0.0	500.0	1.1	500.0
SK	-198.7	0.0	0.0	0.0	39.8	-171.6	12.8	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTALS	193221.5	189732.9	0.6	136.4	0.0	0.0	3351.4	0.0
	41047.9	47188.4	1864.4	731.1	61755.8	0.0	53005.0	



Figure 13.4.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario WPPs export 4600 MW to Italy, Turkey and CENTREL

Table 13.4.6: Changes in power flow in winter maximum 2020, scenario WPPs export 4600 MW to Italy, Turkey and CENTREL

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
6	[XWE_BR12	400.00]	50009 [OWESTT1	400.00]	1	0.0	0.0	450.0	-9.5	450.0	999.9
7	[XWE_LE11	400.00]	50009 [OWESTT1	400.00]	1	0.0	0.0	450.0	-23.2	450.0	999.9
8	[XWI_GY11	400.00]	24067 [MGYOR 4	400.00]	1	-633.2	69.0	84.1	12.2	717.4	113.3
8	[XWI_GY11	400.00]	50010 [OWIEN 1	400.00]	1	-633.2	-69.0	-84.1	-12.2	-717.4	113.3
9	[XKA_MA11	400.00]	31420 [LMARIB1	400.00]	1	-192.9	14.7	258.7	-53.8	451.6	234.1
9	[XKA_MA11	400.00]	50004 [OKAINA1	400.00]	1	192.9	-14.7	-258.7	53.8	-451.6	234.1
12	[XUG_ER11	400.00]	14402 [TS UGLJEVIK	400.00]	1	-238.3	66.1	73.4	44.3	311.7	130.8
12	[XUG_ER11	400.00]	20030 [HERNES11	400.00]	1	238.3	-66.1	-73.4	-44.3	-311.7	130.8
71	[XME_DI11	400.00]	20078 [HMELIN11	400.00]	1	-810.8	-1.8	-210.7	-110.0	600.1	74.0
71	[XME_DI11	400.00]	31410 [LDIVAC1	400.00]	1	810.8	1.8	210.7	110.0	-600.1	74.0
74	[XER_SM11	400.00]	20030 [HERNES11	400.00]	1	479.1	-93.7	126.3	-64.6	-352.8	73.6
74	[XER_SM11	400.00]	34045 [JSMIT21	400.00]	1	-479.1	93.7	-126.3	64.6	352.8	73.6
79	[XSA_SU11	400.00]	24148 [MSAFA 4	400.00]	1	199.2	-140.0	-111.8	-101.5	-310.9	156.1
79	[XSA_SU11	400.00]	34050 [JSUBO31	400.00]	1	-199.2	140.0	111.8	101.5	310.9	156.1
80	[XRE_DI11	400.00]	31410 [LDIVAC1	400.00]	1	-1040.5	-94.4	-511.6	-235.9	528.8	50.8
80	[XRE_DI11	400.00]	53357 [IRDPV11	400.00]	1	1040.5	94.4	511.6	235.9	-528.8	50.8
197	[XMI_BA11	400.00]	12474 [VMI 1	400.00]	1	-743.8	17.7	-278.0	-36.4	465.7	62.6
197	[XMI_BA11	400.00]	60037 [TBABA21F	400.00]	1	743.8	-17.7	278.0	36.4	-465.7	62.6
198	[XMI_HA11	400.00]	12471 [VMI3 11	400.00]	1	-1076.2	-7.2	-439.0	-79.8	637.2	59.2
198	[XMI_HA11	400.00]	60009 [THAMIT1	400.00]	1	1076.2	7.2	439.0	79.8	-637.2	59.2
215	[XNS_BA11	400.00]	22238 [GK_NSAL1	400.00]	1	-480.0	-17.0	-82.9	-55.0	397.1	82.7
215	[XNS_BA11	400.00]	60007 [TBABA11	400.00]	1	480.0	17.0	82.9	55.0	-397.1	82.7
219	[XBE_OR11	400.00]	24013 [MBEKO 4	400.00]	1	267.0	-34.8	-33.8	24.0	-300.8	112.6
219	[XBE_OR11	400.00]	28009 [RNADAB1B	400.00]	1	-267.0	34.8	33.8	-24.0	300.8	112.6
221	[XLI_CO11	400.00]	50005 [OLLENZ1	400.00]	A	-558.4	-86.0	-1009.3	-29.7	-450.9	80.8





24094*MMART 4	400.00	24096 MMART 21	220.00	1	SINGLE 379	500.0	590.1	118.0
24034*MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE 380	426.8	588.9	131.5
24094*MMART 4	400.00	24095 MMART 22	220.00	1	SINGLE 380	500.0	594.2	118.8
28001 RTANTAL	400.00	28035*RTURC 1G	400.00	2	SINGLE 540	1247.0	1585.2	127.5
28001 RTANTAL	400.00	28035*RTURC 1G	400.00	1	SINGLE 541	1247.0	1585.2	127.5
28040*RLOTRU2	220.00	28366 RSIBIU2	220.00	1	SINGLE 621	333.4	393.4	113.7
28040*RLOTRU2	220.00	28100 RSIBIU21	220.00	1	SINGLE 622	333.4	393.4	113.7
28040*RLOTRU2	220.00	28366 RSIBIU2	220.00	1	SINGLE 719	333.4	393.3	112.9
28040*RLOTRU2	220.00	28100 RSIBIU21	220.00	1	SINGLE 720	333.4	393.3	112.9
31210*LDIVAC2	220.00	156 XPA_DI21	220.00	1	SINGLE 763	320.1	449.5	137.1
34100*JBGD172	220.00	34111 JBGD8 22	220.00	2	SINGLE 819	445.8	467.2	106.3
34100*JBGD172	220.00	34111 JBGD8 22	220.00	1	SINGLE 820	445.8	467.2	106.3

MONITORED VOLTAGE REPORT:

SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
'HU220	RANGE BASE CASE	24025 MDETK 2	220.00	1.05000	1.05000	0.90000
'BG220	RANGE SINGLE 98	12223 VGPP_12	220.00	0.89369	1.00821	0.90000
'BG220	RANGE SINGLE 134	12286 VUZUND2	220.00	0.86108	0.99207	0.90000
'BG220	RANGE SINGLE 136	12282 VORFEJ2	220.00	1.10160	1.02297	0.90000
'HU220	RANGE SINGLE 356	24005 MALBF 22	220.00	0.89275	1.04262	0.90000
'HU220	RANGE SINGLE 357	24006 MALBF 21	220.00	0.89461	1.04267	0.90000
'RO220	RANGE SINGLE 691	28855 RMOSTI2	220.00	0.80099	0.99709	0.90000
'RS400	RANGE SINGLE 796	34085 JSOMB31	400.00	0.84951	0.97964	0.90000
'RS220	RANGE SINGLE 844	34200 JSABA32	220.00	0.87231	1.01418	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 19	: OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	: OPEN LINE FROM BUS 10010 [AELBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 260	: OPEN LINE FROM BUS 20041 [HE ORLOV 220.00] TO BUS 20059 [HKONJS21 220.00] CKT 1
SINGLE 261	: OPEN LINE FROM BUS 20041 [HE ORLOV 220.00] TO BUS 20059 [HKONJS21 220.00] CKT 2
SINGLE 291	: OPEN LINE FROM BUS 71 [XME_DI11 400.00] TO BUS 31410 [LDIVAC1 400.00] CKT 1
SINGLE 291	: OPEN LINE FROM BUS 71 [XME_DI11 400.00] TO BUS 31410 [LDIVAC1 400.00] CKT 1
SINGLE 291	: OPEN LINE FROM BUS 71 [XME_DI11 400.00] TO BUS 31410 [LDIVAC1 400.00] CKT 1
SINGLE 367	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 367	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 368	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 368	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 379	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 379	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 380	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 380	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 621	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 719	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 763	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1
SINGLE 819	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 820	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2

## 13.5. Impact of HVDC link Albania – Italy

### 13.5.1. Export from Bulgaria and Romania to Italy

Table 13.5.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Albania –Italy

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1374.6	1491.9	0.0	0.0	0.0	-200.3	83.0	-200.0
AL			774.0	689.7	-174.6	0.0	408.3	-59.3	726.5	
20			9328.1	7603.7	0.0	14.3	0.0	1500.2	209.8	1500.0
BG			3087.0	3045.8	-44.7	120.2	2975.5	297.4	2643.8	
30			3158.1	2610.1	0.0	0.0	0.0	490.3	57.7	490.0
BA			863.5	724.5	0.0	0.0	899.1	419.6	618.5	
35			39306.0	49222.0	0.0	1.1	0.0	-10399.7	482.7	-10400.0
IT			8031.9	10816.5	0.0	-156.6	12488.6	-241.3	10101.9	
40			3100.2	3483.0	0.0	0.0	0.0	-435.1	52.3	-435.0
HR			410.9	1074.2	0.0	0.0	1403.0	61.8	678.0	
45			5391.5	6500.0	0.1	0.0	0.0	-1200.0	91.4	-1200.0
HU			982.5	1926.6	178.1	-29.6	2423.0	116.0	1214.4	
50			10304.7	10371.1	0.0	0.0	0.0	-349.9	283.5	-350.0
GR			2445.6	5312.0	169.9	9.2	6563.9	288.1	3216.6	
55			4397.0	-4593.5	0.0	4.8	0.0	8885.1	100.6	8886.0
UX			5.5	637.5	0.0	12.8	2319.8	382.4	1292.6	
60			1504.6	1577.0	0.0	0.0	0.0	-100.0	27.6	-100.0
MK			518.3	573.6	-30.5	0.0	396.1	73.8	297.5	
65			1207.0	0.0	0.0	0.0	0.0	1200.0	7.0	1200.0
UA			-196.0	0.0	0.0	0.0	653.8	347.4	110.3	
70			10761.1	9416.9	0.0	88.2	0.0	1044.8	211.2	1045.0
RO			2645.6	4075.6	512.4	273.2	4607.9	-241.8	2634.1	
75			2994.2	2514.0	0.0	8.8	0.0	423.9	47.4	424.0
SI			988.8	811.0	0.0	54.0	608.0	183.5	548.4	
80			54595.6	54622.1	0.0	0.0	0.0	-800.0	773.5	-800.0
TR			4631.4	7792.0	1175.3	0.0	17194.5	-111.6	12970.2	
90			7736.4	7871.1	0.0	17.4	0.0	-359.8	207.5	-360.0
RS			2978.0	2853.5	0.0	75.0	1698.4	-559.0	2307.0	
91			640.0	805.2	0.5	1.8	0.0	-199.6	32.1	-200.0
ME			353.6	299.2	-31.9	10.3	222.2	6.5	291.7	
95			501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK			-383.7	0.0	0.0	0.0	40.0	-359.5	15.8	
101			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX			(IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	

102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	604.0	0.0	0.0	0.0	-604.0	0.0	0.0
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	156300.5	153494.7	0.6	136.5	0.0	0.0	2668.9	0.0
	28136.9	41235.6	1754.0	368.5	54902.2	0.0	39667.3	



Figure 13.5.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Albania–Italy



'AL220	'	RANGE SINGLE	154	10133	ASAUKU2	220.00	0.89649	0.92213	1.10000	0.90000
'GR400	'	RANGE SINGLE	434	22759	GTH_AG11	400.00	1.05024	1.02246	1.05000	0.90000
'GR400	'	RANGE SINGLE	434	23125	GKPATC11	400.00	1.05001	1.03539	1.05000	0.90000
'GR400	'	RANGE SINGLE	434	23173	GDISTO11	400.00	1.05089	1.03514	1.05000	0.90000
'GR400	'	RANGE SINGLE	434	23174	GDISTO12	400.00	1.05049	1.03527	1.05000	0.90000
'GR400	'	RANGE SINGLE	434	23180	GAXELO12	400.00	1.05010	1.03594	1.05000	0.90000
'GR400	'	RANGE SINGLE	434	23181	GAXELO11	400.00	1.05004	1.03615	1.05000	0.90000
'GR400	'	RANGE SINGLE	435	23064	GK_MEG13	400.00	1.05124	1.03850	1.05000	0.90000
'GR400	'	RANGE SINGLE	435	23066	GK_MEG11	400.00	1.05124	1.03850	1.05000	0.90000
'GR400	'	RANGE SINGLE	435	23123	GKPATR11	400.00	1.05057	1.03541	1.05000	0.90000
'GR400	'	RANGE SINGLE	435	23125	GKPATC11	400.00	1.05066	1.03539	1.05000	0.90000
'GR400	'	RANGE SINGLE	435	23126	GKPATC12	400.00	1.05060	1.03550	1.05000	0.90000
'GR400	'	RANGE SINGLE	435	23173	GDISTO11	400.00	1.05128	1.03514	1.05000	0.90000
'GR400	'	RANGE SINGLE	435	23174	GDISTO12	400.00	1.05110	1.03527	1.05000	0.90000
'GR400	'	RANGE SINGLE	435	23180	GAXELO12	400.00	1.05077	1.03594	1.05000	0.90000
'GR400	'	RANGE SINGLE	435	23181	GAXELO11	400.00	1.05082	1.03615	1.05000	0.90000
'GR400	'	RANGE SINGLE	464	23036	GK_KOR13	400.00	1.06077	1.01505	1.05000	0.90000
'GR400	'	RANGE SINGLE	464	23068	GK_MEG14	400.00	1.05838	1.02706	1.05000	0.90000
'GR400	'	RANGE SINGLE	465	23037	GK_KOR14	400.00	1.06077	1.01505	1.05000	0.90000
'GR400	'	RANGE SINGLE	465	23067	GK_MEG12	400.00	1.05838	1.02706	1.05000	0.90000
'GR400	'	RANGE SINGLE	475	23126	GKPATC12	400.00	1.06542	1.03550	1.05000	0.90000
'GR400	'	RANGE SINGLE	475	23180	GAXELO12	400.00	1.06542	1.03594	1.05000	0.90000
'GR400	'	RANGE SINGLE	475	23181	GAXELO11	400.00	1.06523	1.03615	1.05000	0.90000
'GR400	'	RANGE SINGLE	477	23180	GAXELO12	400.00	1.06487	1.03594	1.05000	0.90000
'GR400	'	RANGE SINGLE	477	23181	GAXELO11	400.00	1.06469	1.03615	1.05000	0.90000
'RO220	'	RANGE SINGLE	569	28043	RSTUPA2	220.00	0.89218	0.97973	1.10000	0.90000
'RO220	'	RANGE SINGLE	639	28855	RMOSTI2	220.00	0.88185	1.04046	1.10000	0.90000
'RO220	'	RANGE SINGLE	644	28907	RSTILP2	220.00	0.84339	0.98194	1.10000	0.90000
'RO220	'	RANGE SINGLE	672	28095	RVETIS2	220.00	0.89842	1.02122	1.10000	0.90000
'RS400	'	RANGE SINGLE	741	34085	JSOMB31	400.00	0.87763	0.99395	1.05000	0.90000
'RS220	'	RANGE SINGLE	787	34200	JSABA32	220.00	0.89912	1.02406	1.10000	0.90000
'AL400	'	RANGE SINGLE	835	10011	AELBS21	400.00	0.89778	0.91572	1.05000	0.90000

CONTINGENCY LEGEND:  
LABEL                      EVENTS

SINGLE 200	:	OPEN LINE FROM BUS 116 [XTR_PE21	220.00]	TO BUS 36027 [OHPERU21	220.00]	CKT 1
SINGLE 346	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 347	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 358	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 359	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 564	:	OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 565	:	OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 669	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 670	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 709	:	OPEN LINE FROM BUS 31410 [LDIVAC1	400.00]	TO BUS 80 [XRE_DI11	400.00]	CKT 1

Table 13.5.5: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Albania –Italy

X-- AREA	--X GENERATION	FROM TO	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1653.7	1723.7	0.0	0.0	0.0	-150.0	79.9	-150.0
AL	991.8	779.7	-183.4	0.0	430.0	68.9	756.6	
20	10184.0	8411.0	0.0	15.7	0.0	1500.0	257.2	1500.0
BG	3792.3	3357.9	0.0	182.7	3263.3	211.9	3303.2	
30	2955.0	2897.8	0.0	0.0	0.0	0.0	57.2	0.0
BA	1160.9	1017.2	0.0	0.0	900.6	334.4	709.9	
35	44096.4	54409.8	0.0	1.1	0.0	-10740.0	425.6	-10740.0
IT	10705.8	11942.3	0.0	147.4	12318.1	-504.9	11439.2	
40	3429.7	4359.0	0.0	0.0	0.0	-1000.0	70.7	-1000.0
HR	569.7	1075.9	0.0	0.0	1528.2	246.0	776.1	
45	6094.1	7180.0	0.1	0.0	0.0	-1200.0	113.9	-1200.0
HU	1394.0	2128.1	178.5	-29.1	2402.9	24.7	1494.7	
50	11760.7	11426.0	0.0	0.0	0.0	0.0	334.7	0.0

GR	3472.6	5724.7	204.2	9.3	6618.5	313.3	3825.9	
55	5227.0	-4356.2	0.0	4.8	0.0	9449.6	128.7	9450.0
UX	366.0	622.8	0.0	12.7	2299.0	342.3	1687.2	
60	1945.7	2001.9	0.0	0.0	0.0	-100.0	43.7	-100.0
MK	854.2	752.3	-29.8	0.0	386.8	34.8	482.5	
65	1207.4	0.0	0.0	0.0	0.0	1200.0	7.4	1200.0
UA	-146.5	0.0	0.0	0.0	652.2	385.4	120.3	
70	13766.1	12110.2	0.0	90.5	0.0	1300.1	265.2	1300.0
RO	3174.0	4455.6	781.1	286.5	5581.0	-67.9	3299.7	
75	3950.4	2990.0	0.0	8.9	0.0	890.0	61.5	890.0
SI	1244.5	964.6	0.0	53.7	867.2	342.0	751.4	
80	77662.4	77342.9	0.0	0.0	0.0	-800.0	1119.5	-800.0
TR	9865.3	11034.0	996.9	0.0	22660.1	-151.2	20645.7	
90	7789.7	8298.8	0.0	16.9	0.0	-749.9	224.0	-750.0
RS	3146.4	2986.6	0.0	71.5	1693.2	-676.1	2457.6	
91	874.4	938.0	0.5	2.0	0.0	-100.0	33.9	-100.0
ME	387.5	346.6	-31.8	10.7	220.5	-6.0	288.5	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-322.7	0.0	0.0	0.0	40.0	-297.5	14.7	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	600.0	0.0	0.0	0.0	-600.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTALS	193098.0	189732.9	0.6	139.9	0.0	0.0	3224.6	0.0
	40655.9	47788.4	1915.7	745.3	61861.5	0.0	52053.1	

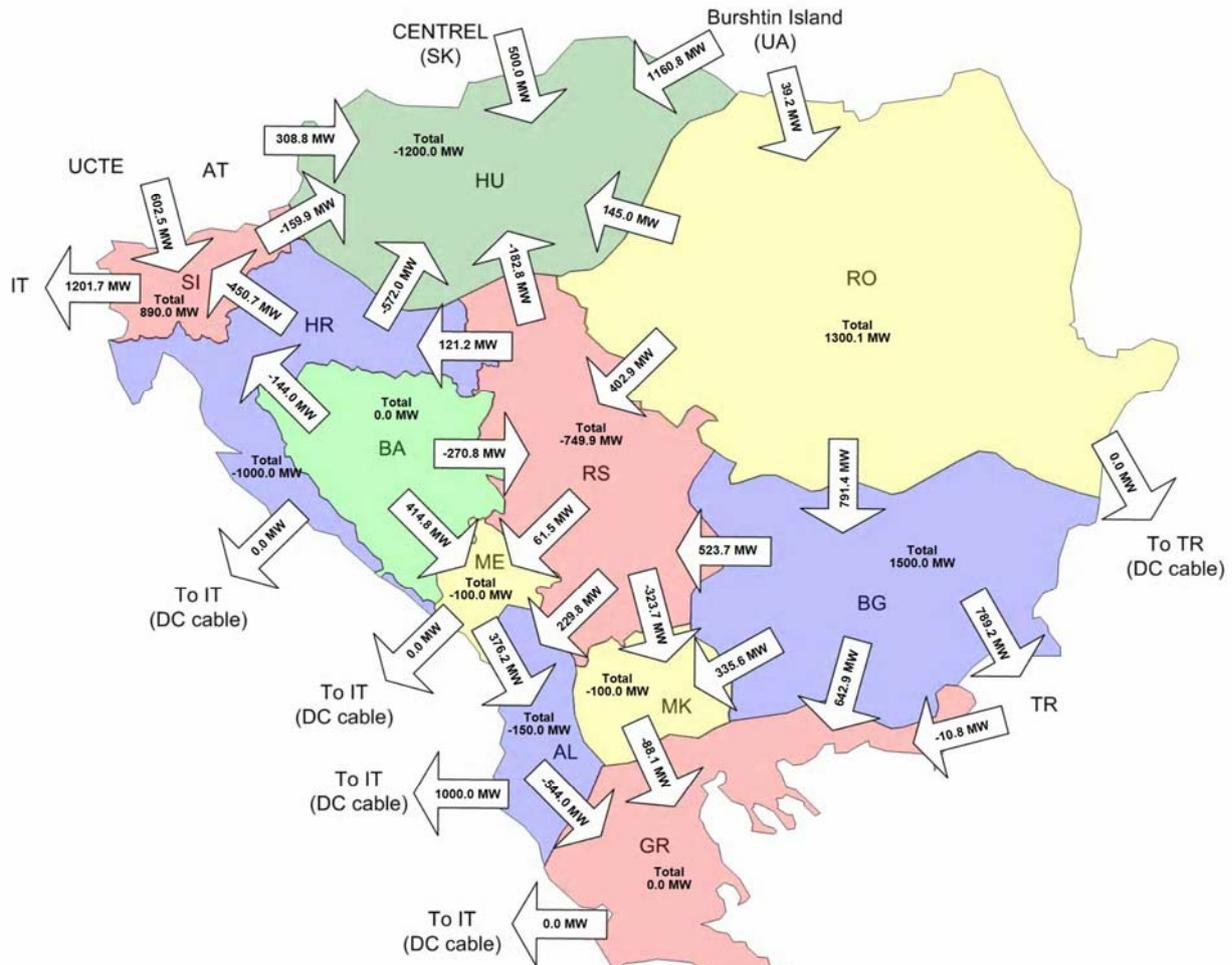


Figure 13.5.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Albania–Italy

Table 13.5.6: Changes in power flow in area of SEE in winter maximum 2020, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Albania–Italy

X-----	FROM BUS	-----X	-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
2	[XZE_KA11	400.00]	10020	[AZEMLA1	400.00]	1	544.0	143.7	281.1	30.6	-262.9	48.3
2	[XZE_KA11	400.00]	22461	[GKARDI11	400.00]	1	-544.0	-143.7	-281.1	-30.6	262.9	48.3
82	[XKA_KC11	400.00]	10015	[AKASHA1	400.00]	1	295.5	59.8	6.5	-49.5	-289.1	97.8
82	[XKA_KC11	400.00]	34073	[JGJAK31	400.00]	1	-295.5	-59.8	-6.5	49.5	289.1	97.8
220	[XKA_PG11	400.00]	10015	[AKASHA1	400.00]	1	324.0	94.2	9.5	-27.0	-314.4	97.1
220	[XKA_PG11	400.00]	36005	[OPODG211	400.00]	1	-324.0	-94.2	-9.5	27.0	314.4	97.1
505	[XDU_F01A	400.00]	10110	[ARASHB1	400.00]	1	-1000.0	-300.0	OUT OF SERVICE		1000.0	100.0
616	[XDU_F01I	400.00]	52085	[IFOGN111	400.00]	1	1000.0	-300.0	OUT OF SERVICE		-1000.0	100.0
10011	[AELBS21	400.00]	10015	[AKASHA1	400.00]	1	387.1	163.4	100.6	51.6	-286.5	74.0
10011	[AELBS21	400.00]	10020	[AZEMLA1	400.00]	1	-441.2	-112.9	-190.7	-59.0	250.5	56.8
10015	[AKASHA1	400.00]	10110	[ARASHB1	400.00]	1	1005.2	345.9	OUT OF SERVICE		-1005.2	100.0
28026	[RTARNI1A	400.00]	28037	[RGADAL1	400.00]	1	498.0	21.0	252.8	62.7	-245.2	49.2
28026	[RTARNI1A	400.00]	29473	[RTARNIG3	15.750]	1	-238.1	112.0	OUT OF SERVICE		238.1	100.0
34020	[JNIS2_1	400.00]	34070	[JTKOSB1	400.00]	1	468.8	23.1	264.2	-39.5	-204.6	43.6
52021	[IBN2N111	400.00]	52182	[IPREN111	400.00]	1	834.8	-16.8	590.1	-19.2	-244.7	29.3
52021	[IBN2N111	400.00]	53182	[II72N111	400.00]	1	-977.5	88.0	-627.3	-1.1	350.3	35.8
52048	[ICPNR111	400.00]	52093	[IGASN111	400.00]	1	-753.3	-1.1	-552.5	-15.6	200.8	26.7
52048	[ICPNR111	400.00]	52137	[ILATR111	400.00]	1	480.7	6.8	279.9	21.3	-200.8	41.8
52085	[IFOGN111	400.00]	52962	[ICDLN111	400.00]	1	-117.4	-123.3	-322.0	-48.1	-204.7	174.3
52085	[IFOGN111	400.00]	53182	[II72N111	400.00]	1	710.3	-17.2	357.1	-6.4	-353.2	49.7
52093	[IGASN111	400.00]	53162	[II52R111	400.00]	1	769.6	57.3	503.1	40.1	-266.5	34.6
52093	[IGASN111	400.00]	53451	[ISPNN111	400.00]	1	-1043.9	-72.1	-829.2	-52.4	214.7	20.6
52137	[ILATR111	400.00]	52276	[IVLMR111	400.00]	1	48.9	-99.4	292.0	-92.1	243.1	497.2
52137	[ILATR111	400.00]	53121	[II11R111	400.00]	1	954.7	-8.0	-10.4	-7.7	-965.2	101.1
52137	[ILATR111	400.00]	53162	[II52R111	400.00]	1	-765.6	-12.8	-501.4	-62.0	264.2	34.5
52229	[ISMNR111	400.00]	52240	[ISSON111	400.00]	1	-566.2	125.4	-358.9	90.4	207.3	36.6



52229 [ISMRN111 400.00]	53451 [ISPNN111 400.00]	1	398.3	-112.9	181.8	-102.0	-216.5	54.4
52962 [ICDLN111 400.00]	53183 [II73N111 400.00]	1	168.4	-0.5	-36.6	25.1	-205.0	121.7
53120 [II10C111 400.00]	53121 [II11R111 400.00]	1	-954.6	10.0	10.4	6.4	965.0	101.1

Table 13.5.7: Changes in power flow greater than 50 MW through tie-lines in area of interest in winter maximum 2020, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Albania–Italy

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%
2	[XZE_KA11 400.00]	22461	[GKARDI11 400.00]	1		-544.0	-143.7	-281.1	-30.6	262.9	48.3	113.1	78.7
82	[XKA_KC11 400.00]	34073	[JGJAK31 400.00]	1		-295.5	-59.8	-6.5	49.5	289.1	97.8	109.4	182.8
87	[XFI_PR21 220.00]	34190	[JPRIZ22 220.00]	1		65.8	65.3	128.7	62.0	62.9	95.6	-3.2	4.9
88	[XVD_PO21 220.00]	36015	[OPODG121 220.00]	1		-52.3	1.4	18.4	-8.2	70.7	135.3	-9.7	677.8
220	[XKA_PG11 400.00]	36005	[OPODG211 400.00]	1		-324.0	-94.2	-9.5	27.0	314.4	97.1	121.3	128.7

Table 13.5.8: Results of contingency (n-1) analysis in winter maximum 2020, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Albania–Italy

<----- MONITORED BRANCH ----->	CONTINGENCY	RATING	FLOW	%
316 XTR_HN51 110.00 36050*OHNOVI51 110.00 1	BASE CASE	89.6	95.4	110.6
10010*AELBS22 220.00 10125 ACEKIN2 220.00 1	SINGLE 20	370.0	399.2	112.8
10009*AELBS12 220.00 10125 ACEKIN2 220.00 1	SINGLE 23	370.0	397.3	112.3
24034*MDUME 2 220.00 24096 MMART 21 220.00 1	SINGLE 369	426.8	525.0	117.3
24094*MMART 4 400.00 24096 MMART 21 220.00 1	SINGLE 369	500.0	534.1	106.8
24034*MDUME 2 220.00 24095 MMART 22 220.00 1	SINGLE 370	426.8	528.8	118.1
24094*MMART 4 400.00 24095 MMART 22 220.00 1	SINGLE 370	500.0	537.9	107.6
24034*MDUME 2 220.00 24096 MMART 21 220.00 1	SINGLE 381	426.8	525.3	117.3
24094*MMART 4 400.00 24096 MMART 21 220.00 1	SINGLE 381	500.0	534.4	106.9
24034*MDUME 2 220.00 24095 MMART 22 220.00 1	SINGLE 382	426.8	529.1	118.2
24094*MMART 4 400.00 24095 MMART 22 220.00 1	SINGLE 382	500.0	538.3	107.7
28040*RLOTRU2 220.00 28366 RSIBIU2 220.00 1	SINGLE 623	333.4	393.1	112.5
28040*RLOTRU2 220.00 28100 RSIBIU21 220.00 1	SINGLE 624	333.4	393.1	112.5
28040*RLOTRU2 220.00 28366 RSIBIU2 220.00 1	SINGLE 721	333.4	392.9	111.8
28040*RLOTRU2 220.00 28100 RSIBIU21 220.00 1	SINGLE 722	333.4	392.9	111.8
34100*JBGD172 220.00 34111 JBGD8 22 220.00 2	SINGLE 821	445.8	467.0	105.9
34100*JBGD172 220.00 34111 JBGD8 22 220.00 1	SINGLE 822	445.8	467.0	105.9

MONITORED VOLTAGE REPORT:	SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
'AL400	'	RANGE BASE CASE	10110 ARASHB1	400.00	0.88280	0.88280	1.05000 0.90000
'HU220	'	RANGE BASE CASE	24025 MDET K 2	220.00	1.05000	1.05000	1.05000 0.90000
'AL400	'	RANGE SINGLE 1	10015 AKASHA1	400.00	0.84249	0.90126	1.05000 0.90000
'BG220	'	RANGE SINGLE 136	12286 VUZUND2	220.00	0.88611	1.00879	1.10000 0.90000
'BG220	'	RANGE SINGLE 138	12282 VORFEJ2	220.00	1.10474	1.03974	1.10000 0.90000
'AL400	'	RANGE SINGLE 165	10015 AKASHA1	400.00	0.87653	0.90126	1.05000 0.90000
'HU220	'	RANGE SINGLE 358	24005 MALBF 22	220.00	0.89275	1.04262	1.05000 0.90000
'HU220	'	RANGE SINGLE 359	24006 MALBF 21	220.00	0.89461	1.04267	1.05000 0.90000
'HU220	'	RANGE SINGLE 369	24095 MMART 22	220.00	1.06716	1.04938	1.05000 0.90000
'HU220	'	RANGE SINGLE 370	24096 MMART 21	220.00	1.06711	1.04936	1.05000 0.90000
'AL400	'	RANGE SINGLE 530	10015 AKASHA1	400.00	0.87872	0.90126	1.05000 0.90000
'AL400	'	RANGE SINGLE 532	10011 AELBS21	400.00	0.88909	0.92284	1.05000 0.90000
'AL400	'	RANGE SINGLE 532	10015 AKASHA1	400.00	0.86563	0.90126	1.05000 0.90000
'RS400	'	RANGE SINGLE 532	34072 JUROS21	400.00	0.89773	0.94793	1.05000 0.90000
'RS400	'	RANGE SINGLE 532	34073 JGJAK31	400.00	0.89821	0.94304	1.05000 0.90000
'RO220	'	RANGE SINGLE 693	28855 RMOSTI2	220.00	0.82043	1.01312	1.10000 0.90000
'AL400	'	RANGE SINGLE 781	10015 AKASHA1	400.00	0.88272	0.90126	1.05000 0.90000
'RS400	'	RANGE SINGLE 798	34085 JSOMB31	400.00	0.86042	0.98871	1.05000 0.90000
'RS220	'	RANGE SINGLE 846	34200 JSABA32	220.00	0.87938	1.01683	1.10000 0.90000
'AL400	'	RANGE SINGLE 897	10015 AKASHA1	400.00	0.88526	0.90126	1.05000 0.90000

CONTINGENCY LEGEND:	LABEL	EVENTS
SINGLE 20	:	OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 23	:	OPEN LINE FROM BUS 10010 [AELBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 369	:	OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 370	:	OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 381	:	OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 382	:	OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 623	:	OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 624	:	OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 721	:	OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 722	:	OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 821	:	OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 822	:	OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2

### 13.5.2. Export from BiH to Italy

Table 13.5.9: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario export of 1000 MW from BiH to Italy via HVDC link Albania – Italy

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1378.7	1491.9	0.0	0.0	0.0	-200.0	86.8	-200.0
AL			797.2	689.7	-171.7	0.0	402.9	-70.0	752.1	
20			8811.0	7603.7	0.0	14.3	0.0	1000.0	192.9	1000.0
BG			3011.5	3045.8	-44.8	120.5	2982.6	352.5	2520.1	
30			4181.9	2610.1	0.0	0.0	0.0	1490.1	81.6	1490.0
BA			1009.6	724.5	0.0	0.0	899.6	323.9	860.8	
35			39279.8	49222.0	0.0	1.1	0.0	-10400.0	456.7	-10400.0
IT			7487.3	10816.5	0.0	-156.7	12525.4	-167.2	9520.2	
40			3101.7	3483.0	0.0	0.0	0.0	-435.0	53.6	-435.0
HR			482.5	1074.2	0.0	0.0	1395.0	110.7	692.7	
45			5393.3	6500.0	0.1	0.0	0.0	-1200.0	93.2	-1200.0
HU			1012.6	1926.6	178.2	-29.5	2420.3	132.6	1225.1	
50			10302.5	10371.1	0.0	0.0	0.0	-350.0	281.4	-350.0
GR			2426.1	5312.0	169.8	9.2	6567.7	295.6	3193.5	
55			5361.0	-4593.5	0.0	4.7	0.0	9785.8	164.0	8886.0
UX			1012.3	637.5	0.0	12.4	2266.8	193.5	2435.6	
60			1502.8	1577.0	0.0	0.0	0.0	-100.0	25.8	-100.0
MK			512.8	573.6	-30.6	0.0	396.9	87.2	279.5	
65			1207.3	0.0	0.0	0.0	0.0	1200.0	7.3	1200.0
UA			-189.9	0.0	0.0	0.0	653.7	349.7	114.0	
70			10252.0	9416.9	0.0	88.3	0.0	545.0	201.7	545.0
RO			2548.3	4075.6	512.6	273.7	4613.7	-183.3	2483.4	
75			3001.7	2514.0	0.0	8.7	0.0	424.0	55.0	424.0
SI			1095.2	811.0	0.0	53.4	600.7	214.4	617.0	
80			54593.8	54622.1	0.0	0.0	0.0	-800.0	771.8	-800.0
TR			4606.3	7792.0	1175.4	0.0	17195.0	-116.8	12950.8	
90			7730.1	7871.1	0.0	17.4	0.0	-360.0	201.6	-360.0
RS			2945.2	2853.5	0.0	74.9	1700.1	-515.1	2232.1	
91			646.9	805.2	0.5	1.8	0.0	-200.0	39.4	-200.0
ME			354.8	299.2	-31.1	10.1	218.1	-57.6	352.3	
95			501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK			-376.1	0.0	0.0	0.0	40.0	-351.7	15.7	
TOTALS			157246.0	154394.7	0.6	136.4	0.0	0.0	2714.4	0.0
			28735.8	41230.0	1757.7	368.1	54878.5	0.0	40244.9	



Figure 13.5.3: Aggregated border flows in area of SEE in winter maximum 2015, scenario export of 1000 MW from BiH to Italy via HVDC link Albania – Italy

Table 13.5.10: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2015, scenario export of 1000 MW from BiH to Italy via HVDC link Albania – Italy

FRMBUS,	FROMBUSNAME,	TOBUS,	TOBUSNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I		
10015,	AKASHA1	400.00,	10110,	ARASHB1	400.00,	1,	1,	1005.33,	347.24,	1063.61,	88.81

Table 13.5.11: Changes in power flow greater than 150 MW in area of SEE in winter maximum 2015, scenario export of 1000 MW from BiH to Italy via HVDC link Albania – Italy

BRANCHES WITH FROM OR TO END MW FLOWS DIFFERING BY MORE THAN 150.0 MW:												
IN WORKING CASE				IN BASE CASE								
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
2	[XZE_KA11	400.00]	10020	[AZEMLA1	400.00]	1	360.9	202.5	171.2	55.3	-189.7	52.6
2	[XZE_KA11	400.00]	22461	[GKARDI11	400.00]	1	-360.9	-202.5	-171.2	-55.3	189.7	52.6
13	[XTR_PG11	400.00]	14405	[WTREBI1	400.00]	1	-601.0	-148.9	-279.0	-80.8	322.0	53.6
13	[XTR_PG11	400.00]	36005	[OPODG211	400.00]	1	601.0	148.9	279.0	80.8	-322.0	53.6
80	[XRE_DI11	400.00]	31410	[LDIVAC1	400.00]	1	-911.9	-227.6	-730.1	-211.1	181.8	19.9
80	[XRE_DI11	400.00]	52189	[IRDPV11	400.00]	1	911.9	227.6	730.1	211.1	-181.8	19.9
82	[XKA_KC11	400.00]	10015	[AKASHA1	400.00]	1	282.1	107.7	55.1	-28.4	-227.0	80.5
82	[XKA_KC11	400.00]	34071	[JTKOSC1	400.00]	1	-282.1	-107.7	-55.1	28.4	227.0	80.5
211	[XUG_SM11	400.00]	14402	[WUGLJE1	400.00]	1	1.6	-52.9	168.0	-63.0	166.5	999.9
211	[XUG_SM11	400.00]	34045	[JSMIT21	400.00]	1	-1.6	52.9	-168.0	63.0	-166.5	999.9
220	[XKA_PG11	400.00]	10015	[AKASHA1	400.00]	1	545.3	97.7	129.0	-24.6	-416.3	76.3

220 [XKA_PG11	400.00]	36005 [OPODG211	400.00]	1	-545.3	-97.7	-129.0	24.6	416.3	76.3
221 [XLI_CO11	400.00]	50005 [OLIENZ1	400.00]	A	-1283.1	7.4	-982.5	-37.3	300.6	23.4
221 [XLI_CO11	400.00]	52049 [ICRD1111	400.00]	1	1283.1	-7.4	982.5	37.3	-300.6	23.4
222 [XLI_CO12	400.00]	50005 [OLIENZ1	400.00]	B	-1283.1	7.4	-982.5	-37.3	300.6	23.4
222 [XLI_CO12	400.00]	52049 [ICRD1111	400.00]	2	1283.1	-7.4	982.5	37.3	-300.6	23.4
505 [XDU_F01A	400.00]	10110 [ARASHB1	400.00]	1	-1000.0	-299.2	OUT OF SERVICE		1000.0	100.0
10011 [AELBS21	400.00]	10015 [AKASHA1	400.00]	1	183.2	196.9	-57.3	63.0	-240.5	131.3
10011 [AELBS21	400.00]	10020 [AZEMLA1	400.00]	1	-262.7	-195.9	-80.8	-90.4	181.9	69.2
10015 [AKASHA1	400.00]	10110 [ARASHB1	400.00]	1	1005.3	347.2	OUT OF SERVICE		-1005.3	100.0
14404 [WGACKO1	400.00]	14405 [WTREBI1	400.00]	1	434.4	140.3	206.0	53.6	-228.4	52.6
14404 [WGACKO1	400.00]	18401 [WMOST41	400.00]	1	-139.7	-58.8	13.8	-21.9	153.5	109.9
16009 [TUZ-G6	15.750]	16210 [WTUZL62	220.00]	1	198.0	76.0	0.0	0.0	-198.0	100.0
16210 [WTUZL62	220.00]	16211 [WTSTUZ2	220.00]	1	197.2	42.7	0.0	0.0	-197.2	100.0
18007 [CAPL-G2	15.700]	18205 [WHECAP2	220.00]	1	210.0	32.4	0.0	0.0	-210.0	100.0
34040 [JRPMLA1	400.00]	34045 [JSMIT21	400.00]	1	307.7	-59.9	486.0	-62.6	178.2	57.9
50005 [OLIENZ1	400.00]	50008 [OTAUER1	400.00]	1	-1238.2	141.0	-880.0	51.8	358.2	28.9
50005 [OLIENZ1	400.00]	50008 [OTAUER1	400.00]	2	-1238.2	141.0	-880.0	51.8	358.2	28.9
50008 [OTAUER1	400.00]	50011 [OZELL 1	400.00]	1	-1411.1	124.6	-936.2	78.3	474.9	33.7
50008 [OTAUER1	400.00]	50011 [OZELL 1	400.00]	2	-1411.1	124.6	-936.2	78.3	474.9	33.7
50009 [OWESTT1	400.00]	50024 [OWESTT2	220.00]	1	-325.1	-121.7	-139.5	-130.0	185.5	57.1
50011 [OZELL 1	400.00]	50042 [OZELL 2	220.00]	1	-1388.4	-14.2	-609.5	64.7	778.9	56.1
52035 [ICAM1111	400.00]	52060 [IDUG1111	400.00]	1	294.2	-73.3	117.4	-30.2	-176.9	60.1
52049 [ICRD1111	400.00]	52103 [II121111	400.00]	1	1149.5	7.7	880.0	55.9	-269.5	23.4
52049 [ICRD1111	400.00]	52271 [IVEZ1111	400.00]	1	1000.6	-199.8	681.7	-91.8	-318.9	31.9
52059 [IDOL1111	400.00]	52271 [IVEZ1111	400.00]	1	-467.2	194.9	-230.0	93.9	237.2	50.8
52059 [IDOL1111	400.00]	52271 [IVEZ1111	400.00]	2	-464.5	193.5	-228.7	93.2	235.8	50.8
52060 [IDUG1111	400.00]	52117 [II491111	400.00]	1	10.1	303.3	273.9	168.6	263.8	999.9
52060 [IDUG1111	400.00]	52169 [IOST1111	400.00]	1	-682.8	-353.2	-968.3	-232.4	-285.4	41.8
52103 [II121111	400.00]	52231 [ISNG1111	400.00]	1	845.5	-160.0	579.2	-64.4	-266.4	31.5
52117 [II491111	400.00]	52231 [ISNG1111	400.00]	1	-213.4	266.8	50.4	132.1	263.8	123.6
52169 [IOST1111	400.00]	52228 [ISMD1111	400.00]	1	310.1	-235.0	120.4	-200.3	-189.7	61.2
52179 [IPLN1111	400.00]	52226 [ISLG1111	400.00]	1	712.6	-21.0	529.1	-32.1	-183.5	25.8
52226 [ISLG1111	400.00]	52271 [IVEZ1111	400.00]	1	258.3	-79.4	98.5	-72.7	-159.9	61.9

Table 13.5.12: Results of contingency (n-1) analysis in winter maximum 2015 scenario export of 1000 MW from BiH to Italy via HVDC link Albania – Italy

MONITORED BRANCH	CONTINGENCY	RATING	FLOW	%				
316*XTR_HN51	110.00 36050 OHNOVI51 110.00 1 BASE CASE	89.6	96.6	113.2				
31210*LDIVAC2	220.00 156 XPA_DI21 220.00 1 SINGLE 3	320.1	336.4	102.4				
31210*LDIVAC2	220.00 156 XPA_DI21 220.00 1 SINGLE 38	320.1	336.4	102.4				
14405 WTBREBI1	400.00 14202*WTREBI2 220.00 1 SINGLE 154	400.0	414.5	103.6				
31210*LDIVAC2	220.00 156 XPA_DI21 220.00 1 SINGLE 271	320.1	346.7	106.2				
31210*LDIVAC2	220.00 156 XPA_DI21 220.00 1 SINGLE 709	320.1	690.1	212.2				
MONITORED VOLTAGE REPORT:								
SYSTEM	CONTINGENCY	B U S			V-CONT	V-INIT	V-MAX	V-MIN
'AL400	RANGE BASE CASE	10015 AKASHA1	400.00	0.88713	0.88713	1.05000	0.90000	
'AL400	RANGE BASE CASE	10110 ARASHB1	400.00	0.86835	0.86835	1.05000	0.90000	
'AL400	RANGE SINGLE 5	10011 AELBS21	400.00	0.89114	0.91077	1.05000	0.90000	
'AL220	RANGE SINGLE 5	10007 ABURRE2	220.00	0.87401	0.94457	1.10000	0.90000	
'AL220	RANGE SINGLE 5	10008 ATIRAN2	220.00	0.89226	0.91981	1.10000	0.90000	
'AL220	RANGE SINGLE 5	10009 AELBS12	220.00	0.88299	0.91476	1.10000	0.90000	
'AL220	RANGE SINGLE 5	10010 AELBS22	220.00	0.88440	0.91537	1.10000	0.90000	
'AL220	RANGE SINGLE 5	10013 AFIER 2	220.00	0.88654	0.92187	1.10000	0.90000	
'AL220	RANGE SINGLE 5	10014 AKASHA2	220.00	0.89894	0.92591	1.10000	0.90000	
'AL220	RANGE SINGLE 5	10017 ARRASHZ2	220.00	0.89028	0.91847	1.10000	0.90000	
'AL220	RANGE SINGLE 5	10055 ABABIC2	220.00	0.89483	0.93037	1.10000	0.90000	
'AL220	RANGE SINGLE 5	10133 ASAKU2	220.00	0.88555	0.91429	1.10000	0.90000	
'AL220	RANGE SINGLE 5	10629 AVL0TP2	220.00	0.89728	0.93259	1.10000	0.90000	
'AL400	RANGE SINGLE 6	10011 AELBS21	400.00	0.89259	0.91077	1.05000	0.90000	
'AL220	RANGE SINGLE 6	10008 ATIRAN2	220.00	0.88836	0.91981	1.10000	0.90000	
'AL220	RANGE SINGLE 6	10009 AELBS12	220.00	0.88721	0.91476	1.10000	0.90000	
'AL220	RANGE SINGLE 6	10010 AELBS22	220.00	0.88828	0.91537	1.10000	0.90000	
'AL220	RANGE SINGLE 6	10013 AFIER 2	220.00	0.88909	0.92187	1.10000	0.90000	
'AL220	RANGE SINGLE 6	10014 AKASHA2	220.00	0.89781	0.92591	1.10000	0.90000	
'AL220	RANGE SINGLE 6	10017 ARRASHZ2	220.00	0.88951	0.91847	1.10000	0.90000	
'AL220	RANGE SINGLE 6	10055 ABABIC2	220.00	0.89742	0.93037	1.10000	0.90000	
'AL220	RANGE SINGLE 6	10133 ASAKU2	220.00	0.88373	0.91429	1.10000	0.90000	
'AL220	RANGE SINGLE 6	10629 AVL0TP2	220.00	0.89986	0.93259	1.10000	0.90000	
'AL400	RANGE SINGLE 8	10011 AELBS21	400.00	0.89634	0.91077	1.05000	0.90000	
'AL220	RANGE SINGLE 8	10008 ATIRAN2	220.00	0.89880	0.91981	1.10000	0.90000	
'AL220	RANGE SINGLE 8	10009 AELBS12	220.00	0.89422	0.91476	1.10000	0.90000	
'AL220	RANGE SINGLE 8	10010 AELBS22	220.00	0.89502	0.91537	1.10000	0.90000	
'AL220	RANGE SINGLE 8	10013 AFIER 2	220.00	0.89619	0.92187	1.10000	0.90000	
'AL220	RANGE SINGLE 8	10017 ARRASHZ2	220.00	0.89397	0.91847	1.10000	0.90000	
'AL220	RANGE SINGLE 8	10133 ASAKU2	220.00	0.89311	0.91429	1.10000	0.90000	



'AL220	'	RANGE SINGLE 834	10010 AELBS22	220.00	0.89868	0.91537	1.10000	0.90000
'AL220	'	RANGE SINGLE 834	10133 ASAUKU2	220.00	0.89756	0.91429	1.10000	0.90000
'AL400	'	RANGE SINGLE 835	10011 AELBS21	400.00	0.88838	0.91077	1.05000	0.90000
'AL220	'	RANGE SINGLE 835	10008 ATIRAN2	220.00	0.89305	0.91981	1.10000	0.90000
'AL220	'	RANGE SINGLE 835	10009 AELBS12	220.00	0.88814	0.91476	1.10000	0.90000
'AL220	'	RANGE SINGLE 835	10010 AELBS22	220.00	0.88893	0.91537	1.10000	0.90000
'AL220	'	RANGE SINGLE 835	10013 AFIER 2	220.00	0.89024	0.92187	1.10000	0.90000
'AL220	'	RANGE SINGLE 835	10014 AKASHA2	220.00	0.89882	0.92591	1.10000	0.90000
'AL220	'	RANGE SINGLE 835	10017 ARRAZH2	220.00	0.89055	0.91847	1.10000	0.90000
'AL220	'	RANGE SINGLE 835	10055 ABABIC2	220.00	0.89858	0.93037	1.10000	0.90000
'AL220	'	RANGE SINGLE 835	10133 ASAUKU2	220.00	0.88738	0.91429	1.10000	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 3	: OPEN LINE FROM BUS 10015 [AKASHA1 400.00] TO BUS 10110 [ARASHB1 400.00] CKT 1
SINGLE 5	: OPEN LINE FROM BUS 10004 [AFIERZ2 220.00] TO BUS 10007 [ABURRE2 220.00] CKT 1
SINGLE 6	: OPEN LINE FROM BUS 10004 [AFIERZ2 220.00] TO BUS 10008 [ATIRAN2 220.00] CKT 1
SINGLE 8	: OPEN LINE FROM BUS 10005 [AKOMAN2 220.00] TO BUS 10014 [AKASHA2 220.00] CKT 1
SINGLE 9	: OPEN LINE FROM BUS 10005 [AKOMAN2 220.00] TO BUS 10014 [AKASHA2 220.00] CKT 2
SINGLE 10	: OPEN LINE FROM BUS 10006 [AVDEJA2 220.00] TO BUS 10008 [ATIRAN2 220.00] CKT 1
SINGLE 11	: OPEN LINE FROM BUS 10006 [AVDEJA2 220.00] TO BUS 10008 [ATIRAN2 220.00] CKT 2
SINGLE 13	: OPEN LINE FROM BUS 10007 [ABURRE2 220.00] TO BUS 10009 [AELBS12 220.00] CKT 1
SINGLE 16	: OPEN LINE FROM BUS 10008 [ATIRAN2 220.00] TO BUS 10133 [ASAUKU2 220.00] CKT 1
SINGLE 38	: OPEN LINE FROM BUS 10110 [ARASHB1 400.00] TO BUS 505 [XDU_F01A 400.00] CKT 1
SINGLE 102	: OPEN LINE FROM BUS 12250 [VGORIA2 220.00] TO BUS 12252 [VOCHF2 220.00] CKT 1
SINGLE 126	: OPEN LINE FROM BUS 12275 [VMI3 2 220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 154	: OPEN LINE FROM BUS 14404 [WGACKO1 400.00] TO BUS 14405 [WTREB1 400.00] CKT 1
SINGLE 271	: OPEN LINE FROM BUS 71 [XME_DI11 400.00] TO BUS 31410 [LDIVAC1 400.00] CKT 1
SINGLE 434	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23172 [GDISTO13 400.00] CKT 1
SINGLE 435	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23173 [GDISTO11 400.00] CKT 1
SINGLE 464	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23036 [GK_KOR13 400.00] CKT 1
SINGLE 465	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23037 [GK_KOR14 400.00] CKT 1
SINGLE 475	: OPEN LINE FROM BUS 23123 [GKPTR11 400.00] TO BUS 23126 [GKPTC12 400.00] CKT 1
SINGLE 477	: OPEN LINE FROM BUS 23126 [GKPTC12 400.00] TO BUS 23180 [GAXELO12 400.00] CKT 1
SINGLE 505	: OPEN LINE FROM BUS 81 [XSK_KB11 400.00] TO BUS 34072 [JKURO21 400.00] CKT 1
SINGLE 569	: OPEN LINE FROM BUS 28043 [RSTUPA2 220.00] TO BUS 28044 [RBRADU2 220.00] CKT 1
SINGLE 639	: OPEN LINE FROM BUS 28855 [RMOSTI2 220.00] TO BUS 28935 [RRAC.M2 220.00] CKT 1
SINGLE 644	: OPEN LINE FROM BUS 28906 [RTELEA2 220.00] TO BUS 28907 [RSTILP2 220.00] CKT 1
SINGLE 672	: OPEN LINE FROM BUS 28039 [RROSIO1 400.00] TO BUS 28094 [RROSIO2 220.00] CKT 1
SINGLE 709	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1
SINGLE 723	: OPEN LINE FROM BUS 34015 [JKRAG21 400.00] TO BUS 34920 [JTKOLB1 400.00] CKT A
SINGLE 724	: OPEN LINE FROM BUS 34020 [JNIS2 1 400.00] TO BUS 34070 [JTKOSB1 400.00] CKT 1
SINGLE 741	: OPEN LINE FROM BUS 34050 [JSUBO31 400.00] TO BUS 34085 [JSOMB31 400.00] CKT 1
SINGLE 834	: OPEN LINE FROM BUS 36001 [ORIBAR11 400.00] TO BUS 36005 [OPODG211 400.00] CKT 1
SINGLE 835	: OPEN LINE FROM BUS 36001 [ORIBAR11 400.00] TO BUS 36010 [OPLJE211 400.00] CKT 1

Table 13.5.13: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario export of 1000 MW from BiH to Italy via HVDC link Albania – Italy

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1652.8	1723.7	0.0	0.0	0.0	-150.1	79.2	-150.0
AL	983.9	779.7	-184.4	0.0	432.9	77.1	744.5	
20	9668.0	8411.0	0.0	15.5	0.0	1001.4	240.1	1000.0
BG	3636.1	3357.9	0.0	180.6	3264.6	225.5	3136.8	
30	3966.1	2897.8	0.0	0.0	0.0	1000.0	68.3	1000.0
BA	1283.6	1017.2	0.0	0.0	916.6	328.8	854.2	
35	44085.1	54409.8	0.0	1.1	0.0	-10740.6	414.8	-10740.0
IT	10290.1	11942.3	0.0	147.5	12333.7	-509.1	11043.2	
40	3426.0	4359.0	0.0	0.0	0.0	-999.2	66.2	-1000.0
HR	513.5	1075.9	0.0	0.0	1535.0	229.7	742.8	
45	6093.9	7180.0	0.1	0.0	0.0	-1200.1	113.9	-1200.0
HU	1338.2	2128.1	178.6	-29.1	2405.6	-20.1	1486.3	
50	11756.0	11426.0	0.0	0.0	0.0	0.4	329.6	0.0

GR	3392.0	5724.7	203.9	9.3	6629.1	295.6	3774.0	
55	5221.8	-4356.2	0.0	4.8	0.0	9445.0	128.2	9450.0
UX	346.0	622.8	0.0	12.7	2301.1	338.9	1672.7	
60	1942.4	2001.9	0.0	0.0	0.0	-99.8	40.2	-100.0
MK	833.5	752.3	-30.0	0.0	389.8	51.3	448.5	
65	1207.7	0.0	0.0	0.0	0.0	1199.9	7.7	1200.0
UA	-164.8	0.0	0.0	0.0	652.3	364.6	122.9	
70	13257.2	12110.2	0.0	90.2	0.0	802.7	254.0	800.0
RO	3120.8	4455.6	783.2	285.9	5603.6	34.8	3164.9	
75	3949.6	2990.0	0.0	8.9	0.0	890.2	60.5	890.0
SI	1229.1	964.6	0.0	53.8	868.6	337.4	741.9	
80	77661.9	77342.9	0.0	0.0	0.0	-800.0	1119.0	-800.0
TR	9852.2	11034.0	996.9	0.0	22660.3	-157.5	20639.2	
90	7780.6	8298.8	0.0	17.0	0.0	-749.5	214.4	-750.0
RS	3054.8	2986.6	0.0	71.9	1703.7	-653.2	2353.2	
91	877.6	938.0	0.5	2.0	0.0	-100.5	37.6	-100.0
ME	386.0	346.6	-31.7	10.8	221.3	-40.4	322.0	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-330.0	0.0	0.0	0.0	40.0	-305.0	14.9	
TOTALS	193048.0	189732.9	0.6	139.4	0.0	0.0	3174.9	0.0
	39764.9	47786.8	1916.3	743.4	61958.3	0.0	51262.0	

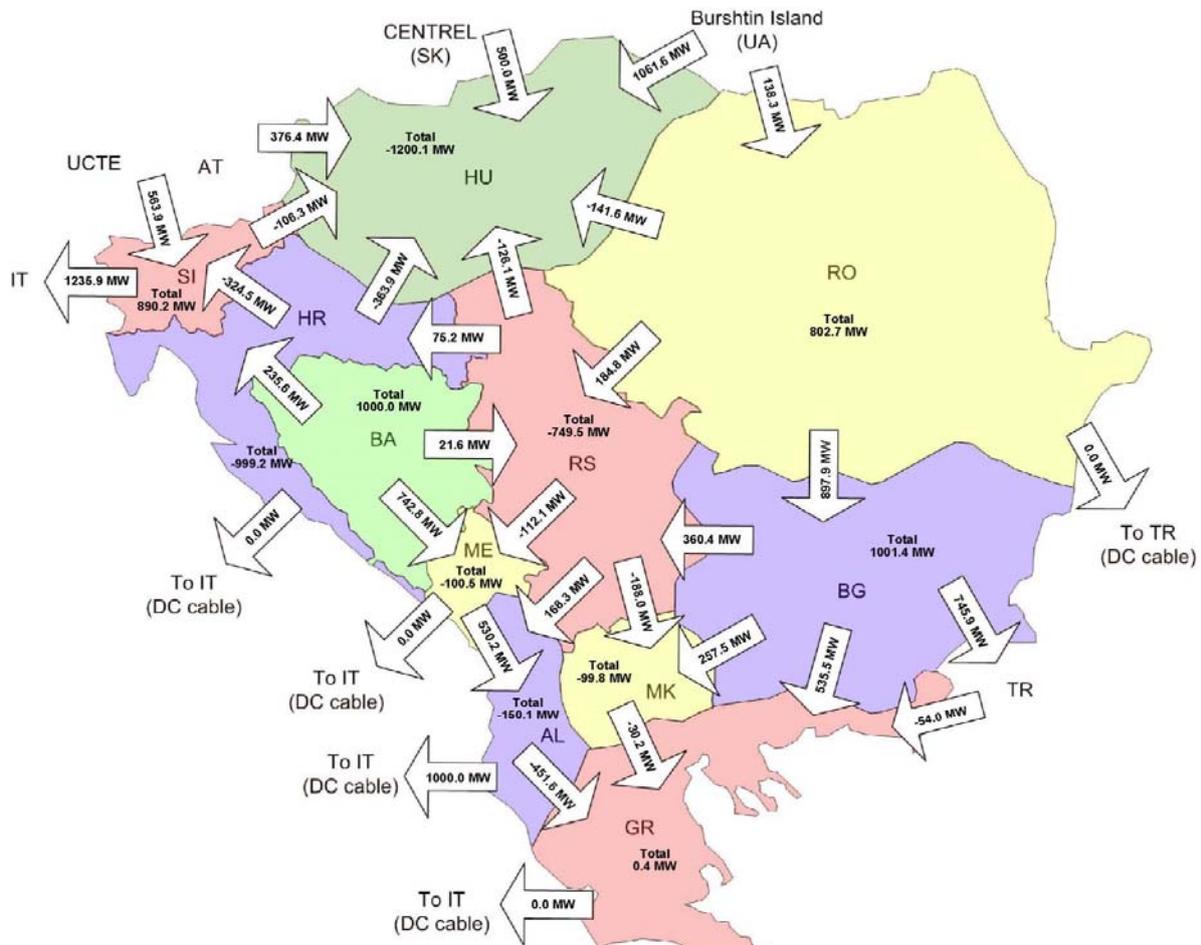


Figure 13.5.4: Aggregated border flows in area of SEE in winter maximum 2020, scenario export of 1000 MW from BiH to Italy via HVDC link Albania – Italy

Table 13.5.14: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2020, scenario export of 1000 MW from BiH to Italy via HVDC link Albania – Italy

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I			
10015,	AKASHA1	400.00,	10110,ARASHB1	400.00,	1,	1,	1005.12,	344.58,	1062.54,	87.00		
12274,	VMI	2	220.00,	12474,VMI	1	400.00,	1,	1,	-521.98,	-110.24,	533.50,	80.56

Table 13.5.15: Changes in power flow greater than 150 MW in area of SEE in winter maximum 2020, scenario export of 1000 MW from BiH to Italy via HVDC link Albania – Italy

BRANCHES WITH FROM OR TO END MW FLOWS DIFFERING BY MORE THAN 150.0 MW:												
IN WORKING CASE						IN BASE CASE						
X-----	FROM BUS	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	
2	[XZE_KA11	400.00]	10020	[AZEMLA1	400.00]	1	451.6	147.1	281.1	30.6	-170.5	37.8
2	[XZE_KA11	400.00]	22461	[GKARDI11	400.00]	1	-451.6	-147.1	-281.1	-30.6	170.5	37.8
13	[XTR_PG11	400.00]	14405	[RP_TREBINJE	400.00]	1	-481.9	-167.2	-152.4	-83.4	329.5	68.4
13	[XTR_PG11	400.00]	36005	[OPODG211	400.00]	1	481.9	167.2	152.4	83.4	-329.5	68.4
82	[XKA_KC11	400.00]	10015	[AKASHA1	400.00]	1	251.2	64.8	6.5	-49.5	-244.8	97.4
82	[XKA_KC11	400.00]	34073	[JGJAK31	400.00]	1	-251.2	-64.8	-6.5	49.5	244.8	97.4
211	[XUG_SM11	400.00]	14402	[TS_UGLJEVIK	400.00]	1	96.6	-33.3	253.9	-28.3	157.3	162.8
211	[XUG_SM11	400.00]	34045	[JSMIT21	400.00]	1	-96.6	33.3	-253.9	28.3	-157.3	162.8
220	[XKA_PG11	400.00]	10015	[AKASHA1	400.00]	1	430.2	81.0	9.5	-27.0	-420.7	97.8
220	[XKA_PG11	400.00]	36005	[OPODG211	400.00]	1	-430.2	-81.0	-9.5	27.0	420.7	97.8
505	[XDU_F01A	400.00]	10110	[ARASHB1	400.00]	1	-1000.0	-299.2	OUT OF SERVICE		1000.0	100.0
616	[XDU_F01I	400.00]	52085	[IFOGN111	400.00]	1	1000.0	-299.2	OUT OF SERVICE		-1000.0	100.0

10011	[AELBS21	400.00]	10015	[AKASHA1	400.00]	1	321.3	179.8	100.6	51.6	-220.6	68.7
10011	[AELBS21	400.00]	10020	[AZEMLA1	400.00]	1	-354.6	-135.1	-190.7	-59.0	163.9	46.2
10015	[AKASHA1	400.00]	10110	[ARASHB1	400.00]	1	1005.1	344.6	OUT OF SERVICE		-1005.1	100.0
14402	[TS UGLJEVIK	400.00]	16402	[TS TUZLA	400.00]	1	172.3	-25.0	337.7	-29.6	165.4	96.0
14404	[TE GACKO	400.00]	14405	[RP TREBINJE	400.00]	1	382.6	154.6	155.3	70.5	-227.3	59.4
14404	[TE GACKO	400.00]	18401	[MO-4	400.00]	1	-83.0	-50.4	132.4	-1.0	215.4	259.7
16009	[TUZ-G6	15.750]	16210	[TUZLA 6	220.00]	1	195.0	104.2	OUT OF SERVICE		-195.0	100.0
16210	[TUZLA 6	220.00]	16211	[TS TUZLA	220.00]	1	194.1	67.9	0.0	0.0	-194.1	100.0
18006	[CAPL-G1	15.700]	18205	[HE CAPLJINA	220.00]	1	170.0	52.2	OUT OF SERVICE		-170.0	100.0
18007	[CAPL-G2	15.700]	18205	[HE CAPLJINA	220.00]	1	170.0	52.2	OUT OF SERVICE		-170.0	100.0
18204	[MO-4	220.00]	18205	[HE CAPLJINA	220.00]	1	-170.1	-31.8	0.0	-6.7	170.1	100.0
18204	[MO-4	220.00]	18205	[HE CAPLJINA	220.00]	2	-167.4	-31.5	0.0	-6.7	167.4	100.0
34040	[JRPMLA1	400.00]	34045	[JSMIT21	400.00]	1	362.2	-40.8	533.3	-23.6	171.1	47.2
52021	[IBN2N111	400.00]	53182	[II27R111	400.00]	1	-882.2	89.4	-627.3	-1.1	254.9	28.9
52084	[IFNOR111	400.00]	53142	[II27R111	400.00]	1	-576.6	44.5	-421.4	-4.1	155.2	26.9
52085	[IFOGN111	400.00]	52962	[ICDLN111	400.00]	1	-137.0	-131.2	-322.0	-48.1	-185.1	135.1
52085	[IFOGN111	400.00]	53129	[II17N111	400.00]	1	271.1	-57.5	115.1	-9.5	-156.0	57.5
52085	[IFOGN111	400.00]	53182	[II27N111	400.00]	1	614.0	-43.6	357.1	-6.4	-257.0	41.8
52246	[ITERR111	400.00]	52275	[IVLLR111	400.00]	1	-930.3	137.9	-733.5	113.8	196.8	21.2
52246	[ITERR111	400.00]	52275	[IVLLR111	400.00]	2	-872.1	128.2	-687.6	105.4	184.5	21.2
52246	[ITERR111	400.00]	53142	[II27R111	400.00]	1	806.6	16.1	656.2	8.0	-150.3	18.6
52962	[ICDLN111	400.00]	53183	[II73N111	400.00]	1	143.6	-17.3	-36.6	25.1	-180.1	125.5

Table 13.5.16: Results of contingency (n-1) analysis in winter maximum 2020, scenario export of 1000 MW from BiH to Italy via HVDC link Albania – Italy

MONITORED BRANCH	CONTINGENCY	RATING	FLOW	%		
<----- MONITORED BRANCH ----->						
316 XTR_HN51	110.00 36050*0HNOVI51 110.00 1	BASE CASE	89.6 106.9	124.0		
10010*AELBS22	220.00 10125 ACEKIN2 220.00 1	SINGLE 20	370.0 399.5	112.5		
10009*AELBS12	220.00 10125 ACEKIN2 220.00 1	SINGLE 23	370.0 397.5	112.1		
24034*MDUME 2	220.00 24096 MMART 21 220.00 1	SINGLE 369	426.8 513.0	114.6		
24094*MMART 4	400.00 24096 MMART 21 220.00 1	SINGLE 369	500.0 522.2	104.4		
24034*MDUME 2	220.00 24095 MMART 22 220.00 1	SINGLE 370	426.8 516.7	115.4		
24094*MMART 4	400.00 24095 MMART 22 220.00 1	SINGLE 370	500.0 526.0	105.2		
24034*MDUME 2	220.00 24096 MMART 21 220.00 1	SINGLE 381	426.8 513.2	114.6		
24094*MMART 4	400.00 24096 MMART 21 220.00 1	SINGLE 381	500.0 522.4	104.5		
24034*MDUME 2	220.00 24095 MMART 22 220.00 1	SINGLE 382	426.8 516.9	115.5		
24094*MMART 4	400.00 24095 MMART 22 220.00 1	SINGLE 382	500.0 526.2	105.2		
28040*ROTRU2	220.00 28366 RSIBIU2 220.00 1	SINGLE 623	333.4 393.1	112.2		
28040*ROTRU2	220.00 28100 RSIBIU21 220.00 1	SINGLE 624	333.4 393.1	112.2		
28040*ROTRU2	220.00 28366 RSIBIU2 220.00 1	SINGLE 721	333.4 392.9	111.6		
28040*ROTRU2	220.00 28100 RSIBIU21 220.00 1	SINGLE 722	333.4 392.9	111.6		
34100*JBGD172	220.00 34111 JBGD8 22 220.00 2	SINGLE 821	445.8 466.9	105.7		
34100*JBGD172	220.00 34111 JBGD8 22 220.00 1	SINGLE 822	445.8 466.9	105.7		
MONITORED VOLTAGE REPORT:						
SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
'AL400	RANGE BASE CASE	10110 ARASHB1 400.00	0.88634	0.88634	1.05000	0.90000
'AL400	RANGE SINGLE 1	10015 AKASHA1 400.00	0.84950	0.90468	1.05000	0.90000
'AL400	RANGE SINGLE 38	10011 AELBS21 400.00	0.88912	0.92738	1.05000	0.90000
'AL400	RANGE SINGLE 38	10015 AKASHA1 400.00	0.86211	0.90468	1.05000	0.90000
'BG220	RANGE SINGLE 136	12286 VUZUND2 220.00	0.88693	1.00914	1.10000	0.90000
'BG220	RANGE SINGLE 138	12282 VORFEJ2 220.00	1.10491	1.04148	1.10000	0.90000
'AL400	RANGE SINGLE 165	10015 AKASHA1 400.00	0.87915	0.90468	1.05000	0.90000
'HU220	RANGE SINGLE 358	24005 MALBF 22 220.00	0.89275	1.04262	1.10000	0.90000
'HU220	RANGE SINGLE 359	24006 MALBF 21 220.00	0.89462	1.04267	1.10000	0.90000
'AL400	RANGE SINGLE 530	10015 AKASHA1 400.00	0.88779	0.90468	1.05000	0.90000
'AL400	RANGE SINGLE 532	10015 AKASHA1 400.00	0.87935	0.90468	1.05000	0.90000
'RO220	RANGE SINGLE 693	28855 RMOSTI2 220.00	0.82225	1.01473	1.10000	0.90000
'AL400	RANGE SINGLE 781	10015 AKASHA1 400.00	0.88931	0.90468	1.05000	0.90000
'RS400	RANGE SINGLE 798	34085 JSOMB31 400.00	0.86319	0.99004	1.05000	0.90000
'RS220	RANGE SINGLE 846	34200 JSABA32 220.00	0.88491	1.01894	1.10000	0.90000
'AL400	RANGE SINGLE 897	10015 AKASHA1 400.00	0.88927	0.90468	1.05000	0.90000
CONTINGENCY LEGEND:						
LABEL	EVENTS					
SINGLE 1	: OPEN LINE FROM BUS 10011 [AELBS21	400.00]	TO BUS 10015 [AKASHA1	400.00]	CKT 1	
SINGLE 20	: OPEN LINE FROM BUS 10009 [AELBS12	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1	
SINGLE 23	: OPEN LINE FROM BUS 10010 [AELBS22	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1	
SINGLE 38	: OPEN LINE FROM BUS 82 [XKA_KC11	400.00]	TO BUS 34073 [JGJAK31	400.00]	CKT 1	
SINGLE 136	: OPEN LINE FROM BUS 12275 [VMI3 2	220.00]	TO BUS 12286 [VUZUND2	220.00]	CKT 1	
SINGLE 138	: OPEN LINE FROM BUS 12280 [VALEKO2	220.00]	TO BUS 12282 [VORFEJ2	220.00]	CKT 1	
SINGLE 165	: OPEN LINE FROM BUS 14404 [TE GACKO	400.00]	TO BUS 14405 [RP TREBINJE	400.00]	CKT 1	
SINGLE 358	: OPEN LINE FROM BUS 24005 [MALBF 22	220.00]	TO BUS 24034 [MDUME 2	220.00]	CKT 1	

SINGLE 359	:	OPEN LINE FROM BUS 24006	[MALBF 21	220.00]	TO BUS 24034	[MDUME 2	220.00]	CKT 1
SINGLE 369	:	OPEN LINE FROM BUS 24034	[MDUME 2	220.00]	TO BUS 24095	[MMART 22	220.00]	CKT 1
SINGLE 370	:	OPEN LINE FROM BUS 24034	[MDUME 2	220.00]	TO BUS 24096	[MMART 21	220.00]	CKT 1
SINGLE 381	:	OPEN LINE FROM BUS 24094	[MMART 4	400.00]	TO BUS 24095	[MMART 22	220.00]	CKT 1
SINGLE 382	:	OPEN LINE FROM BUS 24094	[MMART 4	400.00]	TO BUS 24096	[MMART 21	220.00]	CKT 1
SINGLE 530	:	OPEN LINE FROM BUS 26064	[YSK 41	400.00]	TO BUS 26111	[YSK 5 1	400.00]	CKT 1
SINGLE 532	:	OPEN LINE FROM BUS 81	[XSK_KB11	400.00]	TO BUS 34072	[JUROS21	400.00]	CKT 1
SINGLE 623	:	OPEN LINE FROM BUS 28040	[RLOTU2	220.00]	TO BUS 28100	[RSIBIU21	220.00]	CKT 1
SINGLE 624	:	OPEN LINE FROM BUS 28040	[RLOTU2	220.00]	TO BUS 28366	[RSIBIU2	220.00]	CKT 1
SINGLE 693	:	OPEN LINE FROM BUS 28855	[RMOSTI2	220.00]	TO BUS 28935	[RRAC.M2	220.00]	CKT 1
SINGLE 721	:	OPEN LINE FROM BUS 28034	[RSIBIU1	400.00]	TO BUS 28100	[RSIBIU21	220.00]	CKT 1
SINGLE 722	:	OPEN LINE FROM BUS 28034	[RSIBIU1	400.00]	TO BUS 28366	[RSIBIU2	220.00]	CKT 1
SINGLE 781	:	OPEN LINE FROM BUS 34020	[JNIS2 1	400.00]	TO BUS 34070	[JTKOSB1	400.00]	CKT 1
SINGLE 798	:	OPEN LINE FROM BUS 34050	[JSUBO31	400.00]	TO BUS 34085	[JSOMB31	400.00]	CKT 1
SINGLE 821	:	OPEN LINE FROM BUS 34100	[JBGD172	220.00]	TO BUS 34111	[JBGD8 22	220.00]	CKT 1
SINGLE 822	:	OPEN LINE FROM BUS 34100	[JBGD172	220.00]	TO BUS 34111	[JBGD8 22	220.00]	CKT 2
SINGLE 846	:	OPEN LINE FROM BUS 34170	[JOBREN2	220.00]	TO BUS 34200	[JSABA32	220.00]	CKT 1
SINGLE 897	:	OPEN LINE FROM BUS 36001	[ORIBAR11	400.00]	TO BUS 36010	[OPLJE211	400.00]	CKT 1

## 13.6. Impact of HVDC link Montenegro – Italy

### 13.6.1. Export from Bulgaria and Romania to Italy

Table 13.6.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Montenegro –Italy

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	AL		1342.0 535.2	1491.9 689.7	0.0 -196.6	0.0 0.0	0.0 449.3	-200.0 42.9	50.1 448.5	-200.0
20	BG		9338.0 3087.7	7603.7 3045.8	0.0 -44.7	14.4 120.5	0.0 2983.0	1500.0 264.5	219.9 2684.6	1500.0
30	BA		3173.0 819.0	2610.1 724.5	0.0 0.0	0.0 0.0	0.0 900.8	490.0 252.0	72.8 743.3	490.0
35	IT		39263.6 7074.5	49222.0 10816.5	0.0 0.0	1.1 -156.9	0.0 12550.9	-10400.0 -340.4	440.5 9306.2	-10400.0
40	HR		3100.2 401.3	3483.0 1074.2	0.0 0.0	0.0 0.0	0.0 1404.0	-435.0 53.5	52.3 677.6	-435.0
45	HU		5391.5 980.3	6500.0 1926.6	0.1 178.1	0.0 -29.6	0.0 2423.2	-1200.0 112.4	91.5 1216.0	-1200.0
50	GR		10300.4 2219.1	10371.1 5312.0	0.0 170.3	0.0 9.3	0.0 6600.1	-350.0 147.6	279.3 3166.3	-350.0
55	UX		4398.6 5.9	-4593.5 637.5	0.0 0.0	4.8 12.8	0.0 2319.8	8886.4 380.2	100.8 1295.2	8886.0
60	MK		1504.2 481.4	1577.0 573.6	0.0 -31.0	0.0 0.0	0.0 400.7	-100.0 47.9	27.2 291.6	-100.0
65	UA		1206.9 -196.9	0.0 0.0	0.0 0.0	0.0 0.0	0.0 653.8	1200.0 347.1	6.9 109.8	1200.0
70	RO		10764.4 2678.6	9416.9 4075.6	0.0 511.7	88.7 276.9	0.0 4605.2	1044.9 -263.3	213.9 2682.9	1045.0
75	SI		2994.3 988.2	2514.0 811.0	0.0 0.0	8.8 54.0	0.0 608.1	424.0 182.3	47.5 549.0	424.0
80	TR		54595.7 4621.3	54622.1 7792.0	0.0 1175.3	0.0 0.0	0.0 17194.8	-800.0 -123.6	773.7 12972.3	-800.0
90	RS		7725.1 2783.0	7871.1 2853.5	0.0 0.0	17.6 76.0	0.0 1717.2	-360.2 -622.6	196.5 2193.3	-360.0
91	ME		643.1 338.4	805.2 299.2	0.5 -321.5	1.8 10.6	0.0 261.9	-200.0 279.0	35.6 333.0	-200.0
95	SK		501.4 -383.7	0.0 0.0	0.0 0.0	0.0 0.0	0.0 40.0	500.0 -359.5	1.4 15.8	500.0
101	XX (IT-GR)		0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0

102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	400.0	0.0	0.0	0.0	-400.0	0.0	0.0
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	156242.6	153494.7	0.6	137.3	0.0	0.0	2610.0	0.0
	26433.3	41031.6	1441.7	373.5	55112.8	0.0	38685.6	0.0

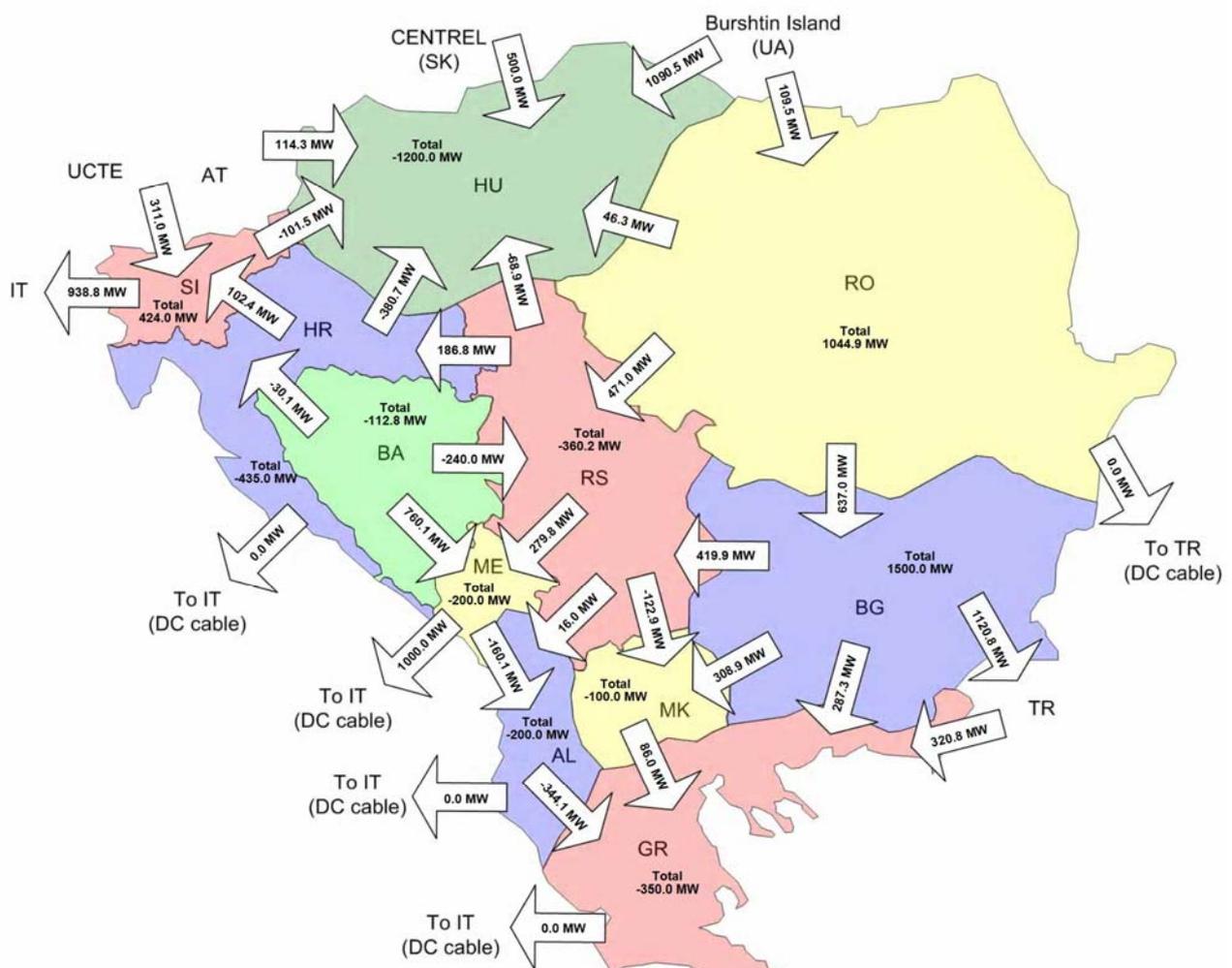


Figure 13.6.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Montenegro-Italy



'GR400	'	RANGE SINGLE	432	23180	GAXELO12	400.00	1.05187	1.03812	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23181	GAXELO11	400.00	1.05183	1.03833	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23064	GK_MEG13	400.00	1.05329	1.04058	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23066	GK_MEG11	400.00	1.05329	1.04058	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23123	GKPTR11	400.00	1.05270	1.03758	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23125	GKPATC11	400.00	1.05279	1.03756	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23126	GKPATC12	400.00	1.05274	1.03767	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23173	GDISTO11	400.00	1.05342	1.03731	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23174	GDISTO12	400.00	1.05324	1.03745	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23180	GAXELO12	400.00	1.05292	1.03812	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23181	GAXELO11	400.00	1.05297	1.03833	1.05000	0.90000
'GR400	'	RANGE SINGLE	462	23036	GK_KOR13	400.00	1.06272	1.01696	1.05000	0.90000
'GR400	'	RANGE SINGLE	462	23068	GK_MEG14	400.00	1.06032	1.02898	1.05000	0.90000
'GR400	'	RANGE SINGLE	463	23037	GK_KOR14	400.00	1.06272	1.01696	1.05000	0.90000
'GR400	'	RANGE SINGLE	463	23067	GK_MEG12	400.00	1.06032	1.02898	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23126	GKPATC12	400.00	1.06820	1.03767	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23180	GAXELO12	400.00	1.06820	1.03812	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23181	GAXELO11	400.00	1.06801	1.03833	1.05000	0.90000
'GR400	'	RANGE SINGLE	475	23180	GAXELO12	400.00	1.06765	1.03812	1.05000	0.90000
'GR400	'	RANGE SINGLE	475	23181	GAXELO11	400.00	1.06746	1.03833	1.05000	0.90000
'RO220	'	RANGE SINGLE	567	28043	RSTUPA2	220.00	0.89161	0.97927	1.10000	0.90000
'RO220	'	RANGE SINGLE	637	28855	RMOSTI2	220.00	0.88134	1.03917	1.10000	0.90000
'RO220	'	RANGE SINGLE	642	28907	RSTILP2	220.00	0.84266	0.98151	1.10000	0.90000
'RO220	'	RANGE SINGLE	670	28095	RVETIS2	220.00	0.89837	1.02105	1.10000	0.90000
'RS400	'	RANGE SINGLE	739	34085	JSOMB31	400.00	0.87828	0.99446	1.05000	0.90000
'RS220	'	RANGE SINGLE	785	34200	JSABA32	220.00	0.89960	1.02494	1.10000	0.90000
'ME400	'	RANGE SINGLE	834	36017	0TIVT211	400.00	0.89103	0.97994	1.05000	0.90000
'BA400	'	RANGE SINGLE	847	14404	WGACKO1	400.00	1.05740	1.02105	1.05000	0.90000
'BA400	'	RANGE SINGLE	847	14405	WTREBI1	400.00	1.06211	1.01195	1.05000	0.90000
'ME400	'	RANGE SINGLE	847	36017	0TIVT211	400.00	1.06951	0.97994	1.05000	0.90000

CONTINGENCY LEGEND:  
 LABEL           EVENTS

SINGLE 152 : OPEN LINE FROM BUS 14404 [WGACKO1   400.00] TO BUS 14405 [WTREBI1   400.00] CKT 1  
 SINGLE 153 : OPEN LINE FROM BUS 14404 [WGACKO1   400.00] TO BUS 18401 [WMOST41   400.00] CKT 1  
 SINGLE 190 : OPEN LINE FROM BUS 14405 [WTREBI1   400.00] TO BUS 14202 [WTREBI2   220.00] CKT 1  
 SINGLE 196 : OPEN LINE FROM BUS 13 [XTR\_PG11   400.00] TO BUS 36017 [0TIVT211   400.00] CKT A  
 SINGLE 344 : OPEN LINE FROM BUS 24034 [MDUME 2   220.00] TO BUS 24095 [MMART 22   220.00] CKT 1  
 SINGLE 345 : OPEN LINE FROM BUS 24034 [MDUME 2   220.00] TO BUS 24096 [MMART 21   220.00] CKT 1  
 SINGLE 356 : OPEN LINE FROM BUS 24094 [MMART 4   400.00] TO BUS 24095 [MMART 22   220.00] CKT 1  
 SINGLE 357 : OPEN LINE FROM BUS 24094 [MMART 4   400.00] TO BUS 24096 [MMART 21   220.00] CKT 1  
 SINGLE 707 : OPEN LINE FROM BUS 31410 [LDIVAC1   400.00] TO BUS 80 [XRE\_DI11   400.00] CKT 1  
 SINGLE 834 : OPEN LINE FROM BUS 36005 [0PODGT211 400.00] TO BUS 36017 [0TIVT211   400.00] CKT A

Table 13.6.5: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Montenegro–Italy

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1633.3	1723.7	0.0	0.0	0.0	-150.0	59.6	-150.0
AL	882.5	779.7	-194.3	0.0	443.1	169.3	570.8	
20	10199.8	8411.0	0.0	15.3	0.0	1500.0	273.5	1500.0
BG	3819.1	3357.9	0.0	179.4	3242.8	151.1	3373.6	
30	2959.3	2897.8	0.0	0.0	0.0	0.0	61.5	0.0
BA	1258.4	1017.2	0.0	0.0	889.7	375.4	755.5	
35	44050.3	54409.8	0.0	1.1	0.0	-10740.0	379.4	-10740.0
IT	9534.5	11942.3	0.0	147.7	12383.0	-603.7	10431.2	
40	3430.6	4359.0	0.0	0.0	0.0	-1000.0	71.6	-1000.0
HR	637.1	1075.9	0.0	0.0	1523.1	300.4	783.9	
45	6094.0	7180.0	0.1	0.0	0.0	-1200.0	113.9	-1200.0
HU	1405.1	2128.1	178.5	-29.1	2402.4	36.2	1493.7	
50	11757.4	11426.0	0.0	0.0	0.0	0.0	331.4	0.0
GR	3364.7	5724.7	204.3	9.3	6631.9	256.7	3787.9	

55	5227.9	-4356.2	0.0	4.8	0.0	9450.5	128.9	9450.0
UX	370.2	622.8	0.0	12.7	2298.6	344.3	1689.0	
60	1945.9	2001.9	0.0	0.0	0.0	-100.0	43.9	-100.0
MK	845.6	752.3	-29.9	0.0	388.0	26.1	483.9	
65	1207.5	0.0	0.0	0.0	0.0	1200.0	7.5	1200.0
UA	-155.4	0.0	0.0	0.0	652.2	376.4	120.3	
70	13779.5	12110.2	0.0	89.6	0.0	1299.7	280.0	1300.0
RO	3365.0	4455.6	776.9	283.7	5561.8	-41.0	3451.6	
75	3950.5	2990.0	0.0	8.9	0.0	890.0	61.6	890.0
SI	1249.8	964.6	0.0	53.7	866.7	345.8	752.4	
80	77662.3	77342.9	0.0	0.0	0.0	-800.0	1119.4	-800.0
TR	9875.1	11034.0	996.9	0.0	22659.9	-140.4	20644.5	
90	7792.5	8298.8	0.0	16.9	0.0	-750.1	227.0	-750.0
RS	3224.2	2986.6	0.0	71.4	1690.0	-636.7	2492.9	
91	902.2	938.0	0.5	1.9	0.0	-100.0	61.8	-100.0
ME	410.4	346.6	-29.4	10.3	237.2	-263.4	583.5	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-321.7	0.0	0.0	0.0	40.0	-296.5	14.7	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	400.0	0.0	0.0	0.0	-400.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTALS	193094.2	189732.9	0.6	138.4	0.0	0.0	3222.3	0.0
	39764.7	47588.4	1903.0	739.1	61910.1	0.0	51429.5	



Figure 13.6.2: Aggregated border flows in area of SEE in winter maximum 2015, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Montenegro –Italy

Table 13.6.6: Changes in power flow in area of SEE in winter maximum 2015, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Montenegro –Italy

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
13	[XTR_PG11 400.00]	14405	[RP TREBINJE 400.00]	1		-406.6	-254.4	-152.4	-83.4	254.3	62.5
13	[XTR_PG11 400.00]	36005	[OPODG211 400.00]	1		406.6	254.4	152.4	83.4	-254.3	62.5
184	[XRI_PE11 400.00]	34089	[JPEC3 1 400.00]	1		-70.1	-5.2	161.1	76.0	231.2	329.7
184	[XRI_PE11 400.00]	36001	[ORIBAR11 400.00]	1		70.1	5.2	-161.1	-76.0	-231.2	329.7
220	[XKA_PG11 400.00]	10015	[AKASHA1 400.00]	1		-266.6	-121.0	9.5	-27.0	276.1	103.6
220	[XKA_PG11 400.00]	36005	[OPODG211 400.00]	1		266.6	121.0	-9.5	27.0	-276.1	103.6
700	[XIT_ME11 400.00]	52275	[IVLLR111 400.00]	1		1000.0	-200.0	OUT OF SERVICE		-1000.0	100.0
701	[XIT_ME10 400.00]	36017	[OTIVT211 400.00]	D1		-1000.0	-200.0	OUT OF SERVICE		1000.0	100.0
34071	[JTKOSC1 400.00]	34089	[JPEC3 1 400.00]	1		271.7	40.1	52.4	-44.8	-219.4	80.7
36001	[ORIBAR11 400.00]	36005	[OPODG211 400.00]	1		481.6	141.3	150.6	11.9	-331.0	68.7
36005	[OPODG211 400.00]	36017	[OTIVT211 400.00]	A		1018.2	383.1	OUT OF SERVICE		-1018.2	100.0
52008	[IALSN111 400.00]	52135	[ILAIN111 400.00]	1		128.9	33.7	461.0	26.3	332.1	257.6
52008	[IALSN111 400.00]	52135	[ILAIN111 400.00]	2		122.7	30.8	438.9	24.0	316.1	257.6
52008	[IALSN111 400.00]	52903	[IALCN311 400.00]	1		0.0	-0.3	-219.9	13.8	-219.9	999.9
52021	[IBN2N111 400.00]	53182	[II72N111 400.00]	1		-847.7	41.8	-627.3	-1.1	-220.4	26.0
52085	[IPOGN111 400.00]	52962	[ICDLN111 400.00]	1		-110.4	-72.8	-322.0	-48.1	-211.6	191.6
52085	[IPOGN111 400.00]	53129	[II17N111 400.00]	1		-88.5	8.4	115.1	-9.5	203.6	230.1
52085	[IPOGN111 400.00]	53182	[II72N111 400.00]	1		579.1	-7.8	357.1	-6.4	-222.1	38.3
52135	[ILAIN111 400.00]	52145	[IMCON111 400.00]	1		456.0	16.6	669.4	23.7	213.4	46.8
52135	[ILAIN111 400.00]	52145	[IMCON111 400.00]	2		454.9	16.5	667.7	23.6	212.8	46.8
52135	[ILAIN111 400.00]	53186	[II76N111 400.00]	1		-347.7	33.3	-86.7	-15.5	261.1	75.1
52136	[ILARR111 400.00]	53109	[IGSSR111 400.00]	1		330.8	34.6	542.1	2.8	211.3	63.9
52136	[ILARR111 400.00]	53129	[II17N111 400.00]	1		-241.4	-54.9	-444.5	-25.8	-203.2	84.2
52143	[ILEYT111 400.00]	52197	[IRONT111 400.00]	1		77.7	36.1	306.3	55.1	228.7	294.5
52143	[ILEYT111 400.00]	52893	[IAEPT111 400.00]	1		0.0	-13.9	-299.9	-36.5	-299.9	999.9

52155 [IMRAN111	400.00]	53186 [II76N111	400.00]	1	500.5	-53.7	238.2	-34.7	-262.2	52.4
52246 [ITERR111	400.00]	52275 [IVLLR111	400.00]	1	-955.3	127.3	-733.5	113.8	221.8	23.2
52246 [ITERR111	400.00]	52275 [IVLLR111	400.00]	2	-895.5	118.2	-687.6	105.4	207.9	23.2
52275 [IVLLR111	400.00]	53109 [IGSSR111	400.00]	2	-591.1	-93.0	-796.3	-6.1	-205.2	34.7
52893 [IAEPT111	400.00]	52896 [IAEPT919	400.00]	1	0.0	0.0	-300.0	-23.6	-300.0	999.9
52903 [IALCN311	400.00]	52904 [IALCN371	15.000]	1	0.0	0.0	-220.0	14.0	-220.0	999.9
52962 [ICDLN111	400.00]	53183 [II73N111	400.00]	1	175.4	5.3	-36.6	25.1	-212.0	120.8

Table 13.6.7: Changes in power flow greater then 50 MW through tie-lines in area of interest in winter maximum 2015, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Montenegro –Italy

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%
36001	[ORIBAR11	400.00]	184	[XRI_PE11	400.00]	1	-70.1	-29.8	161.4	51.1	231.4	330.3	80.9	271.7
36005	[OPODG211	400.00]	13	[XTR_PG11	400.00]	1	-403.6	-247.7	-152.0	-112.0	251.6	62.3	135.7	54.8
36005	[OPODG211	400.00]	220	[XKA_PG11	400.00]	1	-266.1	-120.0	9.5	-32.6	275.6	103.6	87.5	72.9
36015	[OPODG121	220.00]	88	[XVD_PO21	220.00]	1	-60.7	-35.5	-18.4	5.5	42.2	69.6	40.9	115.4
36017	[OTIVT211	400.00]	701	[XIT_ME10	400.00]	D1	1000.0	200.0	OUT OF SERVICE		-1000.0	100.0	-200.0	100.0
36023	[OTPLJE21	220.00]	182	[XPL_BB21	220.00]	1	-164.2	16.4	-90.8	48.9	73.4	44.7	32.5	198.0
36023	[OTPLJE21	220.00]	183	[XPL_BI21	220.00]	1	-40.7	27.9	14.3	55.6	55.0	135.1	27.7	99.1
36025	[OHPIVA21	220.00]	115	[XSA_PI21	220.00]	1	85.9	-24.3	97.4	-2.2	11.5	13.4	22.2	91.2
36027	[OHPERU21	220.00]	116	[XTR_PE21	220.00]	1	-54.3	-44.3	-41.5	-22.1	12.9	23.7	22.2	50.1
36040	[OPLJEV51	110.00]	326	[XPL_ZA51	110.00]	1	-10.7	9.1	5.3	11.3	16.0	149.9	2.2	23.9
36050	[OHNOVI51	110.00]	316	[XTR_HN51	110.00]	1	-98.6	-23.7	-81.6	-16.9	17.1	17.3	6.8	28.8
36144	[OVIUS5K	110.00]	315	[XBI_NI51	110.00]	1	-9.0	-10.1	-0.6	-3.9	8.4	93.1	6.1	61.0

Table 13.6.8: Results of contingency (n-1) analysis in winter maximum 2015, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Montenegro –Italy

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%			
316	XTR_HN51	110.00	36050*OHNOVI51	110.00	1	BASE CASE	89.6	101.5	121.0
10010*AEBS22	220.00	10125	ACEKIN2	220.00	1	SINGLE 19	370.0	394.5	108.2
10009*AEBS12	220.00	10125	ACEKIN2	220.00	1	SINGLE 22	370.0	391.7	107.6
24034*MDUME 2	220.00	24096	MMART 21	220.00	1	SINGLE 367	426.8	523.8	117.0
24094*MMART 4	400.00	24096	MMART 21	220.00	1	SINGLE 367	500.0	532.9	106.6
24034*MDUME 2	220.00	24095	MMART 22	220.00	1	SINGLE 368	426.8	527.6	117.8
24094*MMART 4	400.00	24095	MMART 22	220.00	1	SINGLE 368	500.0	536.7	107.3
24034*MDUME 2	220.00	24096	MMART 21	220.00	1	SINGLE 379	426.8	524.1	117.1
24094*MMART 4	400.00	24096	MMART 21	220.00	1	SINGLE 379	500.0	533.2	106.6
24034*MDUME 2	220.00	24095	MMART 22	220.00	1	SINGLE 380	426.8	527.9	117.9
24094*MMART 4	400.00	24095	MMART 22	220.00	1	SINGLE 380	500.0	537.0	107.4
28040*RLOTRU2	220.00	28366	RSIBIU2	220.00	1	SINGLE 621	333.4	393.1	112.5
28040*RLOTRU2	220.00	28100	RSIBIU21	220.00	1	SINGLE 622	333.4	393.1	112.5
28040*RLOTRU2	220.00	28366	RSIBIU2	220.00	1	SINGLE 719	333.4	392.9	111.8
28040*RLOTRU2	220.00	28100	RSIBIU21	220.00	1	SINGLE 720	333.4	392.9	111.8
34100*JBGD172	220.00	34111	JBGD8 22	220.00	2	SINGLE 819	445.8	467.2	106.2
34100*JBGD172	220.00	34111	JBGD8 22	220.00	1	SINGLE 820	445.8	467.2	106.2

MONITORED VOLTAGE REPORT:									
SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN			
'HU220	'	RANGE BASE CASE	24025	MDETK 2	220.00	1.05000	1.05000	1.05000	0.90000
'ME400	'	RANGE BASE CASE	36017	OTIVT211	400.00	0.84051	0.84051	1.05000	0.90000
'ME400	'	RANGE SINGLE 1	36005	OPODG211	400.00	0.88875	0.90315	1.05000	0.90000
'ME400	'	RANGE SINGLE 2	36005	OPODG211	400.00	0.88006	0.90315	1.05000	0.90000
'ME400	'	RANGE SINGLE 36	36005	OPODG211	400.00	0.87530	0.90315	1.05000	0.90000
'ME400	'	RANGE SINGLE 40	36005	OPODG211	400.00	0.85653	0.90315	1.05000	0.90000
'BG220	'	RANGE SINGLE 134	12286	VUZUND2	220.00	0.88183	1.00603	1.10000	0.90000
'BG220	'	RANGE SINGLE 136	12282	VORFEJ2	220.00	1.10421	1.03714	1.10000	0.90000
'BA400	'	RANGE SINGLE 163	14405	RP TREBINJE	400.00	0.88698	0.95670	1.05000	0.90000
'ME400	'	RANGE SINGLE 163	36005	OPODG211	400.00	0.85414	0.90315	1.05000	0.90000
'ME400	'	RANGE SINGLE 215	36005	OPODG211	400.00	0.88833	0.90315	1.05000	0.90000
'HU220	'	RANGE SINGLE 356	24005	MALBF 22	220.00	0.89275	1.04262	1.05000	0.90000
'HU220	'	RANGE SINGLE 357	24006	MALBF 21	220.00	0.89461	1.04267	1.05000	0.90000
'HU220	'	RANGE SINGLE 367	24095	MMART 22	220.00	1.06711	1.04938	1.05000	0.90000
'HU220	'	RANGE SINGLE 368	24096	MMART 21	220.00	1.06707	1.04936	1.05000	0.90000
'ME400	'	RANGE SINGLE 530	36005	OPODG211	400.00	0.88786	0.90315	1.05000	0.90000
'RO220	'	RANGE SINGLE 691	28855	RMOSTI2	220.00	0.81496	1.00937	1.10000	0.90000
'RS400	'	RANGE SINGLE 796	34085	JSOMB31	400.00	0.85847	0.98785	1.05000	0.90000
'RS220	'	RANGE SINGLE 844	34200	JSABA32	220.00	0.87627	1.01521	1.10000	0.90000
'ME400	'	RANGE SINGLE 894	36005	OPODG211	400.00	0.82579	0.90315	1.05000	0.90000
'ME400	'	RANGE SINGLE 895	36005	OPODG211	400.00	0.88061	0.90315	1.05000	0.90000

CONTINGENCY LEGEND:	
LABEL	EVENTS
SINGLE 19	: OPEN LINE FROM BUS 10009 [AEBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	: OPEN LINE FROM BUS 10010 [AEBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 367	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1

SINGLE 368	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 379	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 380	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 621	:	OPEN LINE FROM BUS 28040 [RLOTU2	220.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 622	:	OPEN LINE FROM BUS 28040 [RLOTU2	220.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 719	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 720	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 819	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 1
SINGLE 820	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 2

### 13.6.2. Export from BiH to Italy

Table 13.6.9: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario export of 1000 MW from BiH to Italy via HVDC link Montenegro – Italy

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1340.3	1491.9	0.0	0.0	0.0	-200.0	48.4	-200.0
AL	532.1	689.7	-197.0	0.0	450.6	59.0	431.1	
20	8807.9	7603.7	0.0	14.4	0.0	1000.0	189.8	1000.0
BG	2941.5	3045.8	-44.9	120.8	2991.5	326.3	2485.0	
30	4191.7	2610.1	0.0	0.0	0.0	1490.0	91.5	1490.0
BA	889.2	724.5	0.0	0.0	907.9	179.6	893.0	
35	39263.2	49222.0	0.0	1.1	0.0	-10400.0	440.2	-10400.0
IT	7070.4	10816.5	0.0	-156.9	12551.3	-340.2	9302.3	
40	3099.3	3483.0	0.0	0.0	0.0	-434.9	51.2	-435.0
HR	387.7	1074.2	0.0	0.0	1405.9	47.8	671.6	
45	5392.5	6500.0	0.1	0.0	0.0	-1200.0	92.3	-1200.0
HU	964.1	1926.6	178.1	-29.6	2423.5	93.9	1218.6	
50	10298.6	10371.1	0.0	0.0	0.0	-350.0	277.5	-350.0
GR	2184.1	5312.0	170.2	9.3	6606.5	138.2	3147.2	
55	4397.8	-4593.5	0.0	4.8	0.0	8886.0	100.6	8886.0
UX	-2.4	637.5	0.0	12.8	2320.7	380.7	1287.3	
60	1502.2	1577.0	0.0	0.0	0.0	-100.0	25.2	-100.0
MK	468.1	573.6	-31.2	0.0	402.1	56.4	271.3	
65	1207.2	0.0	0.0	0.0	0.0	1200.0	7.2	1200.0
UA	-194.0	0.0	0.0	0.0	653.8	346.9	112.9	
70	10252.6	9416.9	0.0	88.4	0.0	545.0	202.3	545.0
RO	2520.2	4075.6	512.8	273.9	4616.5	-212.6	2487.0	
75	2994.3	2514.0	0.0	8.8	0.0	424.0	47.4	424.0
SI	984.3	811.0	0.0	54.0	608.3	179.6	548.1	
80	54593.2	54622.1	0.0	0.0	0.0	-800.0	771.2	-800.0
TR	4587.8	7792.0	1175.4	0.0	17195.4	-127.9	12943.7	
90	7720.4	7871.1	0.0	17.7	0.0	-360.0	191.7	-360.0
RS	2718.5	2853.5	0.0	76.2	1721.8	-621.9	2132.5	
91	646.4	805.2	0.5	1.8	0.0	-200.1	38.8	-200.0
ME	338.5	299.2	-320.2	10.6	261.9	254.8	356.0	
95	501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0

SK	-384.6	0.0	0.0	0.0	40.0	-360.4	15.9	
TOTALS	156209.1	153494.7	0.6	137.1	0.0	0.0	2576.8	0.0
	26005.4	41031.6	1443.3	371.1	55157.7	0.0	38303.5	



Figure 13.6.3: Aggregated border flows in area of SEE in winter maximum 2015, scenario export of 1000 MW from BiH to Italy via HVDC link Montenegro – Italy

Table 13.6.10: Branches loaded more then 80% of their thermal limits in monitored grid in winter maximum 2015, scenario export of 1000 MW from BiH to Italy via HVDC link Montenegro – Italy

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT, STS,	MW,	MVAR,	MVA,	%I
				***** NONE *****				

Table 13.6.11: Changes in power flow greater then 150 MW in area of SEE in winter maximum 2015, scenario export of 1000 MW from BiH to Italy via HVDC link Montenegro – Italy

BRANCHES WITH FROM OR TO END MW FLOWS DIFFERING BY MORE THAN 150.0 MW: IN WORKING CASE IN BASE CASE											
X-----	FROM BUS	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
	13 [XTR_PG11	400.00]	14405 [WTREB11	400.00]	1	-785.0	-1.0	-279.0	-80.8	506.0	64.5
	13 [XTR_PG11	400.00]	36005 [OPODG211	400.00]	1	OUT OF SERVICE		279.0	80.8	279.0	999.9
	13 [XTR_PG11	400.00]	36017 [OTIVT211	400.00]	A	785.0	1.0	OUT OF SERVICE		-785.0	100.0
	700 [XIT_ME11	400.00]	52275 [IVLL1111	400.00]	1	1000.0	-200.0	OUT OF SERVICE		-1000.0	100.0
	701 [XIT_ME10	400.00]	36017 [OTIVT211	400.00]	D1	-1000.0	-200.0	OUT OF SERVICE		1000.0	100.0
	14202 [WTREBI2	220.00]	14405 [WTREB11	400.00]	1	268.6	-14.4	76.8	-11.1	-191.7	71.4
	14404 [WGACKO1	400.00]	14405 [WTREB11	400.00]	1	545.7	57.4	206.0	53.6	-339.7	62.3

14404	[WGACKO1	400.00]	18401	[WMOST41	400.00]	1	-246.0	-12.6	13.8	-21.9	259.8	105.6
16009	[TUZ-G6	15.750]	16210	[WTUZL62	220.00]	1	198.0	73.8	0.0	0.0	-198.0	100.0
16210	[WTUZL62	220.00]	16211	[WTSTUZ2	220.00]	1	197.2	40.7	0.0	0.0	-197.2	100.0
18007	[CAPL-G2	15.700]	18205	[WHECAP2	220.00]	1	210.0	25.8	0.0	0.0	-210.0	100.0
36001	[ORIBAR11	400.00]	36005	[OPODG211	400.00]	1	345.6	44.1	123.0	19.3	-222.6	64.4
36005	[OPODG211	400.00]	36017	[OTIVT211	400.00]	A	222.0	-69.2	OUT OF	SERVICE	-222.0	100.0
52021	[IBN21111	400.00]	52125	[II721111	400.00]	1	-968.8	84.1	-816.6	50.8	152.2	15.7
52084	[IFNO1111	400.00]	52086	[IFOR1111	400.00]	1	83.7	-86.9	-77.5	-46.7	-161.2	192.6
52084	[IFNO1111	400.00]	52110	[II271111	400.00]	1	-432.3	16.6	-244.7	-29.7	187.6	43.4
52084	[IFNO1111	400.00]	52230	[ISMV1111	400.00]	1	236.0	-30.2	73.2	8.9	-162.8	69.0
52085	[IFOG1111	400.00]	52125	[II721111	400.00]	1	705.0	-18.0	550.2	-22.3	-154.8	22.0
52086	[IFOR1111	400.00]	52230	[ISMV1111	400.00]	1	68.2	81.7	231.0	41.3	162.7	238.5
52098	[IGSS1111	400.00]	52275	[IVLL1111	400.00]	2	502.1	42.9	658.2	-17.8	156.1	31.1
52110	[II271111	400.00]	52246	[ITER1111	400.00]	1	-643.8	18.2	-462.1	-10.0	181.7	28.2
52246	[ITER1111	400.00]	52275	[IVLL1111	400.00]	1	-847.7	157.4	-550.3	124.3	297.4	35.1
52246	[ITER1111	400.00]	52275	[IVLL1111	400.00]	2	-790.6	144.8	-513.2	114.0	277.4	35.1
52246	[ITER1111	400.00]	52277	[IVLV1111	400.00]	1	491.6	-77.4	317.6	-58.3	-174.0	35.4

Table 13.6.12: Results of contingency (n-1) analysis in winter maximum 2015 scenario export of 1000 MW from BiH to Italy via HVDC link Montenegro – Italy

<----- MONITORED BRANCH ----->				CONTINGENCY		RATING	FLOW		%	
316*XTR_HN51	110.00	36050	OHNOVI51	110.00	1	BASE CASE	89.6	94.4	108.5	
14405	WTREBI1	400.00	14202*WTREBI2	220.00	1	SINGLE 152	400.0	574.6	143.7	
14405	WTREBI1	400.00	14202	WTREBI2	220.00	1	SINGLE 153	400.0	412.9	103.2
116	XTR_PE21	220.00	36027*OHPERU21	220.00	1	SINGLE 196	301.0	377.5	135.3	
24034	MDUME 2	220.00	24095	MMART 22	220.00	1	SINGLE 345	426.8	450.0	100.5
24034	MDUME 2	220.00	24095	MMART 22	220.00	1	SINGLE 357	426.8	450.1	100.5
31210	LDIVAC2	220.00	156	XPA_DI21	220.00	1	SINGLE 707	320.1	552.7	167.2
36010	OPLJE211	400.00	36023*OTPLJE21	220.00	2	SINGLE 841	400.0	403.9	101.0	
36010	OPLJE211	400.00	36023	*OTPLJE21	220.00	1	SINGLE 842	400.0	402.7	100.7

MONITORED VOLTAGE REPORT:		CONTINGENCY		<----- B U S ----->						
SYSTEM					V-CONT	V-INIT	V-MAX	V-MIN		
'BG220	'	RANGE	SINGLE 100	12252	VOCHIF2	220.00	0.81830	0.95836	1.10000	0.90000
'BG220	'	RANGE	SINGLE 124	12286	VUZUND2	220.00	0.89539	1.00425	1.10000	0.90000
'AL400	'	RANGE	SINGLE 196	10015	AKASHA1	400.00	0.89727	0.97979	1.05000	0.90000
'ME400	'	RANGE	SINGLE 196	36001	ORIBAR11	400.00	0.88238	0.98817	1.05000	0.90000
'ME400	'	RANGE	SINGLE 196	36005	OPODG211	400.00	0.82501	0.97239	1.05000	0.90000
'ME400	'	RANGE	SINGLE 196	36017	OTIVT211	400.00	0.78849	0.97783	1.05000	0.90000
'GR400	'	RANGE	SINGLE 432	22759	GTH_AG11	400.00	1.05180	1.02493	1.05000	0.90000
'GR400	'	RANGE	SINGLE 432	23123	GKPATR11	400.00	1.05189	1.03786	1.05000	0.90000
'GR400	'	RANGE	SINGLE 432	23125	GKPATC11	400.00	1.05199	1.03784	1.05000	0.90000
'GR400	'	RANGE	SINGLE 432	23126	GKPATC12	400.00	1.05193	1.03796	1.05000	0.90000
'GR400	'	RANGE	SINGLE 432	23173	GDISTO11	400.00	1.05283	1.03759	1.05000	0.90000
'GR400	'	RANGE	SINGLE 432	23174	GDISTO12	400.00	1.05245	1.03773	1.05000	0.90000
'GR400	'	RANGE	SINGLE 432	23180	GAXELO12	400.00	1.05210	1.03840	1.05000	0.90000
'GR400	'	RANGE	SINGLE 432	23181	GAXELO11	400.00	1.05206	1.03862	1.05000	0.90000
'GR400	'	RANGE	SINGLE 433	23064	GK_MEG13	400.00	1.05355	1.04085	1.05000	0.90000
'GR400	'	RANGE	SINGLE 433	23066	GK_MEG11	400.00	1.05355	1.04085	1.05000	0.90000
'GR400	'	RANGE	SINGLE 433	23123	GKPATR11	400.00	1.05297	1.03786	1.05000	0.90000
'GR400	'	RANGE	SINGLE 433	23125	GKPATC11	400.00	1.05306	1.03784	1.05000	0.90000
'GR400	'	RANGE	SINGLE 433	23126	GKPATC12	400.00	1.05301	1.03796	1.05000	0.90000
'GR400	'	RANGE	SINGLE 433	23173	GDISTO11	400.00	1.05369	1.03759	1.05000	0.90000
'GR400	'	RANGE	SINGLE 433	23174	GDISTO12	400.00	1.05351	1.03773	1.05000	0.90000
'GR400	'	RANGE	SINGLE 433	23180	GAXELO12	400.00	1.05319	1.03840	1.05000	0.90000
'GR400	'	RANGE	SINGLE 433	23181	GAXELO11	400.00	1.05325	1.03862	1.05000	0.90000
'GR400	'	RANGE	SINGLE 462	23036	GK_KOR13	400.00	1.06297	1.01720	1.05000	0.90000
'GR400	'	RANGE	SINGLE 462	23068	GK_MEG14	400.00	1.06057	1.02922	1.05000	0.90000
'GR400	'	RANGE	SINGLE 463	23037	GK_KOR14	400.00	1.06297	1.01720	1.05000	0.90000
'GR400	'	RANGE	SINGLE 463	23067	GK_MEG12	400.00	1.06057	1.02922	1.05000	0.90000
'GR400	'	RANGE	SINGLE 473	23126	GKPATC12	400.00	1.06857	1.03796	1.05000	0.90000
'GR400	'	RANGE	SINGLE 473	23180	GAXELO12	400.00	1.06857	1.03840	1.05000	0.90000
'GR400	'	RANGE	SINGLE 473	23181	GAXELO11	400.00	1.06838	1.03862	1.05000	0.90000
'GR400	'	RANGE	SINGLE 475	23180	GAXELO12	400.00	1.06802	1.03840	1.05000	0.90000
'GR400	'	RANGE	SINGLE 475	23181	GAXELO11	400.00	1.06783	1.03862	1.05000	0.90000
'RO220	'	RANGE	SINGLE 567	28043	RSTUPA2	220.00	0.89305	0.98042	1.10000	0.90000
'RO220	'	RANGE	SINGLE 637	28855	RMOSTI2	220.00	0.88214	1.04051	1.10000	0.90000
'RO220	'	RANGE	SINGLE 642	28907	RSTILP2	220.00	0.84374	0.98219	1.10000	0.90000
'RO220	'	RANGE	SINGLE 670	28095	RVETIS2	220.00	0.89802	1.02192	1.10000	0.90000
'RS400	'	RANGE	SINGLE 739	34085	JSOMB31	400.00	0.87981	0.99493	1.05000	0.90000
'BA400	'	RANGE	SINGLE 847	14404	WGACKO1	400.00	1.05512	1.02975	1.05000	0.90000
'BA400	'	RANGE	SINGLE 847	14405	WTREBI1	400.00	1.05975	1.01560	1.05000	0.90000
'ME400	'	RANGE	SINGLE 847	36017	OTIVT211	400.00	1.06173	0.97783	1.05000	0.90000

CONTINGENCY LEGEND:	
LABEL	EVENTS

SINGLE 100	:	OPEN LINE FROM BUS 12250 [VGORIA2	220.00]	TO BUS 12252 [VOCHIF2	220.00]	CKT 1
SINGLE 124	:	OPEN LINE FROM BUS 12275 [VMI3 2	220.00]	TO BUS 12286 [VUZUND2	220.00]	CKT 1
SINGLE 152	:	OPEN LINE FROM BUS 14404 [WGACKO1	400.00]	TO BUS 14405 [WTREBI1	400.00]	CKT 1
SINGLE 153	:	OPEN LINE FROM BUS 14404 [WGACKO1	400.00]	TO BUS 18401 [WMOST41	400.00]	CKT 1
SINGLE 196	:	OPEN LINE FROM BUS 13 [XTR_PG11	400.00]	TO BUS 36017 [OTIVT211	400.00]	CKT A
SINGLE 345	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 357	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 432	:	OPEN LINE FROM BUS 22759 [GTH_AG11	400.00]	TO BUS 23172 [GDISTO13	400.00]	CKT 1
SINGLE 433	:	OPEN LINE FROM BUS 22759 [GTH_AG11	400.00]	TO BUS 23173 [GDISTO11	400.00]	CKT 1
SINGLE 462	:	OPEN LINE FROM BUS 23033 [GKYT_K11	400.00]	TO BUS 23036 [GK_KOR13	400.00]	CKT 1
SINGLE 463	:	OPEN LINE FROM BUS 23033 [GKYT_K11	400.00]	TO BUS 23037 [GK_KOR14	400.00]	CKT 1
SINGLE 473	:	OPEN LINE FROM BUS 23123 [GKPATR11	400.00]	TO BUS 23126 [GKPATC12	400.00]	CKT 1
SINGLE 475	:	OPEN LINE FROM BUS 23126 [GKPATC12	400.00]	TO BUS 23180 [GAXELO12	400.00]	CKT 1
SINGLE 567	:	OPEN LINE FROM BUS 28043 [RSTUPA2	220.00]	TO BUS 28044 [RBRADU2	220.00]	CKT 1
SINGLE 637	:	OPEN LINE FROM BUS 28855 [RMOSTI2	220.00]	TO BUS 28935 [RRAC.M2	220.00]	CKT 1
SINGLE 642	:	OPEN LINE FROM BUS 28906 [RTELEA2	220.00]	TO BUS 28907 [RSTILP2	220.00]	CKT 1
SINGLE 670	:	OPEN LINE FROM BUS 28039 [RROSIO1	400.00]	TO BUS 28094 [RROSIO2	220.00]	CKT 1
SINGLE 707	:	OPEN LINE FROM BUS 31410 [LDIVAC1	400.00]	TO BUS 80 [XRE_DI11	400.00]	CKT 1
SINGLE 739	:	OPEN LINE FROM BUS 34050 [JSUBO31	400.00]	TO BUS 34085 [JSOMB31	400.00]	CKT 1
SINGLE 841	:	OPEN LINE FROM BUS 36010 [OPLJE211	400.00]	TO BUS 36023 [OTPLJE21	220.00]	CKT 1
SINGLE 842	:	OPEN LINE FROM BUS 36010 [OPLJE211	400.00]	TO BUS 36023 [OTPLJE21	220.00]	CKT 2
SINGLE 847	:	OPEN LINE FROM BUS 36017 [OTIVT211	400.00]	TO BUS 701 [XIT_ME10	400.00]	CKT D1

Table 13.6.13: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario export of 1000 MW from BiH to Italy via HVDC link Montenegro – Italy

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1624.5	1723.7	0.0	0.0	0.0	-150.0	50.8	-150.0
AL	711.0	779.7	-202.7	0.0	469.4	114.4	489.0	
20	9663.0	8411.0	0.0	15.5	0.0	1000.0	236.5	1000.0
BG	3557.9	3357.9	0.0	181.0	3275.0	197.8	3096.1	
30	3968.8	2897.8	0.0	0.0	0.0	1000.0	71.0	1000.0
BA	1196.4	1017.2	0.0	0.0	922.5	213.7	888.0	
35	44068.8	54409.8	0.0	1.1	0.0	-10740.0	397.9	-10740.0
IT	9854.1	11942.3	0.0	147.6	12359.2	-610.1	10733.6	
40	3425.4	4359.0	0.0	0.0	0.0	-1000.0	66.4	-1000.0
HR	486.2	1075.9	0.0	0.0	1537.4	204.9	742.8	
45	6093.8	7180.0	0.1	0.0	0.0	-1200.0	113.7	-1200.0
HU	1334.9	2128.1	178.6	-29.1	2405.8	-22.0	1485.1	
50	11751.3	11426.0	0.0	0.0	0.0	0.0	325.2	0.0
GR	3165.1	5724.7	203.8	9.4	6658.1	146.2	3725.4	
55	5227.0	-4356.2	0.0	4.8	0.0	9449.8	128.6	9450.0
UX	352.1	622.8	0.0	12.7	2300.7	337.8	1679.4	
60	1941.1	2001.9	0.0	0.0	0.0	-100.0	39.1	-100.0
MK	777.7	752.3	-30.7	0.0	396.3	15.2	436.0	
65	1207.6	0.0	0.0	0.0	0.0	1200.0	7.6	1200.0
UA	-165.8	0.0	0.0	0.0	652.3	364.3	122.2	
70	13257.1	12110.2	0.0	90.2	0.0	800.1	256.6	800.0
RO	3105.5	4455.6	783.5	286.0	5604.7	-0.8	3186.0	
75	3949.7	2990.0	0.0	8.9	0.0	890.0	60.8	890.0
SI	1229.0	964.6	0.0	53.8	868.6	335.3	743.9	
80	77661.7	77342.9	0.0	0.0	0.0	-800.0	1118.8	-800.0
TR	9840.1	11034.0	996.9	0.0	22660.6	-167.2	20637.1	

90	7772.1	8298.8	0.0	17.2	0.0	-750.0	206.1	-750.0
RS	2937.1	2986.6	0.0	73.1	1727.1	-674.9	2279.4	
91	879.6	938.0	0.5	2.1	0.0	-100.0	39.1	-100.0
ME	366.9	346.6	-326.1	11.2	263.2	249.7	348.6	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-329.5	0.0	0.0	0.0	40.0	-304.4	14.9	
TOTALS	192992.8	189732.9	0.6	139.8	0.0	0.0	3119.4	0.0
	38418.7	47588.4	1603.3	745.6	62140.8	0.0	50607.5	



Figure 13.6.4: Aggregated border flows in area of SEE in winter maximum 2020, scenario export of 1000 MW from BiH to Italy via HVDC link Montenegro – Italy

Table 13.6.14: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2020, scenario export of 1000 MW from BiH to Italy via HVDC link Montenegro – Italy

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I		
12274,VMI	2	220.00,	12474,VMI	1	400.00,	1,	1,	-525.88,	-110.08,	537.28,	81.07

Table 13.6.15: Changes in power flow greater than 150 MW in area of SEE in winter maximum 2020, scenario export of 1000 MW from BiH to Italy via HVDC link Montenegro – Italy

BRANCHES WITH FROM OR TO END MW FLOWS DIFFERING BY MORE THAN 150.0 MW:												
IN WORKING CASE				IN BASE CASE								
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
13 [XTR_PG11	400.00]	14405 [RP TREBINJE	400.00]	1	-688.7	-36.3	-152.4	-83.4	536.3	77.9		
13 [XTR_PG11	400.00]	36005 [OPODG211	400.00]	1	OUT OF SERVICE		152.4	83.4	152.4	999.9		
13 [XTR_PG11	400.00]	36017 [OTIVT211	400.00]	A	688.7	36.3	OUT OF SERVICE		-688.7	100.0		
700 [XIT_ME11	400.00]	52275 [IVLLR111	400.00]	1	1000.0	-200.0	OUT OF SERVICE		-1000.0	100.0		
701 [XIT_ME10	400.00]	36017 [OTIVT211	400.00]	D1	-1000.0	-200.0	OUT OF SERVICE		1000.0	100.0		
14202 [RP TREBINJE	220.00]	14405 [RP TREBINJE	400.00]	1	193.2	-29.4	-2.4	-31.9	-195.6	101.2		
14404 [TE GACKO	400.00]	14405 [RP TREBINJE	400.00]	1	500.9	80.5	155.3	70.5	-345.7	69.0		
14404 [TE GACKO	400.00]	18401 [MO-4	400.00]	1	-201.2	-4.2	132.4	-1.0	333.7	165.8		
16009 [TUZ-G6	15.750]	16210 [TUZLA 6	220.00]	1	195.0	102.9	OUT OF SERVICE		-195.0	100.0		
16210 [TUZLA 6	220.00]	16211 [TS TUZLA	220.00]	1	194.1	66.9	0.0	0.0	-194.1	100.0		
18006 [CAPL-G1	15.700]	18205 [HE CAPLJINA	220.00]	1	170.0	48.2	OUT OF SERVICE		-170.0	100.0		
18007 [CAPL-G2	15.700]	18205 [HE CAPLJINA	220.00]	1	170.0	48.2	OUT OF SERVICE		-170.0	100.0		
18204 [MO-4	220.00]	18205 [HE CAPLJINA	220.00]	1	-170.1	-28.1	0.0	-6.7	170.1	100.0		
18204 [MO-4	220.00]	18205 [HE CAPLJINA	220.00]	2	-167.5	-27.8	0.0	-6.7	167.5	100.0		
36001 [ORIBAR11	400.00]	36005 [OPODG211	400.00]	1	360.4	19.7	150.6	11.9	-209.8	58.2		
36005 [OPODG211	400.00]	36017 [OTIVT211	400.00]	A	317.5	-120.7	OUT OF SERVICE		-317.5	100.0		
52021 [IBN2N111	400.00]	53182 [II72N111	400.00]	1	-788.7	26.6	-627.3	-1.1	161.4	20.5		
52084 [IFNOR111	400.00]	52086 [IFORF111	400.00]	1	203.8	-121.4	43.2	-76.9	-160.6	78.8		
52084 [IFNOR111	400.00]	52230 [ISMVF111	400.00]	1	372.9	-59.4	208.9	-15.4	-164.0	44.0		
52084 [IFNOR111	400.00]	53142 [II27R111	400.00]	1	-610.5	48.0	-421.4	-4.1	189.2	31.0		
52085 [IFOGN111	400.00]	53182 [II72N111	400.00]	1	519.6	-4.4	357.1	-6.4	-162.6	31.3		
52086 [IFORF111	400.00]	52230 [ISMVF111	400.00]	1	-35.9	132.4	127.8	79.2	163.7	455.6		
52136 [ILARR111	400.00]	53109 [IGSSR111	400.00]	1	387.9	41.6	542.1	2.8	154.2	39.8		
52246 [ITERR111	400.00]	52275 [IVLLR111	400.00]	1	-1027.8	127.9	-733.5	113.8	294.3	28.6		
52246 [ITERR111	400.00]	52275 [IVLLR111	400.00]	2	-963.5	118.8	-687.6	105.4	275.9	28.6		
52246 [ITERR111	400.00]	52277 [IVLVR111	400.00]	1	500.1	-70.9	328.2	-49.9	-171.8	34.4		
52246 [ITERR111	400.00]	53142 [II27R111	400.00]	1	839.5	25.4	656.2	8.0	-183.2	21.8		
52275 [IVLLR111	400.00]	53109 [IGSSR111	400.00]	2	-641.7	-101.8	-796.3	-6.1	-154.6	24.1		

Table 13.6.16: Results of contingency (n-1) analysis in winter maximum 2020, scenario export of 1000 MW from BiH to Italy via HVDC link Montenegro – Italy

<----- MONITORED BRANCH ----->	CONTINGENCY	RATING	FLOW	%
316 XTR_HN51	110.00 36050*0HNOVI51 110.00 1 BASE CASE	89.6	101.8	115.9
10010*AELBS22	220.00 10125 ACEKIN2 220.00 1 SINGLE 19	370.0	387.7	103.8
10009*AELBS12	220.00 10125 ACEKIN2 220.00 1 SINGLE 22	370.0	385.5	103.5
14405 RP TREBINJE	400.00 14202*RP TREBINJE 220.00 1 SINGLE 163	400.0	474.2	118.6
24034*MDUME 2	220.00 24096 MMART 21 220.00 1 SINGLE 367	426.8	515.0	115.0
24094*MMART 4	400.00 24096 MMART 21 220.00 1 SINGLE 367	500.0	524.2	104.8
24034*MDUME 2	220.00 24095 MMART 22 220.00 1 SINGLE 368	426.8	518.7	115.9
24094*MMART 4	400.00 24095 MMART 22 220.00 1 SINGLE 368	500.0	528.0	105.6
24034*MDUME 2	220.00 24096 MMART 21 220.00 1 SINGLE 379	426.8	515.2	115.1
24094*MMART 4	400.00 24096 MMART 21 220.00 1 SINGLE 379	500.0	524.4	104.9
24034*MDUME 2	220.00 24095 MMART 22 220.00 1 SINGLE 380	426.8	518.9	115.9
24094*MMART 4	400.00 24095 MMART 22 220.00 1 SINGLE 380	500.0	528.2	105.6
28040*RLOTRU2	220.00 28366 RSIBIU2 220.00 1 SINGLE 621	333.4	393.1	112.2
28040*RLOTRU2	220.00 28100 RSIBIU21 220.00 1 SINGLE 622	333.4	393.1	112.2
28040*RLOTRU2	220.00 28366 RSIBIU2 220.00 1 SINGLE 719	333.4	392.8	111.6
28040*RLOTRU2	220.00 28100 RSIBIU21 220.00 1 SINGLE 720	333.4	392.8	111.6
34100*JBGD172	220.00 34111 JBGD8 22 220.00 2 SINGLE 819	445.8	466.9	105.5
34100*JBGD172	220.00 34111 JBGD8 22 220.00 1 SINGLE 820	445.8	466.9	105.5

MONITORED VOLTAGE REPORT:	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN	
SYSTEM							
'BG220	RANGE SINGLE 134	12286 VUZUND2	220.00	0.88826	1.01001	1.10000	0.90000
'BG220	RANGE SINGLE 136	12282 VORFEJ2	220.00	1.10509	1.04339	1.10000	0.90000
'ME400	RANGE SINGLE 207	36005 OPODG211	400.00	0.86601	0.97530	1.05000	0.90000
'ME400	RANGE SINGLE 207	36017 OTIVT211	400.00	0.83794	0.98769	1.05000	0.90000
'HR220	RANGE SINGLE 257	20045 HE SENJ	220.00	1.10008	1.08248	1.10000	0.90000
'HU220	RANGE SINGLE 356	24005 MALBF 22	220.00	0.89275	1.04262	1.10000	0.90000
'HU220	RANGE SINGLE 357	24006 MALBF 21	220.00	0.89462	1.04267	1.10000	0.90000
'RO220	RANGE SINGLE 691	28855 RMOSTI2	220.00	0.82178	1.01475	1.10000	0.90000
'RS400	RANGE SINGLE 796	34085 JSOMB31	400.00	0.86412	0.99064	1.05000	0.90000
'RS220	RANGE SINGLE 844	34200 JSABA32	220.00	0.88642	1.02010	1.10000	0.90000
'ME400	RANGE SINGLE 909	36017 OTIVT211	400.00	1.05882	0.98769	1.05000	0.90000

CONTINGENCY LEGEND:	EVENTS
LABEL	



SINGLE 19	:	OPEN LINE FROM BUS 10009 [AELBS12	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1
SINGLE 22	:	OPEN LINE FROM BUS 10010 [AELBS22	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1
SINGLE 134	:	OPEN LINE FROM BUS 12275 [VMI3 2	220.00]	TO BUS 12286 [VUZUND2	220.00]	CKT 1
SINGLE 136	:	OPEN LINE FROM BUS 12280 [VALEKO2	220.00]	TO BUS 12282 [VORFEJ2	220.00]	CKT 1
SINGLE 163	:	OPEN LINE FROM BUS 14404 [TE GACKO	400.00]	TO BUS 14405 [RP TREBINJE	400.00]	CKT 1
SINGLE 207	:	OPEN LINE FROM BUS 13 [XTR_PG11	400.00]	TO BUS 36017 [0TIVT211	400.00]	CKT A
SINGLE 257	:	OPEN LINE FROM BUS 20008 [HBRINJ21	220.00]	TO BUS 20045 [HE SENJ	220.00]	CKT 1
SINGLE 356	:	OPEN LINE FROM BUS 24005 [MALBF 22	220.00]	TO BUS 24034 [MDUME 2	220.00]	CKT 1
SINGLE 357	:	OPEN LINE FROM BUS 24006 [MALBF 21	220.00]	TO BUS 24034 [MDUME 2	220.00]	CKT 1
SINGLE 367	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 368	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 379	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 380	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 621	:	OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 622	:	OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 691	:	OPEN LINE FROM BUS 28855 [RMOSTI2	220.00]	TO BUS 28935 [RRAC.M2	220.00]	CKT 1
SINGLE 719	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 720	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 819	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 1
SINGLE 820	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 2
SINGLE 844	:	OPEN LINE FROM BUS 34170 [JOBREN2	220.00]	TO BUS 34200 [JSABA32	220.00]	CKT 1
SINGLE 909	:	OPEN LINE FROM BUS 36017 [0TIVT211	400.00]	TO BUS 701 [XIT_ME10	400.00]	CKT D1

## 13.7. Impact of HVDC link Croatia – Italy

### 13.7.1. Export from Bulgaria and Romania to Italy

Table 13.7.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Croatia –Italy

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1338.8	1491.9	0.0	0.0	0.0	-200.1	47.0	-200.0
AL			486.4	689.7	-199.2	0.0	456.9	28.9	424.0	
20			9321.0	7603.7	0.0	14.4	0.0	1499.0	203.9	1500.0
BG			2986.8	3045.8	-44.7	120.6	2988.0	276.0	2577.1	
30			3156.4	2610.1	0.0	0.0	0.0	489.6	56.7	490.0
BA			942.0	724.5	0.0	0.0	889.7	426.0	681.2	
35			39278.7	49222.0	0.0	1.1	0.0	-10399.6	455.2	-10400.0
IT			7607.9	10816.5	0.0	-156.7	12521.2	-226.7	9696.0	
40			3117.5	3483.0	0.0	0.0	0.0	-435.6	70.1	-435.0
HR			699.6	1074.2	0.0	0.0	1372.8	178.1	820.1	
45			5392.9	6500.0	0.1	0.0	0.0	-1200.6	93.4	-1200.0
HU			1029.2	1926.6	178.1	-29.6	2420.9	140.3	1234.8	
50			10298.9	10371.1	0.0	0.0	0.0	-350.1	277.9	-350.0
GR			2173.8	5312.0	170.3	9.3	6607.8	125.1	3151.2	
55			4406.5	-4593.5	0.0	4.8	0.0	8893.4	101.9	8886.0
UX			41.8	637.5	0.0	12.8	2316.5	391.7	1316.3	
60			1503.1	1577.0	0.0	0.0	0.0	-100.1	26.2	-100.0
MK			466.6	573.6	-31.2	0.0	402.2	44.8	281.6	
65			1206.9	0.0	0.0	0.0	0.0	1200.0	6.9	1200.0
UA			-193.7	0.0	0.0	0.0	653.7	350.6	109.5	
70			10764.1	9416.9	0.0	88.1	0.0	1042.2	216.9	1045.0
RO			2642.4	4075.6	512.3	273.1	4605.5	-296.5	2683.4	
75			2994.8	2514.0	0.0	8.8	0.0	423.7	48.3	424.0
SI			1032.2	811.0	0.0	53.8	605.4	217.3	555.6	
80			54594.3	54622.1	0.0	0.0	0.0	-800.1	772.4	-800.0
TR			4602.9	7792.0	1175.4	0.0	17195.1	-126.2	12956.8	
90			7724.2	7871.1	0.0	17.7	0.0	-361.5	196.9	-360.0
RS			2751.3	2853.5	0.0	76.2	1720.2	-653.2	2195.0	
91			628.9	805.2	0.5	1.9	0.0	-200.1	21.3	-200.0
ME			321.2	299.2	-34.7	10.8	237.5	83.3	200.1	
95			501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK			-379.0	0.0	0.0	0.0	40.0	-354.7	15.7	
101			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)			0.0	604.6	0.0	0.0	0.0	-604.6	0.0	

103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	156228.3	153494.7	0.6	136.8	0.0	0.0	2596.2	0.0
	27211.3	41236.2	1726.2	370.2	55033.6	0.0	38898.5	

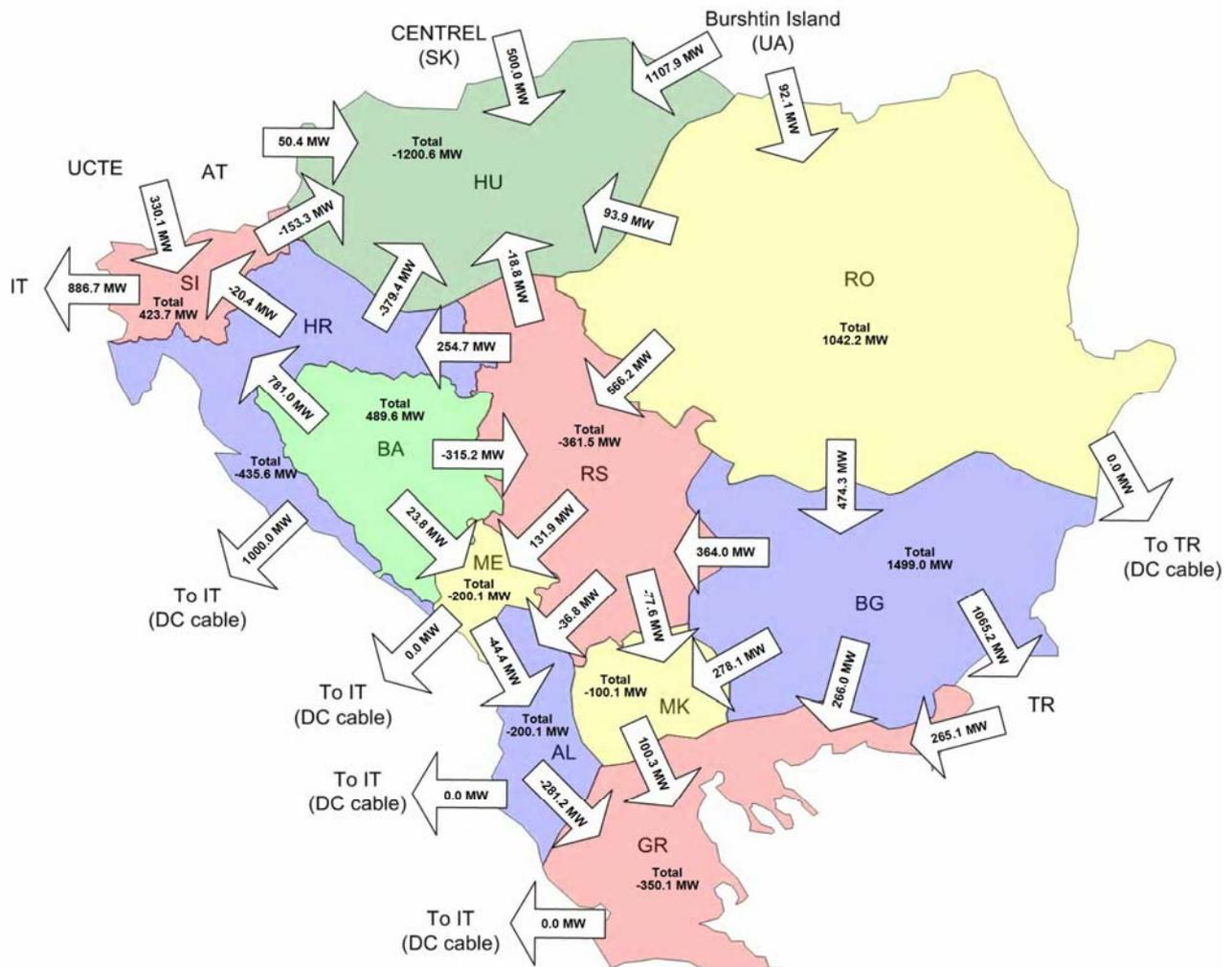


Figure 13.7.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Croatia –Italy

Table 13.7.2: Changes in power flow in area of SEE in winter maximum 2015, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Croatia –Italy

X-----	FROM BUS	-----X X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	
11	[XMO_KO11	400.00]	18401	[WMOST41	400.00]	1	-571.0	-143.9	-96.7	-30.9	474.3	83.1



'GR400	'	RANGE SINGLE	433	22759	GTH_AG11	400.00	1.05187	1.02505	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23123	GKPATR11	400.00	1.05198	1.03798	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23125	GKPATC11	400.00	1.05208	1.03796	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23126	GKPATC12	400.00	1.05202	1.03807	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23173	GDISTO11	400.00	1.05292	1.03771	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23174	GDISTO12	400.00	1.05254	1.03784	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23180	GAXELO12	400.00	1.05219	1.03852	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23181	GAXELO11	400.00	1.05215	1.03873	1.05000	0.90000
'GR400	'	RANGE SINGLE	434	23064	GK_MEG13	400.00	1.05366	1.04096	1.05000	0.90000
'GR400	'	RANGE SINGLE	434	23066	GK_MEG11	400.00	1.05366	1.04096	1.05000	0.90000
'GR400	'	RANGE SINGLE	434	23123	GKPATR11	400.00	1.05308	1.03798	1.05000	0.90000
'GR400	'	RANGE SINGLE	434	23125	GKPATC11	400.00	1.05317	1.03796	1.05000	0.90000
'GR400	'	RANGE SINGLE	434	23126	GKPATC12	400.00	1.05312	1.03807	1.05000	0.90000
'GR400	'	RANGE SINGLE	434	23173	GDISTO11	400.00	1.05380	1.03771	1.05000	0.90000
'GR400	'	RANGE SINGLE	434	23174	GDISTO12	400.00	1.05362	1.03784	1.05000	0.90000
'GR400	'	RANGE SINGLE	434	23180	GAXELO12	400.00	1.05330	1.03852	1.05000	0.90000
'GR400	'	RANGE SINGLE	434	23181	GAXELO11	400.00	1.05336	1.03873	1.05000	0.90000
'GR400	'	RANGE SINGLE	463	23036	GK_KOR13	400.00	1.06307	1.01731	1.05000	0.90000
'GR400	'	RANGE SINGLE	463	23068	GK_MEG14	400.00	1.06067	1.02933	1.05000	0.90000
'GR400	'	RANGE SINGLE	464	23037	GK_KOR14	400.00	1.06307	1.01731	1.05000	0.90000
'GR400	'	RANGE SINGLE	464	23067	GK_MEG12	400.00	1.06067	1.02933	1.05000	0.90000
'GR400	'	RANGE SINGLE	474	23126	GKPATC12	400.00	1.06872	1.03807	1.05000	0.90000
'GR400	'	RANGE SINGLE	474	23180	GAXELO12	400.00	1.06872	1.03852	1.05000	0.90000
'GR400	'	RANGE SINGLE	474	23181	GAXELO11	400.00	1.06852	1.03873	1.05000	0.90000
'GR400	'	RANGE SINGLE	476	23180	GAXELO12	400.00	1.06816	1.03852	1.05000	0.90000
'GR400	'	RANGE SINGLE	476	23181	GAXELO11	400.00	1.06798	1.03873	1.05000	0.90000
'RO220	'	RANGE SINGLE	568	28043	RSTUPA2	220.00	0.89153	0.97926	1.10000	0.90000
'RO220	'	RANGE SINGLE	638	28855	RMOSTI2	220.00	0.88142	1.04034	1.10000	0.90000
'RO220	'	RANGE SINGLE	643	28907	RSTILP2	220.00	0.84304	0.98174	1.10000	0.90000
'RO220	'	RANGE SINGLE	671	28095	RVETIS2	220.00	0.89727	1.02030	1.10000	0.90000
'RS400	'	RANGE SINGLE	740	34085	JSOMB31	400.00	0.87672	0.99334	1.05000	0.90000
'RS220	'	RANGE SINGLE	786	34200	JSABA32	220.00	0.89761	1.02430	1.10000	0.90000

CONTINGENCY LEGEND:  
LABEL                      EVENTS

SINGLE 222	:	OPEN LINE FROM BUS 18401 [WMOST41	400.00]	TO BUS 11 [XMO_KO11	400.00]	CKT 1
SINGLE 345	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 346	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 357	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 358	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 563	:	OPEN LINE FROM BUS 28040 [RLOTU2	220.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 564	:	OPEN LINE FROM BUS 28040 [RLOTU2	220.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 668	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 669	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 708	:	OPEN LINE FROM BUS 31410 [LDIVAC1	400.00]	TO BUS 80 [XRE_DI11	400.00]	CKT 1

Table 13.7.5: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Croatia –Italy

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10 AL	1624.9 695.3	1723.7 779.7	0.0 -203.4	0.0 0.0	0.0 482.3	-150.0 107.6	51.2 493.7	-150.0
20 BG	10176.7 3670.7	8411.0 3357.9	0.0 0.0	15.8 183.3	0.0 3279.1	1500.0 186.7	249.9 3222.0	1500.0
30 BA	2965.6 1253.7	2897.8 1017.2	0.0 0.0	0.0 0.0	0.0 889.9	0.1 314.9	67.7 811.6	0.0
35 IT	44068.2 10101.7	54409.8 11942.3	0.0 0.0	1.1 147.6	0.0 12355.1	-10740.0 -484.8	397.4 10851.8	-10740.0
40 HR	3449.5 895.6	4359.0 1075.9	0.0 0.0	0.0 0.0	0.0 1496.9	-1000.0 389.1	90.5 927.6	-1000.0
45 HU	6097.3 1443.2	7180.0 2128.1	0.1 178.3	0.0 -29.1	0.0 2399.3	-1199.9 38.1	117.1 1527.1	-1200.0

50	11753.6	11426.0	0.0	0.0	0.0	0.0	327.5	0.0
GR	3188.2	5724.7	204.0	9.3	6654.8	144.1	3747.2	
55	5227.6	-4356.2	0.0	4.8	0.0	9449.4	129.6	9450.0
UX	401.9	622.8	0.0	12.7	2295.2	357.5	1704.1	
60	1943.2	2001.9	0.0	0.0	0.0	-100.0	41.2	-100.0
MK	786.3	752.3	-30.7	0.0	395.4	2.9	455.8	
65	1207.5	0.0	0.0	0.0	0.0	1200.0	7.5	1200.0
UA	-138.9	0.0	0.0	0.0	652.0	392.4	120.8	
70	13774.9	12110.2	0.0	90.5	0.0	1300.2	274.1	1300.0
RO	3186.5	4455.6	781.0	286.2	5576.3	-139.5	3379.6	
75	3952.4	2990.0	0.0	8.8	0.0	890.0	63.6	890.0
SI	1290.6	964.6	0.0	53.5	862.6	364.4	770.9	
80	77662.1	77342.9	0.0	0.0	0.0	-800.0	1119.2	-800.0
TR	9845.5	11034.0	996.9	0.0	22660.5	-166.4	20641.5	
90	7780.8	8298.8	0.0	17.2	0.0	-749.9	214.7	-750.0
RS	3049.6	2986.6	0.0	72.9	1719.5	-658.2	2367.7	
91	867.9	938.0	0.5	2.1	0.0	-100.0	27.3	-100.0
ME	362.4	346.6	-33.9	11.2	232.9	41.0	230.3	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-310.6	0.0	0.0	0.0	39.9	-285.2	14.5	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	604.6	0.0	0.0	0.0	-604.6	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTALS	193053.5	189732.9	0.6	140.2	0.0	0.0	3179.7	0.0
	39721.8	47793.0	1892.2	747.5	61991.8	0.0	51266.0	

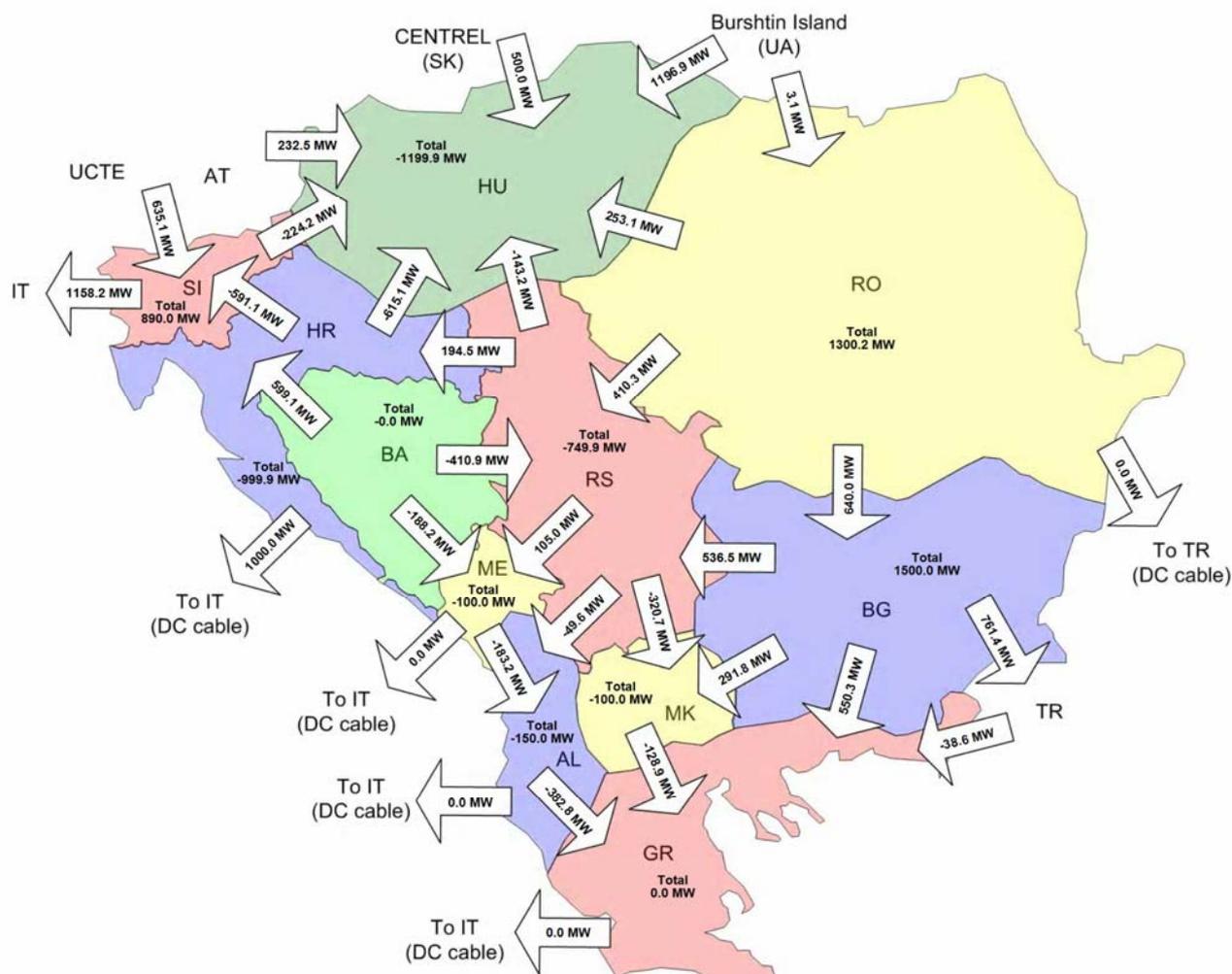


Figure 13.7.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Croatia-Italy

Table 13.7.6: Changes in power flow in area of SEE in winter maximum 2020, scenario Bulgaria and Romania export 1000 MW to Italy via HVDC link Croatia-Italy

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	
11	[XMO_KO11	400.00]	18401	[MO-4	400.00]	1	-547.3	-63.5	-74.9	37.4	472.4	86.3
11	[XMO_KO11	400.00]	20060	[HKONJS11	400.00]	1	547.3	63.5	74.9	-37.4	-472.4	86.3
13	[XTR_PG11	400.00]	14405	[RP TREBINJE	400.00]	1	66.4	-79.5	-152.4	-83.4	-218.8	329.4
13	[XTR_PG11	400.00]	36005	[OPODGT11	400.00]	1	-66.4	79.5	152.4	83.4	218.8	329.4
506	[XKO_CAIH	400.00]	20060	[HKONJS11	400.00]	1	-1000.0	-302.3	OUT OF SERVICE		1000.0	100.0
615	[XKO_CAII	400.00]	52955	[ICANR11	400.00]	1	1000.0	-302.3	OUT OF SERVICE		-1000.0	100.0
16401	[SA 10	400.00]	18401	[MO-4	400.00]	1	223.8	-22.3	17.1	-55.3	-206.6	92.3
20060	[HKONJS11	400.00]	20120	[HOBROV11	400.00]	1	-377.4	-125.1	-97.8	-6.7	279.6	74.1
20078	[HMELIN11	400.00]	20120	[HOBROV11	400.00]	1	102.3	16.1	-134.5	-6.7	-236.9	231.5
28026	[RTARNI1A	400.00]	28037	[RGADAL1	400.00]	1	501.5	24.8	252.8	62.7	-248.6	49.6
28026	[RTARNI1A	400.00]	29473	[RTARNIG3	15.750]	1	-238.1	109.0	OUT OF SERVICE		238.1	100.0
52084	[IFNOR111	400.00]	52955	[ICANR11	400.00]	1	-636.9	158.3	-205.8	2.9	431.2	67.7
52137	[ILATR111	400.00]	52196	[IRMSR111	400.00]	1	27.3	-24.5	246.3	-8.0	219.0	801.0
52137	[ILATR111	400.00]	52276	[IVLMR111	400.00]	1	-11.4	-100.1	292.0	-92.1	303.4	999.9
52137	[ILATR111	400.00]	53121	[II11R111	400.00]	1	983.0	-7.9	-10.4	-7.7	-993.4	101.1
52212	[IRSRR111	400.00]	52246	[ITERR111	400.00]	1	-482.6	-58.7	-759.8	19.1	-277.2	57.4
52212	[IRSRR111	400.00]	53142	[II27R111	400.00]	1	45.7	82.6	322.9	4.9	277.2	606.3
52246	[ITERR111	400.00]	52277	[IVLVR111	400.00]	1	554.0	-42.1	328.2	-49.9	-225.7	40.7
52246	[ITERR111	400.00]	53142	[II27R111	400.00]	1	305.3	80.2	656.2	8.0	351.0	115.0
52955	[ICANR11	400.00]	53142	[II27R111	400.00]	1	159.6	-201.8	-407.8	-15.6	-567.4	355.5
53120	[II10C111	400.00]	53121	[II11R111	400.00]	1	-982.8	10.0	10.4	6.4	993.2	101.1



SINGLE 370	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 371	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 382	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 383	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 624	:	OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 625	:	OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 722	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 723	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 822	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 1
SINGLE 823	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 2

### 13.7.2. Export from BiH to Italy

Table 13.7.9: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario export of 1000 MW from BiH to Italy via HVDC link Croatia – Italy

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1338.6	1491.9	0.0	0.0	0.0	-200.0	46.7	-200.0
AL			489.6	689.7	-199.2	0.0	456.9	36.4	419.6	
20			8805.3	7603.7	0.0	14.4	0.0	1000.0	187.2	1000.0
BG			2904.8	3045.8	-44.9	120.9	2995.9	323.3	2455.5	
30			4169.8	2610.1	0.0	0.0	0.0	1489.5	70.1	1490.0
BA			1022.2	724.5	0.0	0.0	895.9	325.2	868.4	
35			39248.8	49222.0	0.0	1.1	0.0	-10399.9	425.6	-10400.0
IT			6973.3	10816.5	0.0	-156.9	12556.5	-224.3	9094.5	
40			3116.0	3483.0	0.0	0.0	0.0	-435.2	68.2	-435.0
HR			687.5	1074.2	0.0	0.0	1375.2	184.2	804.3	
45			5392.9	6500.0	0.1	0.0	0.0	-1200.0	92.8	-1200.0
HU			994.5	1926.6	178.2	-29.6	2422.3	117.0	1224.7	
50			10298.2	10371.1	0.0	0.0	0.0	-350.0	277.0	-350.0
GR			2151.8	5312.0	170.2	9.3	6611.9	117.2	3141.2	
55			4399.1	-4593.5	0.0	4.8	0.0	8886.7	101.2	8886.0
UX			24.0	637.5	0.0	12.8	2318.1	390.9	1300.9	
60			1501.6	1577.0	0.0	0.0	0.0	-100.0	24.6	-100.0
MK			455.8	573.6	-31.3	0.0	403.4	51.4	265.5	
65			1207.1	0.0	0.0	0.0	0.0	1200.0	7.1	1200.0
UA			-196.1	0.0	0.0	0.0	653.8	346.1	111.5	
70			10254.6	9416.9	0.0	88.3	0.0	545.0	204.4	545.0
RO			2517.1	4075.6	512.8	273.8	4615.9	-234.6	2505.5	
75			2994.8	2514.0	0.0	8.8	0.0	423.9	48.1	424.0
SI			1023.8	811.0	0.0	53.8	605.9	211.8	553.1	
80			54592.8	54622.1	0.0	0.0	0.0	-800.0	770.7	-800.0
TR			4579.0	7792.0	1175.4	0.0	17195.5	-131.2	12938.3	
90			7714.1	7871.1	0.0	17.8	0.0	-360.0	185.2	-360.0
RS			2647.9	2853.5	0.0	76.5	1727.8	-624.7	2070.5	
91			629.2	805.2	0.5	1.9	0.0	-200.0	21.5	-200.0
ME			317.5	299.2	-34.6	10.8	237.2	73.2	206.1	

95	501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK	-381.7	0.0	0.0	0.0	40.0	-357.5	15.8	
TOTALS	156164.2	153494.7	0.6	137.1	0.0	0.0	2531.9	0.0
	26210.9	41236.2	1726.6	371.5	55112.3	0.0	37975.3	



Figure 13.7.3: Aggregated border flows in area of SEE in winter maximum 2015, scenario export of 1000 MW from BiH to Italy via HVDC link Croatia – Italy

Table 13.7.10: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2015, scenario export of 1000 MW from BiH to Italy via HVDC link Croatia – Italy

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,CKT,STS,	MW,	MVAR,	MVA,	%I
			***** NONE *****				

Table 13.7.11: Changes in power flow greater than 150 MW in area of SEE in winter maximum 2015, scenario export of 1000 MW from BiH to Italy via HVDC link Croatia – Italy

BRANCHES WITH FROM OR TO END MW FLOWS DIFFERING BY MORE THAN 150.0 MW:	
IN WORKING CASE	IN BASE CASE





CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 100	: OPEN LINE FROM BUS 12250 [VGORIA2 220.00] TO BUS 12252 [VOCHIF2 220.00] CKT 1
SINGLE 124	: OPEN LINE FROM BUS 12275 [VMI3 2 220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 196	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [OPODG211 400.00] CKT 1
SINGLE 222	: OPEN LINE FROM BUS 18401 [WMOST41 400.00] TO BUS 11 [XMO_KO11 400.00] CKT 1
SINGLE 345	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 346	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 357	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 358	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 433	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23172 [GDISTO13 400.00] CKT 1
SINGLE 434	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23173 [GDISTO11 400.00] CKT 1
SINGLE 463	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23036 [GK_KOR13 400.00] CKT 1
SINGLE 464	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23037 [GK_KOR14 400.00] CKT 1
SINGLE 474	: OPEN LINE FROM BUS 23123 [GKPTR11 400.00] TO BUS 23126 [GKPTR12 400.00] CKT 1
SINGLE 476	: OPEN LINE FROM BUS 23126 [GKPTR12 400.00] TO BUS 23180 [GAXELO12 400.00] CKT 1
SINGLE 568	: OPEN LINE FROM BUS 28043 [RSTUPA2 220.00] TO BUS 28044 [RBRADU2 220.00] CKT 1
SINGLE 638	: OPEN LINE FROM BUS 28855 [RMOSTI2 220.00] TO BUS 28935 [RRAC.M2 220.00] CKT 1
SINGLE 643	: OPEN LINE FROM BUS 28906 [RTELEA2 220.00] TO BUS 28907 [RSTILP2 220.00] CKT 1
SINGLE 671	: OPEN LINE FROM BUS 28039 [RROSI01 400.00] TO BUS 28094 [RROSI02 220.00] CKT 1
SINGLE 708	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1
SINGLE 740	: OPEN LINE FROM BUS 34050 [JSUBO31 400.00] TO BUS 34085 [JSOMB31 400.00] CKT 1

Table 13.7.13: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario export of 1000 MW from BiH to Italy via HVDC link Croatia – Italy

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10 AL	1622.2 677.4	1723.7 779.7	0.0 -204.3	0.0 0.0	0.0 474.0	-150.0 105.3	48.5 470.6	-150.0
20 BG	9659.8 3520.3	8411.0 3357.9	0.0 0.0	15.5 181.2	0.0 3279.5	1000.0 199.4	233.3 3061.3	1000.0
30 BA	3970.5 1333.5	2897.8 1017.2	0.0 0.0	0.0 0.0	0.0 911.0	1000.0 327.5	72.6 899.8	1000.0
35 IT	44054.9 9629.9	54409.8 11942.3	0.0 0.0	1.1 147.7	0.0 12375.6	-10740.0 -492.4	384.1 10407.9	-10740.0
40 HR	3443.3 810.8	4359.0 1075.9	0.0 0.0	0.0 0.0	0.0 1507.5	-999.9 367.0	84.3 875.4	-1000.0
45 HU	6094.7 1362.5	7180.0 2128.1	0.1 178.6	0.0 -29.1	0.0 2403.7	-1200.0 -6.1	114.6 1494.7	-1200.0
50 GR	11750.1 3130.9	11426.0 5724.7	0.0 203.7	0.0 9.4	0.0 6662.6	0.0 129.0	324.1 3712.9	0.0
55 UX	5227.4 379.1	-4356.2 622.8	0.0 0.0	4.8 12.7	0.0 2297.8	9449.7 350.4	129.1 1691.1	9450.0
60 MK	1940.2 764.7	2001.9 752.3	0.0 -30.9	0.0 0.0	0.0 397.6	-100.0 12.8	38.2 426.8	-100.0
65 UA	1207.5 -164.8	0.0 0.0	0.0 0.0	0.0 0.0	0.0 652.3	1200.0 366.3	7.5 121.2	1200.0
70 RO	13261.7 3120.9	12110.2 4455.6	0.0 783.2	90.2 285.8	0.0 5601.2	800.1 -30.3	261.2 3227.9	800.0
75 SI	3951.1 1266.9	2990.0 964.6	0.0 0.0	8.9 53.6	0.0 864.9	890.0 356.0	62.2 757.6	890.0
80 TR	77661.6 9834.6	77342.9 11034.0	0.0 996.9	0.0 0.0	0.0 22660.7	-800.0 -171.1	1118.7 20635.5	-800.0

90	7767.7	8298.8	0.0	17.3	0.0	-749.9	201.6	-750.0
RS	2894.9	2986.6	0.0	73.3	1731.7	-664.1	2230.7	
91	865.2	938.0	0.5	2.1	0.0	-100.0	24.5	-100.0
ME	356.2	346.6	-34.3	11.4	235.7	51.7	216.5	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-322.1	0.0	0.0	0.0	40.0	-296.9	14.7	
TOTALS	192979.2	189732.9	0.6	139.8	0.0	0.0	3105.7	0.0
	38595.8	47793.0	1892.9	745.9	62095.5	0.0	50244.7	

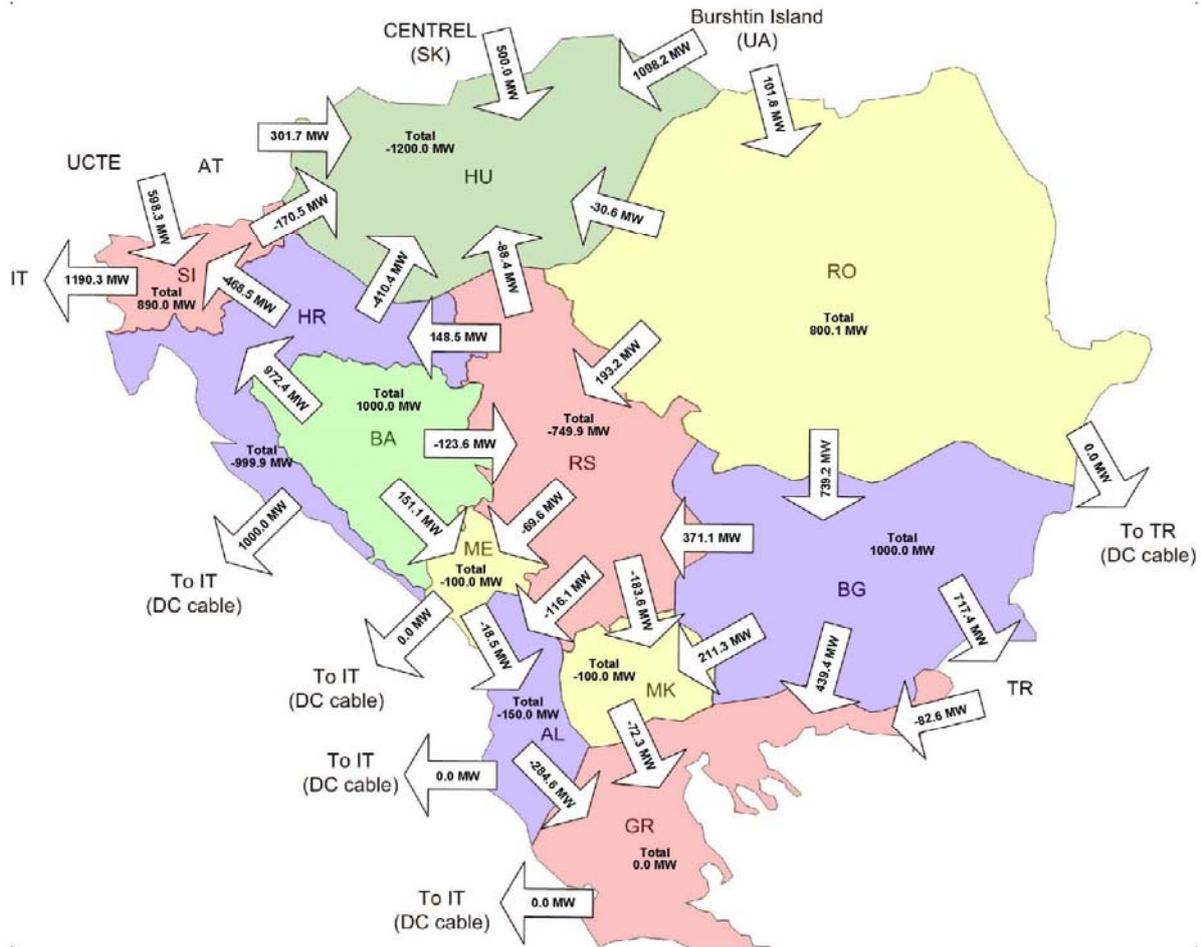


Figure 13.7.4: Aggregated border flows in area of SEE in winter maximum 2020, scenario export of 1000 MW from BiH to Italy via HVDC link Croatia – Italy

Table 13.7.14: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2020, scenario export of 1000 MW from BiH to Italy via HVDC link Croatia – Italy and CENTREL

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I		
12274,VMI	2	220.00,	12474,VMI	1	400.00,	1	1,	-528.95,	-109.84,	540.24,	81.48



SINGLE 381	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 622	:	OPEN LINE FROM BUS 28040 [RLOTU2	220.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 623	:	OPEN LINE FROM BUS 28040 [RLOTU2	220.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 692	:	OPEN LINE FROM BUS 28855 [RMOSTI2	220.00]	TO BUS 28935 [RRAC.M2	220.00]	CKT 1
SINGLE 720	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 721	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 797	:	OPEN LINE FROM BUS 34050 [JSUBO31	400.00]	TO BUS 34085 [JSOMB31	400.00]	CKT 1
SINGLE 820	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 1
SINGLE 821	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 2
SINGLE 845	:	OPEN LINE FROM BUS 34170 [JOBREN2	220.00]	TO BUS 34200 [JSABA32	220.00]	CKT 1

## 13.8. Impact of HVDC link Turkey – Romania

### 13.8.1. Export from Turkey to CENTREL

Table 13.8.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario Turkey exports 1000 MW to CENTREL (Hungary and Slovakia) via HVDC link Romania - Turkey

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1338.1	1491.9	0.0	0.0	0.0	-200.0	46.2	-200.0
AL			470.1	689.7	-200.0	0.0	459.5	22.9	417.1	
20			8818.4	7603.7	0.0	14.3	0.0	1000.1	200.3	1000.0
BG			3119.0	3045.8	-44.2	120.0	2968.7	378.1	2588.1	
30			3148.3	2610.1	0.0	0.0	0.0	489.8	48.4	490.0
BA			705.3	724.5	0.0	0.0	910.2	320.0	571.1	
35			40264.7	49222.0	0.0	1.1	0.0	-9399.8	441.4	-9400.0
IT			7043.5	10816.5	0.0	-157.0	12570.0	-532.4	9486.3	
40			3103.3	3483.0	0.0	0.0	0.0	-435.7	56.0	-435.0
HR			391.8	1074.2	0.0	0.0	1403.9	9.6	711.9	
45			4890.1	6500.0	0.1	0.0	0.0	-1700.5	90.5	-1700.0
HU			807.9	1926.6	178.5	-29.6	2411.7	-59.2	1203.3	
50			10298.5	10371.1	0.0	0.0	0.0	-350.1	277.5	-350.0
GR			2159.1	5312.0	170.3	9.3	6610.1	118.4	3145.4	
55			4401.6	-4593.5	0.0	4.8	0.0	8889.9	100.4	8886.0
UX			48.4	637.5	0.0	12.8	2315.9	436.6	1277.4	
60			1502.6	1577.0	0.0	0.0	0.0	-100.1	25.6	-100.0
MK			460.6	573.6	-31.3	0.0	402.8	45.8	275.4	
65			1206.9	0.0	0.0	0.0	0.0	1200.0	6.9	1200.0
UA			-178.2	0.0	0.0	0.0	653.4	365.2	110.1	
70			10292.5	9416.9	0.0	86.1	0.0	543.5	245.9	545.0
RO			3350.9	4075.6	486.0	268.0	4494.3	26.1	2989.4	
75			2994.4	2514.0	0.0	8.8	0.0	423.8	47.8	424.0
SI			1007.3	811.0	0.0	53.9	606.9	198.6	550.7	
80			55613.4	54622.1	0.0	0.0	0.0	199.7	791.7	200.0
TR			5503.8	7792.0	1173.1	0.0	17144.7	390.5	13292.9	
90			7720.9	7871.1	0.0	17.7	0.0	-360.7	192.7	-360.0
RS			2701.4	2853.5	0.0	76.4	1724.1	-654.2	2149.8	
91			626.9	805.2	0.6	1.9	0.0	-199.9	19.2	-200.0
ME			291.7	299.2	-35.2	11.0	240.3	72.1	185.0	
95			0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
SK			-177.3	0.0	0.0	0.0	40.6	-137.9	1.3	
101			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	

103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	1000.0	0.0	0.0	0.0	-1000.0	0.0	0.0	0.0
TOTALS	156220.6	153494.7	0.6	134.8	0.0	0.0	2590.6	0.0	0.0
	27705.3	41631.6	1697.1	364.8	54957.1	0.0	38955.0		

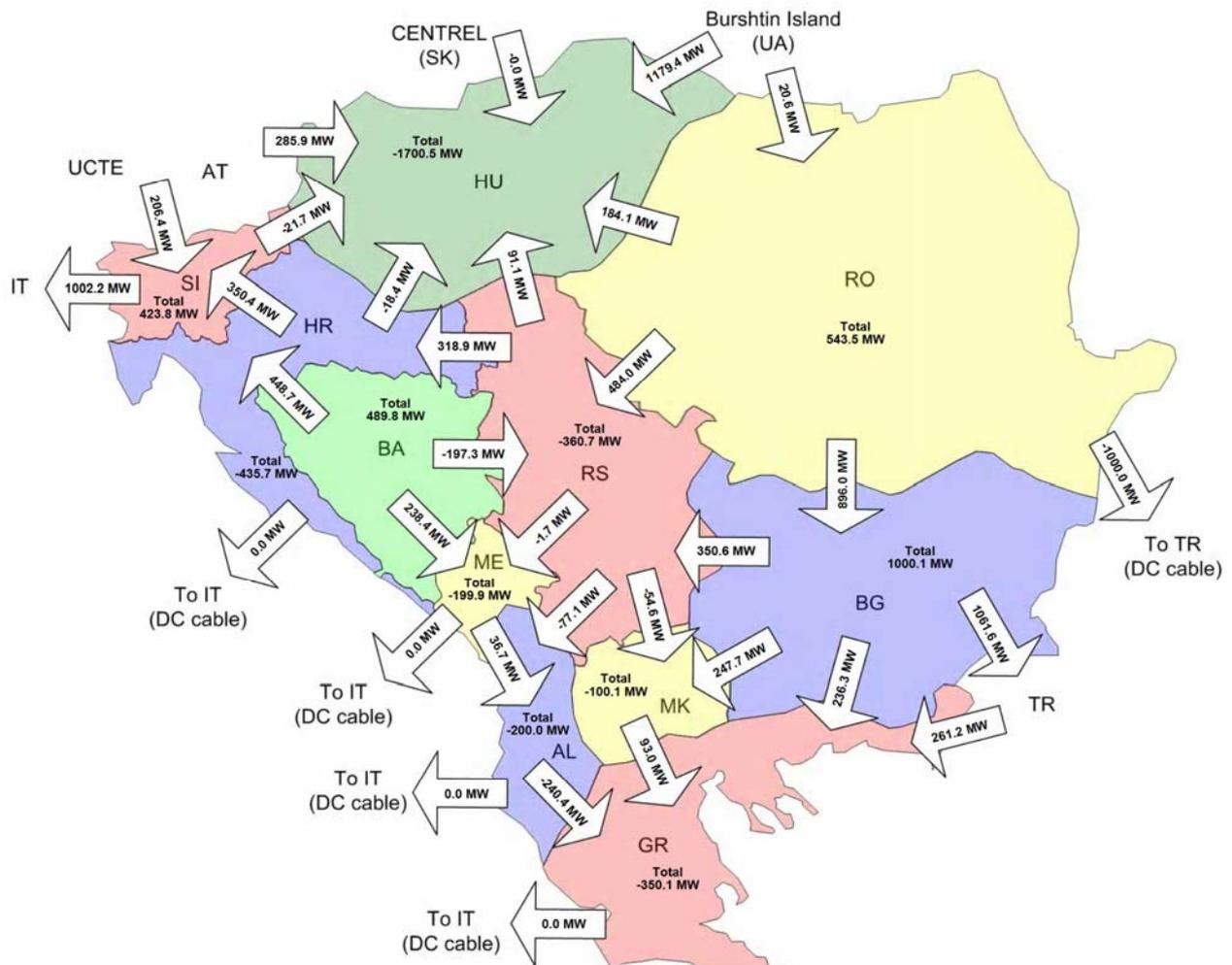


Figure 13.8.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario Turkey exports 1000 MW to CENTREL (Hungary and Slovakia) via HVDC link Romania - Turkey

Table 13.8.2: Changes in power flow in area of SEE winter maximum 2015, scenario Turkey exports 1000 MW to CENTREL (Hungary and Slovakia) via HVDC link Romania - Turkey

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
76	[XGO_LE11	400.00]	24058	[MGOD 4	400.00]	1	0.0	27.3	349.0	-72.3	349.0	999.9
76	[XGO_LE11	400.00]	75002	[LEVIC 1	400.00]	1	0.0	-27.3	-349.0	72.3	-349.0	999.9
181	[XVA_IS11	400.00]	12460	[VVARNA1	400.00]	1	396.0	-102.8	148.1	-30.9	-247.8	62.6
181	[XVA_IS11	400.00]	28974	[RMEDGI1	400.00]	1	-396.0	102.8	-148.1	30.9	247.8	62.6
751	[XRO_TR1R	400.00]	28017	[RCONST1	400.00]	1	1000.0	-500.0	OUT OF SERVICE		-1000.0	100.0
752	[XRO_TR1T	400.00]	60114	[TPSKOY1	400.00]	1	-1000.0	-500.0	OUT OF SERVICE		1000.0	100.0



'RO220	'	RANGE SINGLE 642	28907 RSTILP2	220.00	0.83141	0.97484	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28094 RROSIO2	220.00	0.89899	1.02914	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28095 RVETIS2	220.00	0.88991	1.01659	1.10000	0.90000
'RS400	'	RANGE SINGLE 740	34085 JSOMB31	400.00	0.87545	0.99150	1.05000	0.90000
'RS220	'	RANGE SINGLE 786	34200 JSABA32	220.00	0.89922	1.02481	1.10000	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 344	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 345	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 356	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 357	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 537	: OPEN LINE FROM BUS 28019 [RTULCELA 400.00] TO BUS 28069 [RTARIV1 400.00] CKT 1
SINGLE 708	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1

Table 13.8.5: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario Turkey exports 1000 MW to CENTREL (Hungary and Slovakia) via HVDC link Romania - Turkey

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1623.3	1723.7	0.0	0.0	0.0	-150.0	49.6	-150.0
AL	673.6	779.7	-204.3	0.0	474.1	92.3	480.1	
20	9682.4	8411.0	0.0	15.4	0.0	999.4	256.5	1000.0
BG	3764.6	3357.9	0.0	179.8	3253.9	183.9	3296.9	
30	2951.5	2897.8	0.0	0.0	0.0	-0.3	53.9	0.0
BA	1018.0	1017.2	0.0	0.0	912.1	239.1	673.8	
35	45061.2	54409.8	0.0	1.1	0.0	-9739.8	390.1	-9740.0
IT	9590.2	11942.3	0.0	147.8	12394.0	-803.0	10697.2	
40	3429.6	4359.0	0.0	0.0	0.0	-1000.5	71.1	-1000.0
HR	521.4	1075.9	0.0	0.0	1532.9	199.8	778.5	
45	5570.6	7180.0	0.1	0.0	0.0	-1700.3	90.7	-1700.0
HU	1306.4	2128.1	179.1	-29.4	2409.9	103.4	1335.0	
50	11752.4	11426.0	0.0	0.0	0.0	-0.4	326.8	0.0
GR	3176.1	5724.7	204.0	9.3	6656.3	142.1	3738.5	
55	5231.8	-4356.2	0.0	4.8	0.0	9454.8	128.4	9450.0
UX	344.1	622.8	0.0	12.7	2301.5	336.7	1673.5	
60	1942.4	2001.9	0.0	0.0	0.0	-100.0	40.4	-100.0
MK	779.3	752.3	-30.8	0.0	396.0	4.3	448.2	
65	1207.7	0.0	0.0	0.0	0.0	1200.0	7.8	1200.0
UA	-159.1	0.0	0.0	0.0	652.6	369.8	123.8	
70	13330.1	12110.2	0.0	88.7	0.0	797.9	333.4	800.0
RO	3893.9	4455.6	768.7	281.1	5505.8	-32.8	3927.2	
75	3948.9	2990.0	0.0	8.9	0.0	889.9	60.1	890.0
SI	1231.4	964.6	0.0	53.8	868.4	344.4	737.0	
80	78758.3	77342.9	0.0	0.0	0.0	200.4	1215.0	200.0
TR	11283.1	11034.0	993.8	0.0	22586.4	48.2	21793.5	
90	7778.1	8298.8	0.0	17.2	0.0	-751.1	213.2	-750.0
RS	3019.6	2986.6	0.0	73.0	1722.3	-664.3	2346.6	
91	864.1	938.0	0.5	2.1	0.0	-100.1	23.5	-100.0
ME	350.2	346.6	-34.6	11.4	236.9	58.6	205.1	

95	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0
SK	-260.5	0.0	0.0	0.0	40.5	-222.7	2.8	0.0
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	400.0	0.0	0.0	0.0	-400.0	0.0	0.0
TOTALS	193132.5	189732.9	0.6	138.2	0.0	0.0	3260.7	0.0
	40532.5	47588.4	1876.0	739.6	61943.7	0.0	52257.4	



Figure 13.8.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario Turkey exports 1000 MW to CENTREL (Hungary and Slovakia) via HVDC link Romania - Turkey



Table 13.8.6: Changes in power flow in area of SEE in winter maximum 2020, scenario Turkey exports 1000 MW to CENTREL (Hungary and Slovakia) via HVDC link Romania - Turkey

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
	76 [XGO_LE11	400.00]		24058 [MGOD 4	400.00]	1	0.0	27.2	349.0	-46.5	349.0	999.9
	76 [XGO_LE11	400.00]		75002 [LEVIC 1	400.00]	1	0.0	-27.2	-349.0	46.5	-349.0	999.9
	181 [XVA_IS11	400.00]		12994 [VSVOB014	400.00]	1	722.1	35.0	441.0	64.2	-281.1	38.9
	181 [XVA_IS11	400.00]		28974 [RMEDGI1	400.00]	1	-722.1	-35.0	-441.0	-64.2	281.1	38.9
	219 [XBE_OR11	400.00]		24013 [MBEKO 4	400.00]	1	166.9	-21.0	-33.8	24.0	-200.7	120.2
	219 [XBE_OR11	400.00]		28009 [RNADAB1B	400.00]	1	-166.9	21.0	33.8	-24.0	200.7	120.2
	751 [XRO_TR1R	400.00]		28017 [RCONST1	400.00]	1	1000.0	-200.0	OUT OF SERVICE		-1000.0	100.0
	752 [XRO_TR1T	400.00]		60114 [TPSKOY1	400.00]	1	-1000.0	-200.0	OUT OF SERVICE		1000.0	100.0
	28017 [RCONST1	400.00]		28069 [RTARIV1	400.00]	1	105.0	-38.0	-135.7	55.9	-240.7	229.2
	28017 [RCONST1	400.00]		28973 [RCERNA1	400.00]	1	169.7	-113.3	-81.2	-74.4	-250.8	147.8
	28017 [RCONST1	400.00]		29005 [RCONSTS1	400.00]	1	584.9	-98.4	106.1	-33.1	-478.8	81.9
	28031 [RBRAS01	400.00]		28034 [RSIBIU1	400.00]	1	252.3	-139.2	32.6	-122.5	-219.8	87.1
	28974 [RMEDGI1	400.00]		29005 [RCONSTS1	400.00]	1	-533.8	129.1	-55.6	42.2	478.2	89.6
	60112 [TGBEZE1	400.00]		60114 [TPSKOY1	400.00]	1	524.8	75.6	202.2	-3.3	-322.7	61.5
	60806 [TATATR1	400.00]		61547 [TATAT6G	15.750]	1	-300.0	-41.6	OUT OF SERVICE		300.0	100.0
	60806 [TATATR1	400.00]		61548 [TATAT7G	15.750]	1	-300.0	-41.6	OUT OF SERVICE		300.0	100.0

Table 13.8.7: Changes in power flow greater than 50 MW through tie-lines in area of interest in winter maximum 2020, scenario Turkey exports 1000 MW to CENTREL (Hungary and Slovakia) via HVDC link Romania - Turkey

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%
	75 [XSA_AR11	400.00]		24148 [MSAFA 4	400.00]	1	110.5	-17.7	-7.4	11.4	-117.9	106.7	29.0	164.3
	84 [XRO_MU11	400.00]		65001 [UMUKACH	400.00]	1	73.1	-75.9	-108.4	-32.2	-181.4	248.4	43.6	57.5
	85 [XPF_DJ11	400.00]		34010 [JHDUE11	400.00]	1	214.3	-42.4	100.9	-19.2	-113.5	52.9	23.2	54.8
	86 [XRE_PA11	400.00]		34035 [JPANC21	400.00]	1	145.9	-11.9	107.9	7.8	-38.0	26.1	19.6	165.6
	219 [XBE_OR11	400.00]		24013 [MBEKO 4	400.00]	1	166.9	-21.0	-33.8	24.0	-200.7	120.2	44.9	214.3
	28001 [RTANTA1	400.00]		22 [XKO_TI11	400.00]	1	16.4	-112.8	36.0	-109.2	19.5	119.0	3.6	3.2
	28001 [RTANTA1	400.00]		23 [XKO_TI12	400.00]	2	16.1	-112.8	35.6	-109.2	19.5	121.4	3.6	3.2
	28017 [RCONST1	400.00]		751 [XRO_TR1R	400.00]	1	-1000.0	200.0	OUT OF SERVICE		1000.0	100.0	-200.0	100.0
	28020 [RISACC1A	400.00]		21 [XDO_IS11	400.00]	1	337.5	-67.0	231.9	-77.0	-105.6	31.3	-10.0	14.9
	28974 [RMEDGI1	400.00]		181 [XVA_IS11	400.00]	1	725.5	49.6	442.3	46.7	-283.2	39.0	-2.9	5.9

Table 13.8.8: Results of contingency (n-1) analysis in winter maximum 2020, scenario Turkey exports 1000 MW to CENTREL (Hungary and Slovakia) via HVDC link Romania - Turkey

<----- MULTI-SECTION LINE ----->					<----- MONITORED BRANCH ----->				
--> CONTINGENCY	RATING	FLOW	%						
10010*AE1BS22	220.00	10125 ACEKIN2	220.00	1	SINGLE	19	370.0	387.0	103.2
10009*AE1BS12	220.00	10125 ACEKIN2	220.00	1	SINGLE	22	370.0	384.4	102.7
28040*RL0TRU2	220.00	28366 RSIBIU2	220.00	1	SINGLE	621	333.4	393.2	112.9
28040*RL0TRU2	220.00	28100 RSIBIU21	220.00	1	SINGLE	622	333.4	393.2	112.9
28040*RL0TRU2	220.00	28366 RSIBIU2	220.00	1	SINGLE	719	333.4	393.0	112.2
28040*RL0TRU2	220.00	28100 RSIBIU21	220.00	1	SINGLE	720	333.4	393.0	112.2
34100*JBGD172	220.00	34111 JBGD8 22	220.00	2	SINGLE	820	445.8	467.0	106.0
34100*JBGD172	220.00	34111 JBGD8 22	220.00	1	SINGLE	821	445.8	467.0	106.0

MONITORED VOLTAGE REPORT:

SYSTEM	CONTINGENCY	----- B U S -----	V-CONT	V-INIT	V-MAX	V-MIN
'HU220	RANGE BASE CASE	24025 MDETK 2	220.00	1.05000	1.05000	0.90000
'HU220	RANGE BASE CASE	24095 MMART 22	220.00	1.05040	1.05040	0.90000
'HU220	RANGE BASE CASE	24096 MMART 21	220.00	1.05037	1.05037	0.90000
'BG220	RANGE SINGLE 134	12286 VUZUND2	220.00	0.88463	1.00761	1.10000
'BG220	RANGE SINGLE 136	12282 VORFEJ2	220.00	1.10460	1.04014	1.10000
'HU220	RANGE SINGLE 356	24005 MALBF 22	220.00	0.89275	1.04262	1.05000
'HU220	RANGE SINGLE 357	24006 MALBF 21	220.00	0.89461	1.04267	1.05000
'RO220	RANGE SINGLE 691	28855 RMOSTI2	220.00	0.79966	1.00011	1.10000
'RS400	RANGE SINGLE 797	34085 JSOMB31	400.00	0.85794	0.98650	1.05000
'RS220	RANGE SINGLE 845	34200 JSABA32	220.00	0.87948	1.01727	1.10000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 19	: OPEN LINE FROM BUS 10009 [AE1BS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	: OPEN LINE FROM BUS 10010 [AE1BS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 621	: OPEN LINE FROM BUS 28040 [RL0TRU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	: OPEN LINE FROM BUS 28040 [RL0TRU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 719	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 820	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 821	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2

### 13.8.2. Export from Ukraine to Turkey

Table 13.8.9: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario Ukraine export 1000 MW to Turkey via HVDC link Romania – Turkey

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1339.2	1491.9	0.0	0.0	0.0	-200.0	47.3	-200.0
AL			486.3	689.7	-199.3	0.0	457.6	30.3	423.2	
20			8803.8	7603.7	0.0	14.4	0.0	1000.0	185.7	1000.0
BG			2989.0	3045.8	-44.6	120.6	2985.8	397.8	2455.2	
30			3150.0	2610.1	0.0	0.0	0.0	490.0	49.8	490.0
BA			713.4	724.5	0.0	0.0	910.2	327.6	571.4	
35			40265.2	49222.0	0.0	1.1	0.0	-9400.1	442.2	-9400.0
IT			7043.0	10816.5	0.0	-157.0	12569.7	-542.1	9495.3	
40			3099.2	3483.0	0.0	0.0	0.0	-435.0	51.2	-435.0
HR			356.6	1074.2	0.0	0.0	1408.7	19.5	671.6	
45			5397.2	6500.0	0.1	0.0	0.0	-1200.1	97.2	-1200.0
HU			1003.1	1926.6	177.8	-29.6	2421.1	69.5	1280.0	
50			10298.4	10371.1	0.0	0.0	0.0	-350.0	277.3	-350.0
GR			2154.7	5312.0	170.2	9.3	6611.5	116.7	3144.3	
55			4398.5	-4593.5	0.0	4.8	0.0	8886.5	100.7	8886.0
UX			4.4	637.5	0.0	12.8	2320.0	378.6	1295.4	
60			1501.2	1577.0	0.0	0.0	0.0	-100.0	24.2	-100.0
MK			456.1	573.6	-31.3	0.0	403.3	56.0	261.1	
65			2217.7	0.0	0.0	0.0	0.0	2199.8	17.9	2200.0
UA			-139.9	0.0	0.0	0.0	653.0	296.9	216.2	
70			10278.6	9416.9	0.0	86.9	0.0	544.9	229.9	545.0
RO			3015.9	4075.6	499.7	270.1	4536.7	-76.0	2783.3	
75			2994.1	2514.0	0.0	8.8	0.0	423.9	47.4	424.0
SI			983.1	811.0	0.0	54.0	608.4	178.4	548.1	
80			53559.5	54622.1	0.0	0.0	0.0	-1800.0	737.5	-1800.0
TR			4313.1	7792.0	1176.9	0.0	17202.4	77.4	12469.2	
90			7715.3	7871.1	0.0	17.7	0.0	-360.0	186.4	-360.0
RS			2652.5	2853.5	0.0	76.5	1726.9	-625.3	2074.8	
91			630.7	805.2	0.5	1.9	0.0	-200.0	23.0	-200.0
ME			308.6	299.2	-34.8	10.9	238.4	50.4	221.3	
95			501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK			-379.9	0.0	0.0	0.0	40.0	-355.7	15.8	
101			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	

103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	400.0	0.0	0.0	0.0	-400.0	0.0	0.0
TOTALS	156150.0	153494.7	0.6	135.7	0.0	0.0	2519.2	0.0
	25959.9	41031.6	1714.4	367.6	55093.5	0.0	37926.1	

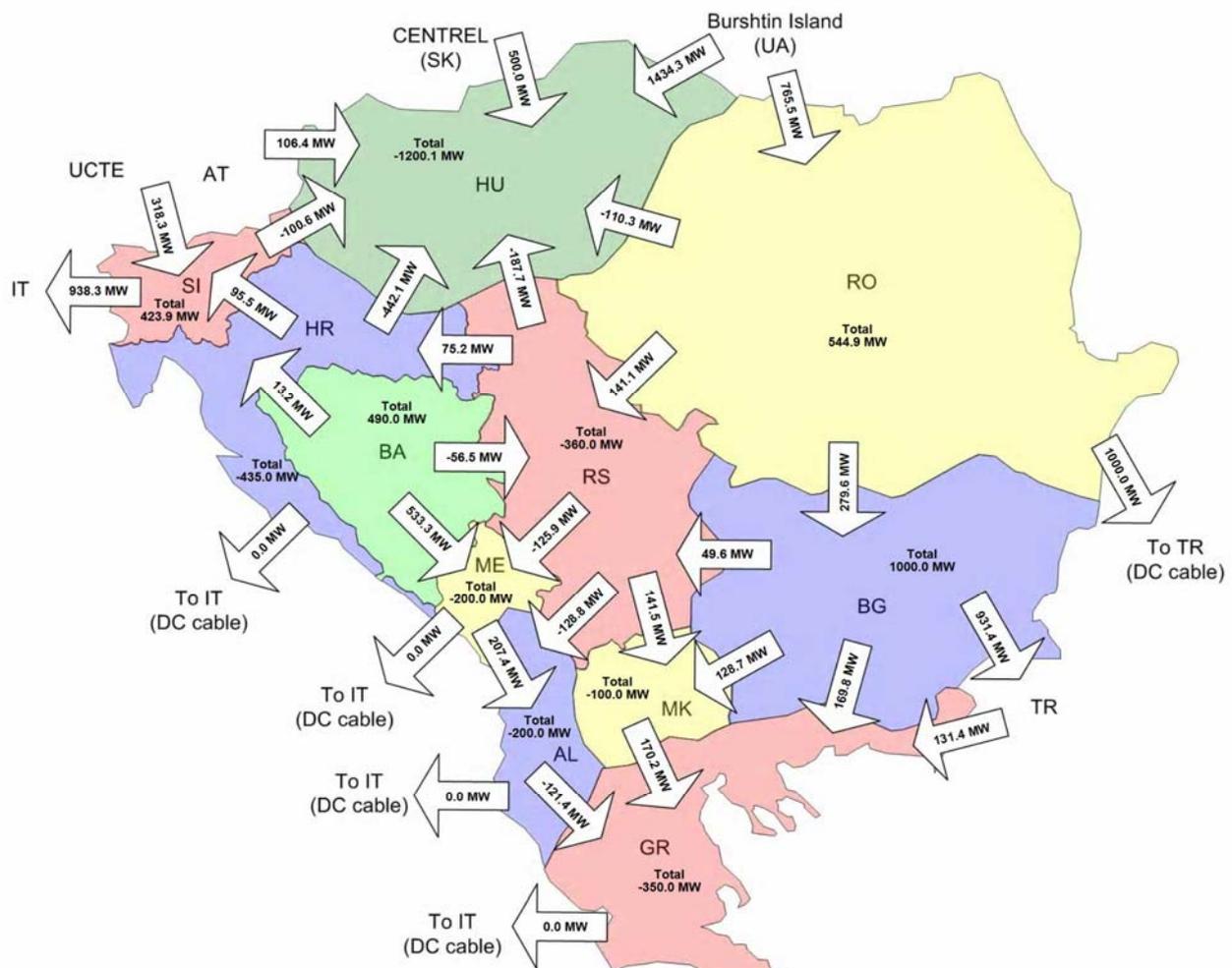


Figure 13.8.3: Aggregated border flows in area of SEE in winter maximum 2015, scenario Ukraine export 1000 MW to Turkey via HVDC link Romania – Turkey

Table 13.8.10: Changes in power flow in area of SEE in winter maximum 2015, scenario Ukraine export 1000 MW to Turkey via HVDC link Romania – Turkey

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
78	[XSA_MU11	400.00]	24157	[MSAJ0 4	400.00]	1	366.0	13.4	-29.1	36.2	-395.1	108.0
78	[XSA_MU11	400.00]	65001	[UMUKACH	400.00]	1	-366.0	-13.4	29.1	-36.2	395.1	108.0
84	[XRO_MU11	400.00]	28039	[RROSIO1	400.00]	1	765.5	31.5	160.8	57.2	-604.7	79.0



'GR400	'	RANGE SINGLE 433	23173	GDISTO11	400.00	1.05396	1.03787	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23174	GDISTO12	400.00	1.05378	1.03800	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23180	GAXELO12	400.00	1.05345	1.03868	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23181	GAXELO11	400.00	1.05351	1.03889	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23036	GK_KOR13	400.00	1.06321	1.01744	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23068	GK_MEG14	400.00	1.06081	1.02946	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23037	GK_KOR14	400.00	1.06321	1.01744	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23067	GK_MEG12	400.00	1.06081	1.02946	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23126	GKPATC12	400.00	1.06893	1.03823	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23180	GAXELO12	400.00	1.06893	1.03868	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23181	GAXELO11	400.00	1.06874	1.03889	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23180	GAXELO12	400.00	1.06838	1.03868	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23181	GAXELO11	400.00	1.06819	1.03889	1.05000	0.90000
'RO400	'	RANGE SINGLE 535	28017	RCONST1	400.00	0.87500	0.97079	1.05000	0.90000
'RO220	'	RANGE SINGLE 567	28042	RRIURE2	220.00	0.88804	0.97132	1.10000	0.90000
'RO220	'	RANGE SINGLE 567	28043	RSTUPA2	220.00	0.87936	0.96979	1.10000	0.90000
'RO220	'	RANGE SINGLE 637	28855	RMOSTI2	220.00	0.86136	1.03306	1.10000	0.90000
'RO220	'	RANGE SINGLE 642	28907	RSTILP2	220.00	0.83423	0.97654	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28093	RBAIA 2	220.00	0.88708	1.01041	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28094	RROSIO2	220.00	0.88326	1.02164	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28095	RVETIS2	220.00	0.87349	1.00924	1.10000	0.90000
'RS400	'	RANGE SINGLE 740	34085	JSOMB31	400.00	0.88008	0.99482	1.05000	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 196	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [0PODG211 400.00] CKT 1
SINGLE 344	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 345	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 356	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 357	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 367	: OPEN LINE FROM BUS 196 [XAL_ZA01 750.00] TO BUS 65003 [UZUKRA01 750.00] CKT 1
SINGLE 555	: OPEN LINE FROM BUS 28037 [RGADALL 400.00] TO BUS 28039 [RROSIO1 400.00] CKT 1
SINGLE 623	: OPEN LINE FROM BUS 28086 [RUNGHE2 220.00] TO BUS 28087 [RIERNU2 220.00] CKT 2
SINGLE 673	: OPEN LINE FROM BUS 84 [XRO_MU11 400.00] TO BUS 65001 [UMUKACH 400.00] CKT 1
SINGLE 708	: OPEN LINE FROM BUS 31410 [LDIVACL 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1

Table 13.8.13: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario Ukraine export 1000 MW to Turkey via HVDC link Romania – Turkey

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1621.7	1723.7	0.0	0.0	0.0	-150.0	48.0	-150.0
AL	670.0	779.7	-204.6	0.0	475.2	104.9	465.3	
20	9646.4	8411.0	0.0	15.5	0.0	1000.0	219.9	1000.0
BG	3440.9	3357.9	0.0	181.5	3287.9	257.0	2932.4	
30	2949.9	2897.8	0.0	0.0	0.0	0.0	52.1	0.0
BA	1007.6	1017.2	0.0	0.0	913.4	244.7	659.2	
35	45061.7	54409.8	0.0	1.1	0.0	-9740.0	390.8	-9740.0
IT	9599.7	11942.3	0.0	147.8	12393.2	-804.1	10707.0	
40	3428.3	4359.0	0.0	0.0	0.0	-1000.1	69.4	-1000.0
HR	507.2	1075.9	0.0	0.0	1534.2	200.7	764.9	
45	6100.3	7180.0	0.1	0.0	0.0	-1200.2	120.5	-1200.0
HU	1395.9	2128.1	178.4	-29.2	2402.9	-38.6	1559.9	
50	11748.7	11426.0	0.0	0.0	0.0	0.0	322.6	0.0
GR	3106.8	5724.7	203.6	9.4	6665.8	122.1	3699.1	
55	5227.7	-4356.2	0.0	4.8	0.0	9450.4	128.7	9450.0
UX	362.4	622.8	0.0	12.7	2299.4	338.5	1687.7	
60	1938.8	2001.9	0.0	0.0	0.0	-100.0	36.8	-100.0
MK	756.0	752.3	-30.9	0.0	398.3	18.0	413.6	

65	2217.3	0.0	0.0	0.0	0.0	2199.9	17.5	2200.0
UA	-148.3	0.0	0.0	0.0	651.8	285.6	217.9	
70	13236.2	12110.2	0.0	90.4	0.0	799.9	235.8	800.0
RO	3146.1	4455.6	786.7	286.5	5613.4	235.6	2995.1	
75	3950.2	2990.0	0.0	8.9	0.0	889.9	61.4	890.0
SI	1237.8	964.6	0.0	53.8	867.8	336.9	750.4	
80	76650.1	77342.9	0.0	0.0	0.0	-1799.7	1106.9	-1800.0
TR	9921.6	11034.0	996.9	0.0	22634.6	20.5	20504.8	
90	7766.5	8298.8	0.0	17.3	0.0	-750.1	200.5	-750.0
RS	2872.9	2986.6	0.0	73.4	1733.4	-667.4	2213.7	
91	865.6	938.0	0.5	2.1	0.0	-100.0	24.9	-100.0
ME	351.8	346.6	-34.5	11.4	236.7	41.3	223.7	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-321.0	0.0	0.0	0.0	39.9	-295.8	14.7	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	400.0	0.0	0.0	0.0	-400.0	0.0	
TOTALS	192910.8	189732.9	0.6	140.1	0.0	0.0	3037.1	0.0
	37907.4	47588.4	1895.5	747.2	62148.0	0.0	49809.4	

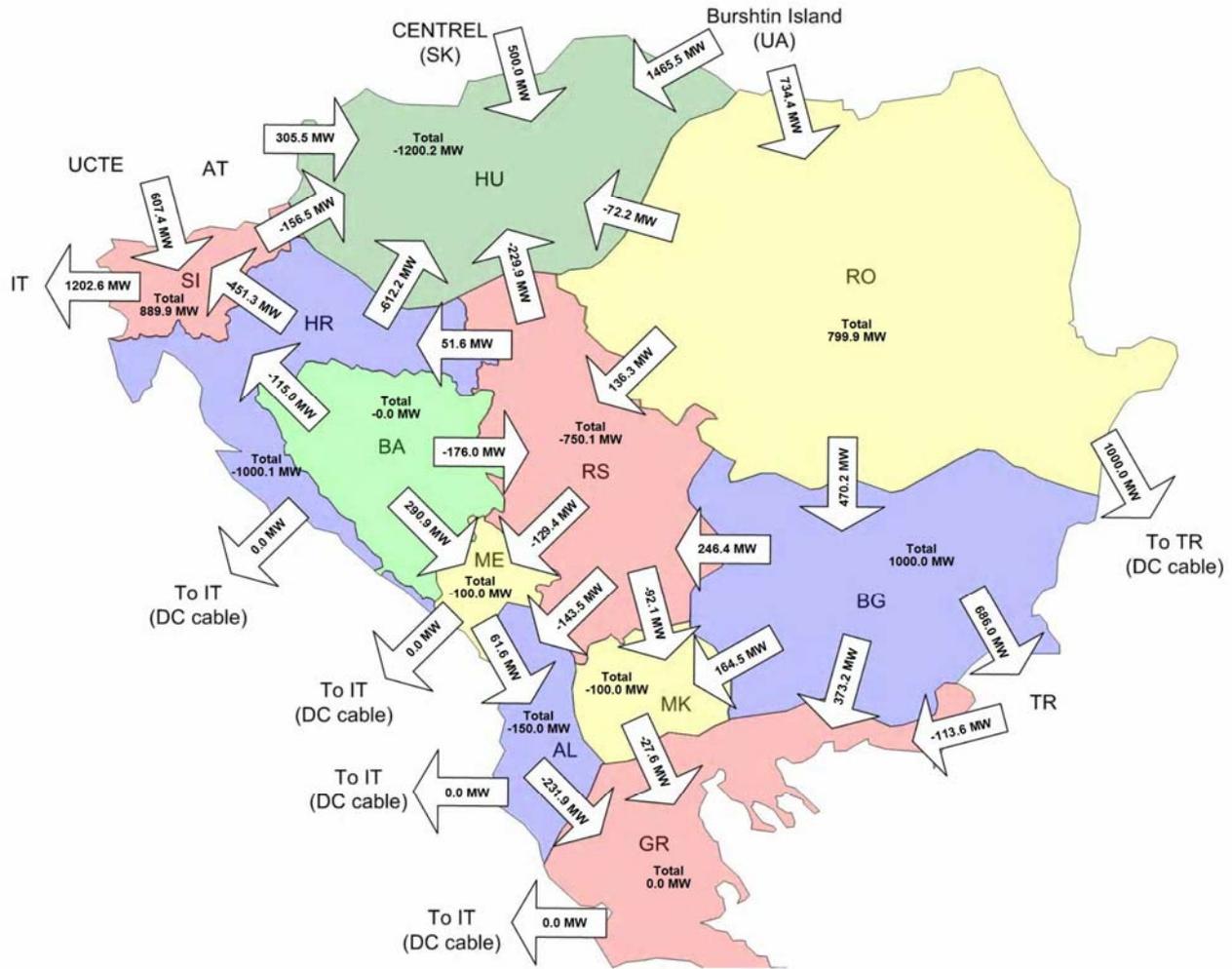


Figure 13.8.4: Aggregated border flows in area of SEE in winter maximum 2020, scenario Ukraine export 1000 MW to Turkey via HVDC link Romania – Turkey

Table 13.8.14: Changes in power flow in area of SEE in winter maximum 2020, scenario Ukraine export 1000 MW to Turkey via HVDC link Romania – Turkey

X-----	FROM BUS	-----X	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
78	[XSA_MU11	400.00]	24157	[MSAJO 4	400.00]	1	347.8	28.5	-26.0	50.6	-373.8	107.5
78	[XSA_MU11	400.00]	65001	[UMUKACH	400.00]	1	-347.8	-28.5	26.0	-50.6	373.8	107.5
84	[XRO_MU11	400.00]	28039	[RROSIO1	400.00]	1	734.4	-24.7	108.4	32.2	-626.0	85.2
84	[XRO_MU11	400.00]	65001	[UMUKACH	400.00]	1	-734.4	24.7	-108.4	-32.2	626.0	85.2
181	[XVA_IS11	400.00]	12994	[VSVOBO14	400.00]	1	175.9	52.6	441.0	64.2	265.1	150.7
181	[XVA_IS11	400.00]	28974	[RMEDGI1	400.00]	1	-175.9	-52.6	-441.0	-64.2	-265.1	150.7
751	[XRO_TR1R	400.00]	28017	[RCONST1	400.00]	1	-1000.0	-200.0	OUT OF SERVICE		1000.0	100.0
752	[XRO_TR1T	400.00]	60114	[TPSKOY1	400.00]	1	1000.0	-200.0	OUT OF SERVICE		-1000.0	100.0
24058	[MGOD 4	400.00]	24200	[MDETK 4	400.00]	A	-1.8	-7.3	218.4	-27.5	220.3	999.9
24157	[MSAJO 4	400.00]	24200	[MDETK 4	400.00]	A	249.6	7.9	21.1	28.7	-228.5	91.5
28017	[RCONST1	400.00]	28069	[RTARIV1	400.00]	1	-376.3	-5.4	-135.7	55.9	240.6	63.9
28017	[RCONST1	400.00]	28973	[RCERNAL	400.00]	1	-333.0	-119.9	-81.2	-74.4	251.8	75.6
28017	[RCONST1	400.00]	29005	[RCONSTS1	400.00]	1	-371.5	-119.5	106.1	-33.1	477.6	128.6
28031	[RBRASO1	400.00]	28034	[RSIBIU1	400.00]	1	-234.5	-85.5	32.6	-122.5	267.1	113.9
28034	[RSIBIU1	400.00]	28036	[RIERNU1	400.00]	1	93.3	-42.0	325.9	-64.8	232.6	249.3
28036	[RIERNU1	400.00]	28037	[RGADAL1	400.00]	1	-140.8	-33.7	78.2	-71.3	218.9	155.5
28037	[RGADAL1	400.00]	28039	[RROSIO1	400.00]	1	-153.0	52.7	176.4	-7.5	329.5	215.3
28974	[RMEDGI1	400.00]	29005	[RCONSTS1	400.00]	1	424.7	141.2	-55.6	42.2	-480.3	113.1
60112	[TGEBZE1	400.00]	60114	[TPSKOY1	400.00]	1	-245.0	27.1	202.2	-3.3	447.2	182.5
60112	[TGEBZE1	400.00]	60184	[TYNDGK1	400.00]	1	-189.8	-123.4	-457.9	-167.2	-268.2	141.3
60112	[TGEBZE1	400.00]	60184	[TYNDGK1	400.00]	2	-189.8	-123.4	-457.9	-167.2	-268.2	141.3

Table 13.8.15: Changes in power flow greater than 50 MW through tie-lines in area of interest in winter maximum 2020, scenario Ukraine export 1000 MW to Turkey via HVDC link Romania – Turkey

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%
75	[XSA_AR11 400.00]	24148 [MSAFA 4 400.00]	1	-19.1	15.6	-7.4	11.4	626.0	85.2	11.7	61.3	-4.2	27.2
84	[XRO_MU11 400.00]	65001 [UMUKACH 400.00]	1	-734.4	24.7	-108.4	-32.2	67.3	200.3	-9.8	104.3	5.9	5.1
85	[XPF_DJ11 400.00]	34010 [JHDJE11 400.00]	1	33.6	-9.4	100.9	-19.2	107.9	7.8	5.1	5.0	-7.4	48.9
86	[XRE_PA11 400.00]	34035 [JPANC21 400.00]	1	102.7	15.2	107.9	7.8	19.3	36.4	-5.0	17.3	-4.2	27.2
219	[XBE_OR11 400.00]	24013 [MBEKO 4 400.00]	1	-53.1	29.0	-33.8	24.0	-44.4	55.3	5.9	5.1	5.9	5.1
28001	[RTANTA1 400.00]	22 [XKO_TI11 400.00]	1	80.4	-115.1	36.0	-109.2	-44.4	55.5	5.9	5.1	5.9	5.1
28001	[RTANTA1 400.00]	23 [XKO_TI12 400.00]	2	80.0	-115.1	35.6	-109.2	-44.4	55.5	5.9	5.1	5.9	5.1
28017	[RCONST1 400.00]	751 [XRO_TR1R 400.00]	1	1000.0	200.0	OUT OF SERVICE	OUT OF SERVICE	-1000.0	100.0	-200.0	100.0	4.7	5.7
28020	[RISACCL1A 400.00]	21 [XDO_IS11 400.00]	1	136.9	-81.7	231.9	-77.0	95.0	69.4	266.2	151.1	26.8	135.2
28974	[RMEDGI1 400.00]	181 [XVA_IS11 400.00]	1	176.1	19.9	442.3	46.7	266.2	151.1	26.8	135.2	26.8	135.2

Table 13.8.16: Results of contingency (n-1) analysis in winter maximum 2020, scenario Ukraine export 1000 MW to Turkey via HVDC link Romania – Turkey

<----- MULTI-SECTION LINE ----->				<----- MONITORED BRANCH ----->				
<--> CONTINGENCY	RATING	FLOW	%					
10010*AELBS22	220.00	10125 ACEKIN2	220.00	1	SINGLE 19	370.0	386.3	102.9
10009*AELBS12	220.00	10125 ACEKIN2	220.00	1	SINGLE 22	370.0	384.3	102.6
316 XTR_HN51	110.00	36050*OHNNOV151	110.00	1	SINGLE 207	89.6	103.5	117.2
24034*MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE 367	426.8	544.5	121.6
24094*MMART 4	400.00	24096 MMART 21	220.00	1	SINGLE 367	500.0	553.8	110.8
24034*MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE 368	426.8	548.4	122.5
24094*MMART 4	400.00	24095 MMART 22	220.00	1	SINGLE 368	500.0	557.8	111.6
24034*MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE 379	426.8	544.9	121.7
24094*MMART 4	400.00	24096 MMART 21	220.00	1	SINGLE 379	500.0	554.3	110.9
24034*MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE 380	426.8	548.9	122.6
24094*MMART 4	400.00	24095 MMART 22	220.00	1	SINGLE 380	500.0	558.2	111.6
84*XRO_MU11	400.00	65001 UMUKACH	400.00	1	SINGLE 390	1178.0	1204.6	102.4
24157*MSAJO 4	400.00	24200 MDETK 4	400.00	A	SINGLE 390	554.3	604.0	110.3
28040*RLOTRU2	220.00	28366 RSIBIU2	220.00	1	SINGLE 621	333.4	393.1	112.1
28040*RLOTRU2	220.00	28100 RSIBIU21	220.00	1	SINGLE 622	333.4	393.1	112.1
28040*RLOTRU2	220.00	28366 RSIBIU2	220.00	1	SINGLE 719	333.4	392.8	111.6
28040*RLOTRU2	220.00	28100 RSIBIU21	220.00	1	SINGLE 720	333.4	392.8	111.6
24157*MSAJO 4	400.00	24200 MDETK 4	400.00	A	SINGLE 726	554.3	685.3	126.5
34100*JBGD172	220.00	34111 JBGD8 22	220.00	2	SINGLE 820	445.8	466.8	105.4
34100*JBGD172	220.00	34111 JBGD8 22	220.00	1	SINGLE 821	445.8	466.8	105.4

MONITORED VOLTAGE REPORT:						
SYSTEM	CONTINGENCY	BUS	V-CONT	V-INIT	V-MAX	V-MIN
'HU220	RANGE BASE CASE	24025 MDETK 2	220.00	1.05000	1.05000	0.90000
'BG400	RANGE SINGLE 80	12473 VMT3 12	400.00	1.05105	1.03344	0.90000
'BG220	RANGE SINGLE 134	12286 VUZUND2	220.00	0.89093	1.01168	0.90000
'BG220	RANGE SINGLE 136	12282 VORFEJ2	220.00	1.10544	1.04592	0.90000
'HU220	RANGE SINGLE 356	24005 MALBF 22	220.00	0.89275	1.04262	0.90000
'HU220	RANGE SINGLE 357	24006 MALBF 21	220.00	0.89461	1.04267	0.90000
'HU220	RANGE SINGLE 367	24095 MMART 22	220.00	1.06687	1.04921	0.90000
'HU220	RANGE SINGLE 368	24096 MMART 21	220.00	1.06683	1.04919	0.90000
'GR400	RANGE SINGLE 499	23126 GKPATC12	400.00	1.05007	1.02516	0.90000
'GR400	RANGE SINGLE 499	23180 GAXELO12	400.00	1.05007	1.02552	0.90000
'RO220	RANGE SINGLE 691	28855 RMOSTI2	220.00	0.82471	1.01853	0.90000
'RS400	RANGE SINGLE 797	34085 JSOMB31	400.00	0.86426	0.99088	0.90000
'RS220	RANGE SINGLE 845	34200 JSABA32	220.00	0.88488	1.02007	0.90000

CONTINGENCY LEGEND:	
LABEL	EVENTS
SINGLE 19	: OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	: OPEN LINE FROM BUS 10010 [AELBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 207	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [OPODG211 400.00] CKT 1
SINGLE 367	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 368	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 379	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 380	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 390	: OPEN LINE FROM BUS 196 [XAL_ZA01 750.00] TO BUS 65003 [UZUKRA01 750.00] CKT 1
SINGLE 621	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 719	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 726	: OPEN LINE FROM BUS 84 [XRO_MU11 400.00] TO BUS 65001 [UMUKACH 400.00] CKT 1
SINGLE 820	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 821	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2

## 13.9. Albanian Power Balance Uncertainty

### 13.9.1. Albanian Power System Is Self-Balanced

Table 13.9.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of Albania is self-balanced

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1539.2	1491.9	0.0	0.0	0.0	-0.3	47.6	0.0
AL			497.3	689.7	-201.2	0.0	460.7	11.7	457.7	
20			8804.3	7603.7	0.0	14.4	0.0	1000.1	186.0	1000.0
BG			2888.9	3045.8	-44.9	121.0	2997.8	321.9	2442.9	
30			3147.0	2610.1	0.0	0.0	0.0	490.0	46.8	490.0
BA			692.9	724.5	0.0	0.0	911.5	319.5	560.4	
35			40264.3	49222.0	0.0	1.1	0.0	-9399.9	441.2	-9400.0
IT			7024.2	10816.5	0.0	-157.0	12571.5	-545.8	9482.1	
40			3101.1	3483.0	0.0	0.0	0.0	-435.2	53.2	-435.0
HR			367.1	1074.2	0.0	0.0	1407.6	11.9	688.6	
45			5392.1	6500.0	0.1	0.0	0.0	-1200.0	92.0	-1200.0
HU			968.5	1926.6	178.1	-29.6	2423.6	98.9	1218.1	
50			10298.0	10371.1	0.0	0.0	0.0	-350.0	276.9	-350.0
GR			2136.2	5312.0	170.2	9.3	6614.5	106.4	3139.0	
55			4189.7	-4593.5	0.0	4.9	0.0	8686.3	92.0	8686.0
UX			-112.0	637.5	0.0	12.8	2325.3	419.3	1143.6	
60			1501.5	1577.0	0.0	0.0	0.0	-100.0	24.5	-100.0
MK			450.0	573.6	-31.4	0.0	403.9	48.0	263.7	
65			1207.1	0.0	0.0	0.0	0.0	1200.0	7.1	1200.0
UA			-197.0	0.0	0.0	0.0	653.8	345.6	111.2	
70			10255.2	9416.9	0.0	88.3	0.0	544.9	205.1	545.0
RO			2514.3	4075.6	512.8	273.8	4615.9	-243.4	2511.4	
75			2995.0	2514.0	0.0	8.8	0.0	423.9	48.3	424.0
SI			985.6	811.0	0.0	54.0	608.2	172.8	556.0	
80			54592.5	54622.1	0.0	0.0	0.0	-800.0	770.5	-800.0
TR			4574.9	7792.0	1175.4	0.0	17195.6	-132.6	12935.7	
90			7712.5	7871.1	0.0	17.8	0.0	-360.0	183.6	-360.0
RS			2609.0	2853.5	0.0	76.6	1731.0	-640.6	2050.5	
91			626.9	805.2	0.6	1.9	0.0	-199.9	19.1	-200.0
ME			289.7	299.2	-35.2	11.0	240.4	66.7	188.5	
95			501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK			-384.4	0.0	0.0	0.0	40.0	-360.2	15.8	
TOTALS			156127.6	153494.7	0.6	137.3	0.0	0.0	2495.1	0.0

25304.9	40631.6	1723.9	372.0	55201.5	0.0	37765.2
---------	---------	--------	-------	---------	-----	---------



Figure 13.9.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of Albania is self-balanced

Table 13.9.2: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2015, scenario when power system of Albania is self-balanced

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I
***** NONE *****									

Table 13.9.3: Changes in power flow greater than 50 MW in area of SEE in winter maximum 2015, scenario when power system of Albania is self-balanced

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 50.0 MW:
IN WORKING CASE IN BASE CASE



X----- FROM BUS -----X X----- TO BUS -----X CKT	MW	MVAR	MW	MVAR	DELTA MW	%
10006 [AVDEJA2 220.00] 10616 [AKOPLI2 220.00] 1	49.9	-22.3	-3.5	-15.2	-53.4	107.1
88 [XVD_PO21 220.00] 10616 [AKOPLI2 220.00] 1	-44.7	19.3	8.5	11.4	53.2	119.1
88 [XVD_PO21 220.00] 36015 [OPODG121 220.00] 1	44.7	-19.3	-8.5	-11.4	-53.2	119.1

Table 13.9.4: Changes in power flow through tie-lines connecting Albania to the rest of the system, in winter maximum 2015, scenario when power system of Albania is self-balanced

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:		IN WORKING CASE		IN BASE CASE		MW	MVAR	MW	MVAR	DELTA MW	%
X----- FROM BUS -----X X----- TO BUS -----X CKT		X----- FROM BUS -----X X----- TO BUS -----X CKT		MW	MVAR	MW	MVAR	DELTA MW	%		
88 [XVD_PO21 220.00]	36015 [OPODG121 220.00]	1		44.7	-19.3	-8.5	-11.4	-53.2	119.1		
220 [XKA_PG11 400.00]	36005 [OPODG211 400.00]	1		-81.3	20.1	-129.0	24.6	-47.7	58.7		
87 [XFI_PR21 220.00]	34190 [JKPRZ22 220.00]	1		200.9	36.5	163.9	41.0	-37.0	18.4		
2 [XZE_KA11 400.00]	22461 [GKARDI11 400.00]	1		-136.0	-55.0	-171.2	-55.3	-35.2	25.9		
82 [XKA_KC11 400.00]	34071 [JTKOSC1 400.00]	1		-28.6	29.4	-55.1	28.4	-26.5	92.7		

Table 13.9.5: Results of contingency (n-1) analysis in winter maximum 2015, scenario when power system of Albania is self-balanced

<----- MONITORED BRANCH ----->	CONTINGENCY	RATING	FLOW	%
24034*MDUME 2 220.00 24096 MMART 21 220.00 1 SINGLE 344		426.8	452.2	101.0
24034*MDUME 2 220.00 24095 MMART 22 220.00 1 SINGLE 345		426.8	455.5	101.8
24034*MDUME 2 220.00 24096 MMART 21 220.00 1 SINGLE 356		426.8	452.3	101.0
24034*MDUME 2 220.00 24095 MMART 22 220.00 1 SINGLE 357		426.8	455.7	101.8
31210*LDIVAC2 220.00 156 XPA_DI21 220.00 1 SINGLE 707		320.1	581.1	176.0

MONITORED VOLTAGE REPORT:		CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
SYSTEM	CONTINGENCY						
'BG220	' RANGE SINGLE 100	12252 VOCHIF2	220.00	0.81903	0.95889	1.10000	0.90000
'BG220	' RANGE SINGLE 124	12286 VUZUND2	220.00	0.89617	1.00478	1.10000	0.90000
'GR400	' RANGE SINGLE 432	22759 GTH_AG11	400.00	1.05207	1.02537	1.05000	0.90000
'GR400	' RANGE SINGLE 432	23123 GKPATR11	400.00	1.05224	1.03830	1.05000	0.90000
'GR400	' RANGE SINGLE 432	23125 GKPATC11	400.00	1.05233	1.03828	1.05000	0.90000
'GR400	' RANGE SINGLE 432	23126 GKPATC12	400.00	1.05227	1.03839	1.05000	0.90000
'GR400	' RANGE SINGLE 432	23173 GDISTO11	400.00	1.05316	1.03803	1.05000	0.90000
'GR400	' RANGE SINGLE 432	23174 GDISTO12	400.00	1.05279	1.03816	1.05000	0.90000
'GR400	' RANGE SINGLE 432	23180 GAXELO12	400.00	1.05245	1.03884	1.05000	0.90000
'GR400	' RANGE SINGLE 432	23181 GAXELO11	400.00	1.05241	1.03905	1.05000	0.90000
'GR400	' RANGE SINGLE 433	23064 GK_MEG13	400.00	1.05395	1.04127	1.05000	0.90000
'GR400	' RANGE SINGLE 433	23066 GK_MEG11	400.00	1.05395	1.04127	1.05000	0.90000
'GR400	' RANGE SINGLE 433	23123 GKPATR11	400.00	1.05339	1.03830	1.05000	0.90000
'GR400	' RANGE SINGLE 433	23125 GKPATC11	400.00	1.05348	1.03828	1.05000	0.90000
'GR400	' RANGE SINGLE 433	23126 GKPATC12	400.00	1.05343	1.03839	1.05000	0.90000
'GR400	' RANGE SINGLE 433	23173 GDISTO11	400.00	1.05411	1.03803	1.05000	0.90000
'GR400	' RANGE SINGLE 433	23174 GDISTO12	400.00	1.05393	1.03816	1.05000	0.90000
'GR400	' RANGE SINGLE 433	23180 GAXELO12	400.00	1.05361	1.03884	1.05000	0.90000
'GR400	' RANGE SINGLE 433	23181 GAXELO11	400.00	1.05367	1.03905	1.05000	0.90000
'GR400	' RANGE SINGLE 462	23036 GK_KOR13	400.00	1.06336	1.01758	1.05000	0.90000
'GR400	' RANGE SINGLE 462	23068 GK_MEG14	400.00	1.06096	1.02960	1.05000	0.90000
'GR400	' RANGE SINGLE 463	23037 GK_KOR14	400.00	1.06336	1.01758	1.05000	0.90000
'GR400	' RANGE SINGLE 463	23067 GK_MEG12	400.00	1.06096	1.02960	1.05000	0.90000
'GR400	' RANGE SINGLE 473	23126 GKPATC12	400.00	1.06914	1.03839	1.05000	0.90000
'GR400	' RANGE SINGLE 473	23180 GAXELO12	400.00	1.06914	1.03884	1.05000	0.90000
'GR400	' RANGE SINGLE 473	23181 GAXELO11	400.00	1.06895	1.03905	1.05000	0.90000
'GR400	' RANGE SINGLE 475	23180 GAXELO12	400.00	1.06859	1.03884	1.05000	0.90000
'GR400	' RANGE SINGLE 475	23181 GAXELO11	400.00	1.06840	1.03905	1.05000	0.90000
'RO220	' RANGE SINGLE 567	28043 RSTUPA2	220.00	0.89269	0.98014	1.10000	0.90000
'RO220	' RANGE SINGLE 637	28855 RMOSTI2	220.00	0.88198	1.04044	1.10000	0.90000
'RO220	' RANGE SINGLE 642	28907 RSTILP2	220.00	0.84359	0.98208	1.10000	0.90000
'RO220	' RANGE SINGLE 670	28095 RVETIS2	220.00	0.89846	1.02183	1.10000	0.90000
'RS400	' RANGE SINGLE 739	34085 JSOMB31	400.00	0.87946	0.99488	1.05000	0.90000

CONTINGENCY LEGEND:		EVENTS
SINGLE 100	:	OPEN LINE FROM BUS 12250 [VGORIA2 220.00] TO BUS 12252 [VOCHIF2 220.00] CKT 1
SINGLE 124	:	OPEN LINE FROM BUS 12275 [VMI3 2 220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 344	:	OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1

SINGLE 345	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 356	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 357	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 432	:	OPEN LINE FROM BUS 22759 [GTH_AG11	400.00]	TO BUS 23172 [GDISTO13	400.00]	CKT 1
SINGLE 433	:	OPEN LINE FROM BUS 22759 [GTH_AG11	400.00]	TO BUS 23173 [GDISTO11	400.00]	CKT 1
SINGLE 462	:	OPEN LINE FROM BUS 23033 [GKYT_K11	400.00]	TO BUS 23036 [GK_KOR13	400.00]	CKT 1
SINGLE 463	:	OPEN LINE FROM BUS 23033 [GKYT_K11	400.00]	TO BUS 23037 [GK_KOR14	400.00]	CKT 1
SINGLE 473	:	OPEN LINE FROM BUS 23123 [GKPATR11	400.00]	TO BUS 23126 [GKPATC12	400.00]	CKT 1
SINGLE 475	:	OPEN LINE FROM BUS 23126 [GKPATC12	400.00]	TO BUS 23180 [GAXELO12	400.00]	CKT 1
SINGLE 567	:	OPEN LINE FROM BUS 28043 [RSTUPA2	220.00]	TO BUS 28044 [RBRADU2	220.00]	CKT 1
SINGLE 637	:	OPEN LINE FROM BUS 28855 [RMOSTI2	220.00]	TO BUS 28935 [RRAC.M2	220.00]	CKT 1
SINGLE 642	:	OPEN LINE FROM BUS 28906 [RTELEA2	220.00]	TO BUS 28907 [RSTILP2	220.00]	CKT 1
SINGLE 670	:	OPEN LINE FROM BUS 28039 [RROSIO1	400.00]	TO BUS 28094 [RROSIO2	220.00]	CKT 1
SINGLE 707	:	OPEN LINE FROM BUS 31410 [LDIVAC1	400.00]	TO BUS 80 [XRE_DI11	400.00]	CKT 1
SINGLE 739	:	OPEN LINE FROM BUS 34050 [JSUBO31	400.00]	TO BUS 34085 [JSOMB31	400.00]	CKT 1

Table 13.9.6: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of Albania is self-balanced

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1775.3	1723.7	0.0	0.0	0.0	0.0	51.6	0.0
AL	690.1	779.7	-205.3	0.0	476.8	93.0	499.5	
20	9658.8	8411.0	0.0	15.5	0.0	1000.0	232.3	1000.0
BG	3507.9	3357.9	0.0	181.2	3281.0	199.9	3049.9	
30	2950.1	2897.8	0.0	0.0	0.0	0.0	52.3	0.0
BA	1001.3	1017.2	0.0	0.0	913.8	238.3	659.7	
35	45060.6	54409.8	0.0	1.1	0.0	-9740.0	389.8	-9740.0
IT	9577.3	11942.3	0.0	147.8	12395.0	-809.4	10691.7	
40	3429.0	4359.0	0.0	0.0	0.0	-999.9	69.9	-1000.0
HR	508.0	1075.9	0.0	0.0	1534.3	197.4	768.9	
45	6093.6	7180.0	0.1	0.0	0.0	-1200.0	113.5	-1200.0
HU	1358.4	2128.1	178.6	-29.1	2405.1	0.0	1485.9	
50	11749.7	11426.0	0.0	0.0	0.0	0.0	323.7	0.0
GR	3116.2	5724.7	203.7	9.4	6664.5	121.1	3708.1	
55	5069.2	-4356.2	0.0	4.8	0.0	9299.7	120.9	9300.0
UX	261.9	622.8	0.0	12.7	2305.0	372.1	1559.2	
60	1940.0	2001.9	0.0	0.0	0.0	-100.0	38.0	-100.0
MK	759.4	752.3	-30.9	0.0	398.0	10.4	424.4	
65	1207.5	0.0	0.0	0.0	0.0	1200.0	7.5	1200.0
UA	-165.1	0.0	0.0	0.0	652.3	366.2	121.1	
70	13263.0	12110.2	0.0	90.2	0.0	800.1	262.5	800.0
RO	3125.7	4455.6	783.1	285.7	5600.2	-38.0	3239.4	
75	3949.9	2990.0	0.0	8.9	0.0	890.0	61.0	890.0
SI	1231.1	964.6	0.0	53.8	868.5	334.4	746.8	
80	77661.5	77342.9	0.0	0.0	0.0	-800.0	1118.6	-800.0
TR	9832.6	11034.0	996.9	0.0	22660.7	-172.4	20634.9	
90	7767.4	8298.8	0.0	17.3	0.0	-749.9	201.3	-750.0
RS	2886.4	2986.6	0.0	73.4	1732.9	-664.4	2223.7	

91	863.7	938.0	0.5	2.1	0.0	-100.0	23.0	-100.0
ME	346.2	346.6	-34.7	11.5	237.7	54.4	206.0	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-328.3	0.0	0.0	0.0	40.0	-303.2	14.8	
TOTALS	192940.7	189732.9	0.6	139.9	0.0	0.0	3067.1	0.0
	37709.1	47188.4	1891.3	746.3	62165.8	0.0	50034.0	



Figure 13.9.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of Albania is self-balanced

Table 13.9.7: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2020, scenario when power system of Albania is self-balanced

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I		
12274,VMI	2	220.00,	12474,VMI	1	400.00,	1,	1,	-530.20,	-109.75,	541.44,	81.65

Table 13.9.8: Changes in power flow greater than 50 MW in area of SEE in winter maximum 2020, scenario when power system of Albania is self-balanced

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 50.0 MW:												
IN WORKING CASE					IN BASE CASE							
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
***** NONE *****												

Table 13.9.9: Changes in power flow through tie-lines connecting Albania to the rest of the system in winter maximum 2020, scenario when power system of Albania is self-balanced

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:												
IN WORKING CASE					IN BASE CASE							
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
88	[XVD_PO21	220.00]	36015	[OPDGG121	220.00]	1	62.1	-13.4	18.4	-8.2	-43.6	70.3
220	[XKA_PG11	400.00]	36005	[OPDGG211	400.00]	1	23.5	25.4	-9.5	27.0	-33.0	140.6
87	[XFI_PR21	220.00]	34190	[JPRIZ22	220.00]	1	156.4	60.8	128.7	62.0	-27.7	17.7
2	[XZE_KA11	400.00]	22461	[GKARDI11	400.00]	1	-256.4	-29.9	-281.1	-30.6	-24.8	9.7
82	[XKA_KC11	400.00]	34073	[JGJAK31	400.00]	1	14.4	50.1	-6.5	49.5	-20.9	144.7

Table 13.9.10: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of Albania is self-balanced

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%
10010*	AELBS22	220.00	10125 ACEKIN2	220.00	1 SINGLE 19	370.0 385.9 102.7
10009*	AELBS12	220.00	10125 ACEKIN2	220.00	1 SINGLE 22	370.0 383.9 102.4
316	XTR_HN51	110.00	36050*OHNOVI51	110.00	1 SINGLE 207	89.6 91.4 102.9
24034*	MDUME 2	220.00	24096 MMART 21	220.00	1 SINGLE 367	426.8 519.9 116.1
24094*	MMART 4	400.00	24096 MMART 21	220.00	1 SINGLE 367	500.0 529.1 105.8
24034*	MDUME 2	220.00	24095 MMART 22	220.00	1 SINGLE 368	426.8 523.7 117.0
24094*	MMART 4	400.00	24095 MMART 22	220.00	1 SINGLE 368	500.0 532.9 106.6
24034*	MDUME 2	220.00	24096 MMART 21	220.00	1 SINGLE 379	426.8 520.1 116.2
24094*	MMART 4	400.00	24096 MMART 21	220.00	1 SINGLE 379	500.0 529.4 105.9
24034*	MDUME 2	220.00	24095 MMART 22	220.00	1 SINGLE 380	426.8 523.9 117.0
24094*	MMART 4	400.00	24095 MMART 22	220.00	1 SINGLE 380	500.0 533.2 106.6
28040*	RLOTRU2	220.00	28366 RSIBIU2	220.00	1 SINGLE 621	333.4 393.1 112.3
28040*	RLOTRU2	220.00	28100 RSIBIU21	220.00	1 SINGLE 622	333.4 393.1 112.3
28040*	RLOTRU2	220.00	28366 RSIBIU2	220.00	1 SINGLE 719	333.4 392.9 111.7
28040*	RLOTRU2	220.00	28100 RSIBIU21	220.00	1 SINGLE 720	333.4 392.9 111.7
34100*	JBGD172	220.00	34111 JBGD8 22	220.00	2 SINGLE 819	445.8 466.9 105.6
34100*	JBGD172	220.00	34111 JBGD8 22	220.00	1 SINGLE 820	445.8 466.9 105.6

MONITORED VOLTAGE REPORT:									
SYSTEM	CONTINGENCY	<-----	B U S	----->	V-CONT	V-INIT	V-MAX	V-MIN	
'BG400	'	RANGE SINGLE 80	12473	VMI3 12	400.00	1.05034	1.03260	1.05000	0.90000
'BG220	'	RANGE SINGLE 134	12286	VUZUND2	220.00	0.88920	1.01058	1.10000	0.90000
'BG220	'	RANGE SINGLE 136	12282	VORFEJ2	220.00	1.10521	1.04448	1.10000	0.90000
'HU220	'	RANGE SINGLE 356	24005	MALBF 22	220.00	0.89275	1.04262	1.10000	0.90000
'HU220	'	RANGE SINGLE 357	24006	MALBF 21	220.00	0.89462	1.04267	1.10000	0.90000
'GR400	'	RANGE SINGLE 499	23126	GKPATC12	400.00	1.05006	1.02515	1.05000	0.90000
'GR400	'	RANGE SINGLE 499	23180	GAXELO12	400.00	1.05006	1.02551	1.05000	0.90000
'RO220	'	RANGE SINGLE 691	28855	RMOSTI2	220.00	0.82129	1.01434	1.10000	0.90000
'RS400	'	RANGE SINGLE 796	34085	JSOMB31	400.00	0.86296	0.99013	1.05000	0.90000
'RS220	'	RANGE SINGLE 844	34200	JSABA32	220.00	0.88327	1.01932	1.10000	0.90000

CONTINGENCY LEGEND:									
LABEL	EVENTS								
SINGLE 19	: OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1								
SINGLE 22	: OPEN LINE FROM BUS 10010 [AELBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1								
SINGLE 80	: OPEN LINE FROM BUS 12471 [VMI3 11 400.00] TO BUS 12473 [VMI3 12 400.00] CKT 1								
SINGLE 134	: OPEN LINE FROM BUS 12275 [VMI3 2 220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1								
SINGLE 136	: OPEN LINE FROM BUS 12280 [VALEKO2 220.00] TO BUS 12282 [VORFEJ2 220.00] CKT 1								
SINGLE 207	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [OPDGG211 400.00] CKT 1								
SINGLE 356	: OPEN LINE FROM BUS 24005 [MALBF 22 220.00] TO BUS 24034 [MDUME 2 220.00] CKT 1								
SINGLE 357	: OPEN LINE FROM BUS 24006 [MALBF 21 220.00] TO BUS 24034 [MDUME 2 220.00] CKT 1								

SINGLE 367	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 368	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 379	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 380	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 621	:	OPEN LINE FROM BUS 28040 [RLOTU2	220.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 622	:	OPEN LINE FROM BUS 28040 [RLOTU2	220.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 719	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 720	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 796	:	OPEN LINE FROM BUS 34050 [JSUBO31	400.00]	TO BUS 34085 [JSOMB31	400.00]	CKT 1
SINGLE 819	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 1
SINGLE 820	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 2
SINGLE 844	:	OPEN LINE FROM BUS 34170 [JOBREN2	220.00]	TO BUS 34200 [JSABA32	220.00]	CKT 1

### 13.9.2. Albanian Power System Exports 500 MW

Table 13.9.11: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of Albania exports 500 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1714.5	1171.9	0.0	0.0	0.0	500.0	42.6	500.0
AL	360.8	541.8	-221.5	0.0	479.6	84.0	436.1	
20	8801.4	7603.7	0.0	14.4	0.0	1000.0	183.3	1000.0
BG	2855.9	3045.8	-44.9	121.1	3001.7	322.9	2412.8	
30	3147.8	2610.1	0.0	0.0	0.0	490.0	47.6	490.0
BA	682.5	724.5	0.0	0.0	911.8	300.6	569.3	
35	40263.0	49222.0	0.0	1.1	0.0	-9400.0	439.9	-9400.0
IT	7002.5	10816.5	0.0	-157.0	12573.9	-549.1	9466.2	
40	3108.4	3483.0	0.0	0.0	0.0	-434.9	60.3	-435.0
HR	400.6	1074.2	0.0	0.0	1403.9	-15.2	745.5	
45	5394.9	6500.0	0.1	0.0	0.0	-1199.9	94.7	-1200.0
HU	1009.5	1926.6	178.1	-29.6	2422.2	110.7	1246.1	
50	10298.0	10371.1	0.0	0.0	0.0	-350.0	276.9	-350.0
GR	2080.4	5312.0	170.3	9.3	6623.6	61.7	3136.8	
55	3673.8	-4593.5	0.0	4.9	0.0	8185.5	77.0	8186.0
UX	-280.6	637.5	0.0	12.9	2332.8	504.4	897.4	
60	1501.3	1577.0	0.0	0.0	0.0	-100.0	24.3	-100.0
MK	437.1	573.6	-31.5	0.0	405.0	39.0	261.1	
65	1206.9	0.0	0.0	0.0	0.0	1200.0	6.9	1200.0
UA	-196.4	0.0	0.0	0.0	653.8	347.3	110.0	
70	10259.5	9416.9	0.0	88.3	0.0	545.2	209.1	545.0
RO	2527.3	4075.6	512.6	273.6	4612.8	-269.3	2547.6	
75	2998.3	2514.0	0.0	8.8	0.0	424.1	51.4	424.0
SI	1005.9	811.0	0.0	53.9	607.1	162.8	585.2	
80	54592.0	54622.1	0.0	0.0	0.0	-800.0	770.0	-800.0
TR	4565.3	7792.0	1175.5	0.0	17195.8	-135.7	12929.3	

90	7713.3	7871.1	0.0	17.8	0.0	-360.0	184.3	-360.0
RS	2567.2	2853.5	0.0	76.8	1735.0	-669.6	2041.5	
91	624.6	805.2	0.6	1.9	0.0	-200.0	16.9	-200.0
ME	262.2	299.2	-35.8	11.1	243.6	61.5	169.9	
95	501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK	-380.4	0.0	0.0	0.0	40.0	-356.1	15.8	
TOTALS	155799.0	153174.7	0.6	137.3	0.0	0.0	2486.5	0.0
	24899.8	40483.7	1702.6	372.2	55242.7	0.0	37570.4	

Table 13.9.12: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2015, scenario when power system of Albania exports 500 MW

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I
87,XFI_PR21	220.00,	10004,AFIERZ2	220.00,	1,	1,	-279.82,	-46.41,	283.64,	85.10
87,XFI_PR21	220.00,	34190,JKPRZ22	220.00,	1,	1,	279.82,	46.41,	283.64,	93.05

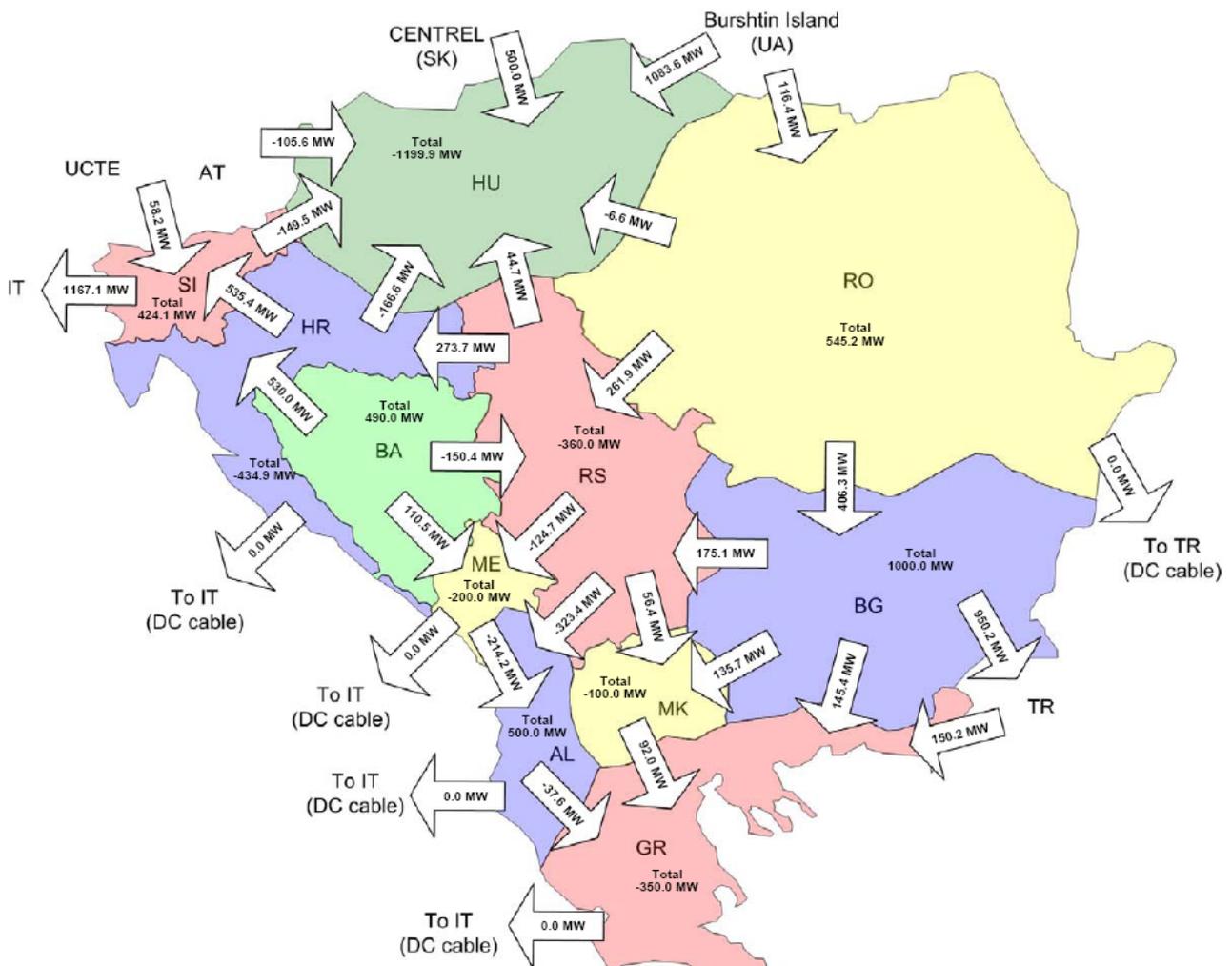


Figure 13.9.3: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of Albania exports 500 MW

Table 13.9.13: Changes in power flow greater than 100 MW in area of SEE in winter maximum 2015, scenario when power system of Albania exports 500 MW

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 100.0 MW:											
IN WORKING CASE						IN BASE CASE					
X	FROM BUS	END	MW	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW %
220	[XKA_PG11	400.00]	10015	[AKASHA1	400.00]	1	-48.0	-34.4	129.0	-24.6	177.1 368.5
220	[XKA_PG11	400.00]	36005	[OPODG211	400.00]	1	48.0	34.4	-129.0	24.6	-177.1 368.5
10006	[AVDEJA2	220.00]	10616	[AKOPLI2	220.00]	1	172.1	-19.6	-3.5	-15.2	-175.6 102.1
88	[XVD_PO21	220.00]	10616	[AKOPLI2	220.00]	1	-166.2	25.1	8.5	11.4	174.7 105.1
88	[XVD_PO21	220.00]	36015	[OPODG121	220.00]	1	166.2	-25.1	-8.5	-11.4	-174.7 105.1
13	[XTR_PG11	400.00]	36005	[OPODG211	400.00]	1	116.8	83.0	279.0	80.8	162.2 138.9
13	[XTR_PG11	400.00]	14405	[WTREBI1	400.00]	1	-116.8	-83.0	-279.0	-80.8	-162.2 138.9
71	[XME_DI11	400.00]	31410	[LDIVAC1	400.00]	1	589.7	6.2	447.4	21.4	-142.2 24.1
71	[XME_DI11	400.00]	20078	[HMELIN11	400.00]	1	-589.7	-6.2	-447.4	-21.4	142.2 24.1
2	[XZE_KA11	400.00]	10020	[AZEMLA1	400.00]	1	37.6	22.2	171.2	55.3	133.6 355.2
14404	[WGACKO1	400.00]	18401	[WMOST41	400.00]	1	142.6	-21.8	13.8	-21.9	-128.7 90.3
14404	[WGACKO1	400.00]	14405	[WTREBI1	400.00]	1	77.3	47.2	206.0	53.6	128.7 166.5
20078	[HMELIN11	400.00]	20120	[HOBROV11	400.00]	1	-237.8	-40.2	-111.8	-58.6	126.0 53.0
20060	[HKONJS11	400.00]	20120	[HOBROV11	400.00]	1	119.2	-25.1	2.5	-21.4	-116.6 97.9
87	[XFI_PR21	220.00]	34190	[JKPRZ22	220.00]	1	279.8	46.4	163.9	41.0	-116.0 41.4
87	[XFI_PR21	220.00]	10004	[AFIERZ2	220.00]	1	-279.8	-46.4	-163.9	-41.0	116.0 41.4
34020	[JNIS2 1	400.00]	34070	[JTKOSB1	400.00]	1	88.7	-31.7	200.4	-34.0	111.6 125.9
11	[XMO_KO11	400.00]	20060	[HKONJS11	400.00]	1	207.1	29.7	96.7	30.9	-110.4 53.3
11	[XMO_KO11	400.00]	18401	[WMOST41	400.00]	1	-207.1	-29.7	-96.7	-30.9	110.4 53.3
74	[XER_SM11	400.00]	20030	[HERNES11	400.00]	1	273.7	-65.9	164.9	-62.2	-108.8 39.8
74	[XER_SM11	400.00]	34045	[JSMIT21	400.00]	1	-273.7	65.9	-164.9	62.2	108.8 39.8
10014	[AKASHA2	220.00]	10015	[AKASHA1	400.00]	2	39.7	-82.5	-62.9	-88.0	-102.6 258.6
10014	[AKASHA2	220.00]	10015	[AKASHA1	400.00]	1	39.7	-82.5	-62.9	-88.0	-102.6 258.6
10011	[AELBS21	400.00]	10020	[AZEMLA1	400.00]	1	21.4	-70.6	-80.8	-90.4	-102.2 478.1

Table 13.9.14: Changes in power flow through tie-lines connecting Albania to the rest of the system, in winter maximum 2015, scenario when power system of Albania exports 500 MW

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:											
IN WORKING CASE						IN BASE CASE					
X	FROM BUS	END	MW	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW %
220	[XKA_PG11	400.00]	36005	[OPODG211	400.00]	1	48.0	34.4	-129.0	24.6	-177.1 368.5
88	[XVD_PO21	220.00]	36015	[OPODG121	220.00]	1	166.2	-25.1	-8.5	-11.4	-174.7 105.1
2	[XZE_KA11	400.00]	22461	[GKARDI11	400.00]	1	-37.6	-22.2	-171.2	-55.3	-133.6 355.2
87	[XFI_PR21	220.00]	34190	[JKPRZ22	220.00]	1	279.8	46.4	163.9	41.0	-116.0 41.4
82	[XKA_KC11	400.00]	34071	[JTKOSC1	400.00]	1	43.6	50.5	-55.1	28.4	-98.7 226.3

Table 13.9.15: Results of contingency (n-1) analysis in winter maximum 2015, scenario when power system of Albania exports 500 MW

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%
87	XFI_PR21	220.00	34190*JKPRZ22	220.00 1	SINGLE 4	297.2 295.0 100.3
87	XFI_PR21	220.00	34190*JKPRZ22	220.00 1	SINGLE 6	297.2 306.6 104.5
87	XFI_PR21	220.00	34190*JKPRZ22	220.00 1	SINGLE 11	297.2 310.0 105.8
87	XFI_PR21	220.00	34190*JKPRZ22	220.00 1	SINGLE 35	297.2 309.3 105.5
328	XMA_IB51	110.00	31050 LILBIS5	110.00 1	SINGLE 269	65.0 70.6 103.1
31210	LDIVAC2	220.00	156 XPA_DI21	220.00 1	SINGLE 269	320.1 344.6 104.7
24034	MDUME 2	220.00	24096 MMART 21	220.00 1	SINGLE 344	426.8 461.2 103.0
24034	MDUME 2	220.00	24095 MMART 22	220.00 1	SINGLE 345	426.8 464.6 103.8
24034	MDUME 2	220.00	24096 MMART 21	220.00 1	SINGLE 356	426.8 461.4 103.1
24034	MDUME 2	220.00	24095 MMART 22	220.00 1	SINGLE 357	426.8 464.8 103.8
31210	LDIVAC2	220.00	156 XPA_DI21	220.00 1	SINGLE 707	320.1 659.3 200.6

MONITORED VOLTAGE REPORT:

SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
'BG220	RANGE SINGLE 100	12252 VOCHIF2	220.00	0.81945	0.95922	1.10000 0.90000

'BG220	'	RANGE SINGLE 124	12286	VUZUND2	220.00	0.89662	1.00513	1.10000	0.90000
'GR400	'	RANGE SINGLE 432	22759	GTH_AG11	400.00	1.05241	1.02591	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23123	GKPATR11	400.00	1.05266	1.03884	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23125	GKPATC11	400.00	1.05275	1.03882	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23126	GKPATC12	400.00	1.05269	1.03893	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23173	GDISTO11	400.00	1.05358	1.03857	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23174	GDISTO12	400.00	1.05320	1.03870	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23180	GAXELO12	400.00	1.05287	1.03939	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23181	GAXELO11	400.00	1.05284	1.03960	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23064	GK_MEG13	400.00	1.05445	1.04178	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23066	GK_MEG11	400.00	1.05445	1.04178	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23123	GKPATR11	400.00	1.05391	1.03884	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23125	GKPATC11	400.00	1.05400	1.03882	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23126	GKPATC12	400.00	1.05395	1.03893	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23173	GDISTO11	400.00	1.05463	1.03857	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23174	GDISTO12	400.00	1.05445	1.03870	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23180	GAXELO12	400.00	1.05413	1.03939	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23181	GAXELO11	400.00	1.05419	1.03960	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23036	GK_KOR13	400.00	1.06384	1.01805	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23068	GK_MEG14	400.00	1.06144	1.03008	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23037	GK_KOR14	400.00	1.06384	1.01805	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23067	GK_MEG12	400.00	1.06144	1.03008	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23126	GKPATC12	400.00	1.06984	1.03893	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23180	GAXELO12	400.00	1.06984	1.03939	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23181	GAXELO11	400.00	1.06964	1.03960	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23180	GAXELO12	400.00	1.06928	1.03939	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23181	GAXELO11	400.00	1.06910	1.03960	1.05000	0.90000
'RO220	'	RANGE SINGLE 567	28043	RSTUPA2	220.00	0.89190	0.97951	1.10000	0.90000
'RO220	'	RANGE SINGLE 637	28855	RMOSTI2	220.00	0.88185	1.04023	1.10000	0.90000
'RO220	'	RANGE SINGLE 642	28907	RSTILP2	220.00	0.84317	0.98182	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28095	RVETIS2	220.00	0.89801	1.02128	1.10000	0.90000
'RS400	'	RANGE SINGLE 739	34085	JSOMB31	400.00	0.87822	0.99395	1.05000	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 4	: OPEN LINE FROM BUS 10004 [AFIERZ2 220.00] TO BUS 10007 [ABURRE2 220.00] CKT 1
SINGLE 6	: OPEN LINE FROM BUS 10005 [AKOMAN2 220.00] TO BUS 10006 [AVDEJA2 220.00] CKT 1
SINGLE 11	: OPEN LINE FROM BUS 10006 [AVDEJA2 220.00] TO BUS 10616 [AKOPLI2 220.00] CKT 1
SINGLE 35	: OPEN LINE FROM BUS 88 [XVD_PO21 220.00] TO BUS 36015 [OPODG121 220.00] CKT 1
SINGLE 100	: OPEN LINE FROM BUS 12250 [VGORIA2 220.00] TO BUS 12252 [VOCHIF2 220.00] CKT 1
SINGLE 124	: OPEN LINE FROM BUS 12275 [VMI3 2 220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 269	: OPEN LINE FROM BUS 71 [XME_DI11 400.00] TO BUS 31410 [LDIVAC1 400.00] CKT 1
SINGLE 344	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 345	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 356	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 357	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 432	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23172 [GDISTO13 400.00] CKT 1
SINGLE 433	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23173 [GDISTO11 400.00] CKT 1
SINGLE 462	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23036 [GK_KOR13 400.00] CKT 1
SINGLE 463	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23037 [GK_KOR14 400.00] CKT 1
SINGLE 473	: OPEN LINE FROM BUS 23123 [GKPATR11 400.00] TO BUS 23126 [GKPATC12 400.00] CKT 1
SINGLE 475	: OPEN LINE FROM BUS 23126 [GKPATC12 400.00] TO BUS 23180 [GAXELO12 400.00] CKT 1
SINGLE 567	: OPEN LINE FROM BUS 28043 [RSTUPA2 220.00] TO BUS 28044 [RBRADU2 220.00] CKT 1
SINGLE 637	: OPEN LINE FROM BUS 28855 [RMOSTI2 220.00] TO BUS 28935 [RRAC.M2 220.00] CKT 1
SINGLE 642	: OPEN LINE FROM BUS 28906 [RTELEA2 220.00] TO BUS 28907 [RSTILP2 220.00] CKT 1
SINGLE 670	: OPEN LINE FROM BUS 28039 [RROSI01 400.00] TO BUS 28094 [RROSI02 220.00] CKT 1
SINGLE 707	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1
SINGLE 739	: OPEN LINE FROM BUS 34050 [JSUBO31 400.00] TO BUS 34085 [JSOMB31 400.00] CKT 1

Table 13.9.16: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of Albania exports 500 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	2274.1	1723.7	0.0	0.0	0.0	500.0	50.4	500.0
AL	816.2	779.7	-209.8	0.0	543.6	206.5	583.4	
20	9655.0	8411.0	0.0	15.5	0.0	1000.0	228.5	1000.0

BG	3466.2	3357.9	0.0	181.4	3286.0	203.7	3009.2	
30	2952.6	2897.8	0.0	0.0	0.0	0.1	54.8	0.0
BA	988.6	1017.2	0.0	0.0	914.4	207.8	678.0	
35	45058.6	54409.8	0.0	1.1	0.0	-9740.0	387.7	-9740.0
IT	9537.5	11942.3	0.0	147.8	12398.4	-816.6	10662.5	
40	3434.9	4359.0	0.0	0.0	0.0	-999.9	75.8	-1000.0
HR	525.0	1075.9	0.0	0.0	1531.7	166.3	814.5	
45	6096.3	7180.0	0.1	0.0	0.0	-1199.9	116.1	-1200.0
HU	1382.0	2128.1	178.4	-29.1	2403.8	-4.1	1512.5	
50	11748.5	11426.0	0.0	0.0	0.0	0.0	322.5	0.0
GR	3045.0	5724.7	203.7	9.4	6673.7	72.4	3694.8	
55	4549.6	-4356.2	0.0	4.8	0.0	8799.4	101.6	8800.0
UX	61.8	622.8	0.0	12.8	2316.0	474.4	1267.8	
60	1939.4	2001.9	0.0	0.0	0.0	-100.0	37.4	-100.0
MK	737.0	752.3	-31.1	0.0	399.6	-4.0	418.2	
65	1207.4	0.0	0.0	0.0	0.0	1200.0	7.4	1200.0
UA	-161.6	0.0	0.0	0.0	652.3	370.4	120.3	
70	13270.3	12110.2	0.0	90.1	0.0	800.2	269.9	800.0
RO	3158.3	4455.6	782.4	285.3	5593.6	-78.1	3306.7	
75	3951.1	2990.0	0.0	8.9	0.0	890.0	62.2	890.0
SI	1235.2	964.6	0.0	53.8	868.1	324.7	760.3	
80	77661.3	77342.9	0.0	0.0	0.0	-800.0	1118.5	-800.0
TR	9825.6	11034.0	996.9	0.0	22660.9	-177.1	20632.8	
90	7766.5	8298.8	0.0	17.4	0.0	-749.9	200.3	-750.0
RS	2840.0	2986.6	0.0	73.7	1738.0	-689.3	2207.0	
91	862.3	938.0	0.6	2.1	0.0	-100.0	21.6	-100.0
ME	316.5	346.6	-35.4	11.6	241.0	41.3	193.4	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-323.5	0.0	0.0	0.0	40.0	-298.3	14.8	
TOTALS	192929.3	189732.9	0.6	139.9	0.0	0.0	3055.8	0.0
	37450.0	47188.4	1885.2	746.6	62261.0	0.0	49876.0	



Figure 13.9.4: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of Albania exports 500 MW

Table 13.9.17: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2020, scenario when power system of Albania exports 500 MW

FRMBUS,	FROMBUSNAME,	TOBUS,	TOBUSNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I		
12274,VMI	2	220.00,	12474,VMI	1	400.00,	1,	1,	-534.51,	-109.43,	545.59,	82.24

Table 13.9.18: Changes in power flow greater than 100 MW in area of SEE in winter maximum 2020, scenario when power system of Albania exports 500 MW

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 100.0 MW:													
IN WORKING CASE						IN BASE CASE							
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	
X-----	10015 [AKASHA1	400.00]	X-----	10145 [APROMA1	400.00]	2	-397.6	-107.6	OUT OF SERVICE		397.6	100.0	
X-----	10015 [AKASHA1	400.00]	X-----	10145 [APROMA1	400.00]	1	-397.6	-107.6	OUT OF SERVICE		397.6	100.0	
X-----	220 [XKA_PG11	400.00]	X-----	36005 [OPODG211	400.00]	1	258.4	63.3		-9.5	27.0	-268.0	103.7
X-----	220 [XKA_PG11	400.00]	X-----	10015 [AKASHA1	400.00]	1	-258.4	-63.3		9.5	-27.0	268.0	103.7



10011	[AELBS21	400.00]	10015	[AKASHA1	400.00]	1	-112.1	-7.7	100.6	51.6	212.8	189.8
82	[XKA_KC11	400.00]	34073	[JGJAK31	400.00]	1	175.1	90.5	-6.5	49.5	-181.5	103.7
82	[XKA_KC11	400.00]	10015	[AKASHA1	400.00]	1	-175.1	-90.5	6.5	-49.5	181.5	103.7
13	[XTR_PG11	400.00]	14405	[RP TREBINJE	400.00]	1	24.2	-67.4	-152.4	-83.4	-176.6	729.4
13	[XTR_PG11	400.00]	36005	[OPODG211	400.00]	1	-24.2	67.4	152.4	83.4	176.6	729.4
14404	[TE_GACKO	400.00]	14405	[RP TREBINJE	400.00]	1	24.7	57.5	155.3	70.5	130.6	528.1
14404	[TE_GACKO	400.00]	18401	[MO-4	400.00]	1	263.0	3.4	132.4	-1.0	-130.6	49.6
10128	[AGRABO2	220.00]	10130	[AGRABO9	10.500]	1	0.0	0.0	-129.5	-37.9	-129.5	999.9
2	[XZE_KA11	400.00]	10020	[AZEMLA1	400.00]	1	157.6	-4.9	281.1	30.6	123.5	78.4
10011	[AELBS21	400.00]	10020	[AZEMLA1	400.00]	1	-67.7	-34.9	-190.7	-59.0	-123.0	181.8
20078	[HMEMLIN11	400.00]	20120	[HOBROV11	400.00]	1	-249.4	11.0	-134.5	-6.7	114.9	46.1
71	[XME_DI11	400.00]	20078	[HMEMLIN11	400.00]	1	-323.7	-93.8	-210.7	-110.0	113.0	34.9
71	[XME_DI11	400.00]	31410	[LDIVAC1	400.00]	1	323.7	93.8	210.7	110.0	-113.0	34.9
20060	[HKONJS11	400.00]	20120	[HOBROV11	400.00]	1	9.1	-14.0	-97.8	-6.7	-106.9	999.9
11	[XMO_KO11	400.00]	18401	[MO-4	400.00]	1	-180.3	41.4	-74.9	37.4	105.4	58.5
11	[XMO_KO11	400.00]	20060	[HKONJS11	400.00]	1	180.3	-41.4	74.9	-37.4	-105.4	58.5
34020	[JNIS2 1	400.00]	34070	[JTKOSB1	400.00]	1	161.1	-44.9	264.2	-39.5	103.1	64.0

Table 13.9.19: Changes in power flow through tie-lines connecting Albania to the rest of the system in winter maximum 2020, scenario when power system of Albania exports 500 MW

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:												
IN WORKING CASE				IN BASE CASE								
X-----	FROM BUS	-----X	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW %	
220	[XKA_PG11	400.00]	36005	[OPODG211	400.00]	1	258.4	63.3	-9.5	27.0	-268.0	103.7
82	[XKA_KC11	400.00]	34073	[JGJAK31	400.00]	1	175.1	90.5	-6.5	49.5	-181.5	103.7
2	[XZE_KA11	400.00]	22461	[GKARDI11	400.00]	1	-157.6	4.9	-281.1	-30.6	-123.5	78.4
88	[XVD_PO21	220.00]	36015	[OPODG121	220.00]	1	71.2	-16.0	18.4	-8.2	-52.8	74.1
87	[XFI_PR21	220.00]	34190	[JPRTZ22	220.00]	1	152.9	63.9	128.7	62.0	-24.3	15.9

Table 13.9.20: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of Albania exports 500 MW

MONITORED BRANCH	CONTINGENCY	RATING	FLOW	%
24034*MDUME 2	220.00 24096 MMART 21	220.00 1 SINGLE 369	426.8 529.3	118.2
24094*MMART 4	400.00 24096 MMART 21	220.00 1 SINGLE 369	500.0 538.4	107.7
24034*MDUME 2	220.00 24095 MMART 22	220.00 1 SINGLE 370	426.8 533.1	119.1
24094*MMART 4	400.00 24095 MMART 22	220.00 1 SINGLE 370	500.0 542.2	108.4
24034*MDUME 2	220.00 24096 MMART 21	220.00 1 SINGLE 381	426.8 529.6	118.3
24094*MMART 4	400.00 24096 MMART 21	220.00 1 SINGLE 381	500.0 538.7	107.7
24034*MDUME 2	220.00 24095 MMART 22	220.00 1 SINGLE 382	426.8 533.4	119.1
24094*MMART 4	400.00 24095 MMART 22	220.00 1 SINGLE 382	500.0 542.5	108.5
28040*RLOTRU2	220.00 28366 RSIBIU2	220.00 1 SINGLE 623	333.4 393.1	112.4
28040*RLOTRU2	220.00 28100 RSIBIU21	220.00 1 SINGLE 624	333.4 393.1	112.4
28040*RLOTRU2	220.00 28366 RSIBIU2	220.00 1 SINGLE 721	333.4 392.9	111.7
28040*RLOTRU2	220.00 28100 RSIBIU21	220.00 1 SINGLE 722	333.4 392.9	111.7
34100*JBGD172	220.00 34111 JBGD8 22	220.00 2 SINGLE 821	445.8 466.9	105.6
34100*JBGD172	220.00 34111 JBGD8 22	220.00 1 SINGLE 822	445.8 466.9	105.6

MONITORED VOLTAGE REPORT:							
SYSTEM	CONTINGENCY	----- B U S -----	V-CONT	V-INIT	V-MAX	V-MIN	
'BG400	RANGE SINGLE 82	12473 VMI3 12	400.00	1.05066	1.03305	1.05000	0.90000
'BG220	RANGE SINGLE 136	12286 VUZUND2	220.00	0.88997	1.01108	1.10000	0.90000
'BG220	RANGE SINGLE 138	12282 VORFEJ2	220.00	1.10532	1.04539	1.10000	0.90000
'HU220	RANGE SINGLE 358	24005 MALBF 22	220.00	0.89275	1.04262	1.10000	0.90000
'HU220	RANGE SINGLE 359	24006 MALBF 21	220.00	0.89462	1.04267	1.10000	0.90000
'GR400	RANGE SINGLE 501	23126 GKPATC12	400.00	1.05075	1.02560	1.05000	0.90000
'GR400	RANGE SINGLE 501	23180 GAXELO12	400.00	1.05074	1.02597	1.05000	0.90000
'GR400	RANGE SINGLE 501	23181 GAXELO11	400.00	1.05056	1.02605	1.05000	0.90000
'GR400	RANGE SINGLE 503	23180 GAXELO12	400.00	1.05021	1.02597	1.05000	0.90000
'GR400	RANGE SINGLE 503	23181 GAXELO11	400.00	1.05003	1.02605	1.05000	0.90000
'RO220	RANGE SINGLE 693	28855 RMOSTI2	220.00	0.82069	1.01381	1.10000	0.90000
'RS400	RANGE SINGLE 798	34085 JSOMB31	400.00	0.86177	0.98933	1.05000	0.90000
'RS220	RANGE SINGLE 846	34200 JSABA32	220.00	0.88184	1.01881	1.10000	0.90000

CONTINGENCY LEGEND:	
LABEL	EVENTS
SINGLE 82	: OPEN LINE FROM BUS 12471 [VMI3 11 400.00] TO BUS 12473 [VMI3 12 400.00] CKT 1
SINGLE 136	: OPEN LINE FROM BUS 12275 [VMI3 2 220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 138	: OPEN LINE FROM BUS 12280 [VALEKO2 220.00] TO BUS 12282 [VORFEJ2 220.00] CKT 1
SINGLE 358	: OPEN LINE FROM BUS 24005 [MALBF 22 220.00] TO BUS 24034 [MDUME 2 220.00] CKT 1

SINGLE 359	:	OPEN LINE FROM BUS 24006 [MALBF 21	220.00]	TO BUS 24034 [MDUME 2	220.00]	CKT 1
SINGLE 369	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 370	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 381	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 382	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 501	:	OPEN LINE FROM BUS 23123 [GKPATR11	400.00]	TO BUS 23126 [GKPATC12	400.00]	CKT 1
SINGLE 503	:	OPEN LINE FROM BUS 23126 [GKPATC12	400.00]	TO BUS 23180 [GAXELO12	400.00]	CKT 1
SINGLE 623	:	OPEN LINE FROM BUS 28040 [RLOTU2	220.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 624	:	OPEN LINE FROM BUS 28040 [RLOTU2	220.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 693	:	OPEN LINE FROM BUS 28855 [RMOSTI2	220.00]	TO BUS 28935 [RRAC.M2	220.00]	CKT 1
SINGLE 721	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 722	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 798	:	OPEN LINE FROM BUS 34050 [JSUBO31	400.00]	TO BUS 34085 [JSOMB31	400.00]	CKT 1
SINGLE 821	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 1
SINGLE 822	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 2
SINGLE 846	:	OPEN LINE FROM BUS 34170 [JOBREN2	220.00]	TO BUS 34200 [JSABA32	220.00]	CKT 1

## 13.10. Bulgarian Power Balance Uncertainty

### 13.10.1. Bulgarian Power System Is Self-Balanced

Table 13.10.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of Bulgaria is self-balanced

SEE REGIONAL MODEL - YEAR 2015 - WINTER MAXIMUM LOAD							IN MW/MVAR		
X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT	
10	1340.5	1491.9	0.0	0.0	0.0	-200.0	48.6	-200.0	
AL	498.9	689.7	-198.7	0.0	455.9	31.2	432.6		
20	7796.0	7603.7	0.0	14.5	0.0	0.0	177.8	0.0	
BG	2979.8	3045.8	-45.5	121.5	3007.3	475.6	2389.6		
30	3152.7	2610.1	0.0	0.0	0.0	489.8	52.7	490.0	
BA	730.1	724.5	0.0	0.0	909.1	336.4	578.3		
35	40270.4	49222.0	0.0	1.1	0.0	-9401.6	449.0	-9400.0	
IT	7181.4	10816.5	0.0	-156.9	12558.1	-491.1	9571.1		
40	3098.5	3483.0	0.0	0.0	0.0	-435.2	50.6	-435.0	
HR	361.3	1074.2	0.0	0.0	1408.1	32.1	663.2		
45	5397.7	6500.0	0.1	0.0	0.0	-1200.1	97.7	-1200.0	
HU	1000.2	1926.6	178.0	-29.5	2420.2	82.2	1263.1		
50	10299.3	10371.1	0.0	0.0	0.0	-350.0	278.2	-350.0	
GR	2168.0	5312.0	170.2	9.3	6609.5	117.5	3154.7		
55	5464.3	-4593.5	0.0	4.7	0.0	9888.2	165.0	9886.0	
UX	814.9	637.5	0.0	12.5	2283.1	136.6	2311.3		
60	1501.0	1577.0	0.0	0.0	0.0	-100.0	24.0	-100.0	
MK	459.2	573.6	-31.3	0.0	403.0	60.1	259.8		
65	1207.9	0.0	0.0	0.0	0.0	1200.0	7.9	1200.0	
UA	-172.4	0.0	0.0	0.0	653.5	361.0	120.0		
70	10256.8	9416.9	0.0	88.3	0.0	545.0	206.6	545.0	
RO	2532.2	4075.6	513.8	273.8	4614.4	-248.9	2532.4		

75	2992.2	2514.0	0.0	8.8	0.0	424.0	45.3	424.0
SI	1002.6	811.0	0.0	53.9	607.0	215.4	529.3	
80	54590.4	54622.1	0.0	0.0	0.0	-800.0	768.4	-800.0
TR	4534.3	7792.0	1175.5	0.0	17196.4	-148.4	12911.7	
90	7720.7	7871.1	0.0	17.7	0.0	-360.0	191.9	-360.0
RS	2683.0	2853.5	0.0	76.3	1724.3	-645.6	2123.1	
91	632.9	805.2	0.5	1.9	0.0	-200.1	25.3	-200.0
ME	318.1	299.2	-34.6	10.8	237.0	37.9	241.8	
95	501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK	-376.3	0.0	0.0	0.0	40.0	-352.0	15.7	
TOTALS	156222.7	153494.7	0.6	137.1	0.0	0.0	2590.4	0.0
	26715.3	40631.6	1727.3	371.9	55126.7	0.0	39097.6	



Figure 13.10.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of Bulgaria is self-balanced

Table 13.10.2: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2015, scenario when power system of Bulgaria is self-balanced

FRMBUS,	FROMBUSNAME,	TOBUS,	TOBUSNAME,CKT,STS,	MW,	MVAR,	MVA,	%I
***** NONE *****							

Table 13.10.3: Changes in power flow greater then 150 MW in area of SEE in winter maximum 2015, scenario when power system of Bulgaria is self-balanced

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 150.0 MW:											
IN WORKING CASE					IN BASE CASE						
X-----	FROM BUS	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
	8 [XWI_GY11	400.00]	24067 [MGYOR 4	400.00]	1	237.9	-5.4	-14.2	34.8	-252.1	106.0
	8 [XWI_GY11	400.00]	50010 [OWIEN 1	400.00]	1	-237.9	5.4	14.2	-34.8	252.1	106.0
	9 [XKA_MA11	400.00]	31420 [LMARIB1	400.00]	1	248.3	-83.8	83.0	-45.4	-165.3	66.6
	9 [XKA_MA11	400.00]	50004 [OKAINA1	400.00]	1	-248.3	83.8	-83.0	45.4	165.3	66.6
	24 [XSO_NI11	400.00]	12431 [VSOFIWI	400.00]	1	49.2	-122.4	-180.4	-89.6	-229.6	466.8
	24 [XSO_NI11	400.00]	34020 [JNIS2 1	400.00]	1	-49.2	122.4	180.4	89.6	229.6	466.8
	71 [XME_DI11	400.00]	20078 [HMELIN11	400.00]	1	-264.9	-39.8	-447.4	-21.4	-182.6	68.9
	71 [XME_DI11	400.00]	31410 [LDIVAC1	400.00]	1	264.9	39.8	447.4	21.4	182.6	68.9
	74 [XER_SM11	400.00]	20030 [HERNES11	400.00]	1	-2.0	-51.0	164.9	-62.2	166.9	999.9
	74 [XER_SM11	400.00]	34045 [JSMIT21	400.00]	1	2.0	51.0	-164.9	62.2	-166.9	999.9
	80 [XRE_DI11	400.00]	31410 [LDIVAC1	400.00]	1	-498.8	-255.8	-730.1	-211.1	-231.3	46.4
	80 [XRE_DI11	400.00]	52189 [IRDVPV1	400.00]	1	498.8	255.8	730.1	211.1	231.3	46.4
	181 [XVA_IS11	400.00]	12460 [VVARNA1	400.00]	1	305.9	-52.7	148.1	-30.9	-157.8	51.6
	181 [XVA_IS11	400.00]	28974 [RMEDGI1	400.00]	1	-305.9	52.7	-148.1	30.9	157.8	51.6
	12275 [VMI3 2	220.00]	13714 [VTMI3_G4	15.7500]	1	17.8	16.2	-191.8	-76.0	-209.6	999.9
	12420 [VMETAL1	400.00]	12430 [VSTOLN1	400.00]	1	179.7	19.9	17.4	41.1	-162.3	90.3
	12420 [VMETAL1	400.00]	12431 [VSOFIWI	400.00]	1	-316.7	-57.7	-141.0	-79.8	175.7	55.5
	12437 [VVETRE1	400.00]	12480 [VPLOVD1	400.00]	1	45.5	-24.8	-137.0	-0.6	-182.4	401.3
	12471 [VMI3 11	400.00]	13910 [VTMI3GG6	20.0000]	1	25.1	10.2	-374.9	152.8	-400.0	999.9
	24067 [MGYOR 4	400.00]	24763 [MGONYU1	400.00]	1	-275.6	-271.8	-451.1	-244.4	-175.5	63.7
	24094 [MMART 4	400.00]	24766 [METYEK1	400.00]	1	247.3	-51.3	400.2	-61.6	152.9	61.8
	24122 [MPAKS 4	400.00]	24148 [MSAFA 4	400.00]	1	501.0	38.5	317.0	27.1	-184.0	36.7
	24763 [MGONYU1	400.00]	24765 [MOROE 11	400.00]	1	460.3	265.0	284.4	272.9	-175.9	38.2
	24765 [MOROE 11	400.00]	24766 [METYEK1	400.00]	1	103.2	120.8	-52.4	133.2	-155.6	150.8
	34040 [JRPMLA1	400.00]	34045 [JSMIT21	400.00]	1	271.1	-57.8	486.0	-62.6	214.9	79.3
	50004 [OKAINA1	400.00]	50006 [OOBERS1	400.00]	1	-137.1	101.5	30.5	64.6	167.6	122.3
	50004 [OKAINA1	400.00]	50006 [OOBERS1	400.00]	2	-137.1	101.5	30.5	64.6	167.6	122.3
	50005 [OLIENZ1	400.00]	50008 [OTAUER1	400.00]	1	-1140.0	137.1	-880.0	51.8	260.0	22.8
	50005 [OLIENZ1	400.00]	50008 [OTAUER1	400.00]	2	-1140.0	137.1	-880.0	51.8	260.0	22.8
	50008 [OTAUER1	400.00]	50011 [OZELL 1	400.00]	1	-1372.8	148.9	-936.2	78.3	436.6	31.8
	50008 [OTAUER1	400.00]	50011 [OZELL 1	400.00]	2	-1372.8	148.9	-936.2	78.3	436.6	31.8
	50009 [OWESTT1	400.00]	50011 [OZELL 1	400.00]	1	874.4	138.9	638.8	38.6	-235.6	26.9
	50009 [OWESTT1	400.00]	50011 [OZELL 1	400.00]	2	874.4	138.9	638.8	38.6	-235.6	26.9
	50011 [OZELL 1	400.00]	50042 [OZELL 2	220.00]	1	-1028.1	-34.9	-609.5	64.7	418.6	40.7
	52049 [ICRD1111	400.00]	52265 [IUDOV11	400.00]	1	259.4	-130.4	73.0	-53.7	-186.5	71.9

Table 13.10.4: Changes in power flow through tie-lines connecting Bulgaria to the rest of the system, in winter maximum 2015, scenario when power system of Bulgaria is self-balanced

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:											
IN WORKING CASE					IN BASE CASE						
X-----	FROM BUS	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
	20 [XBG_TH11	400.00]	22366 [GK_LAG11	400.00]	1	156.1	-0.8	196.5	-5.9	40.4	25.9
	21 [XDO_IS11	400.00]	28020 [RISACC1A	400.00]	1	-111.9	19.3	-11.2	3.4	100.8	90.0
	22 [XKO_TI11	400.00]	28001 [RTANTA1	400.00]	1	-319.9	72.3	-193.4	52.8	126.5	39.5
	23 [XKO_TI12	400.00]	28001 [RTANTA1	400.00]	2	-319.9	72.3	-193.4	52.8	126.5	39.5
	24 [XSO_NI11	400.00]	34020 [JNIS2 1	400.00]	1	-49.2	122.4	180.4	89.6	229.6	466.8
	181 [XVA_IS11	400.00]	28974 [RMEDGI1	400.00]	1	-305.9	52.7	-148.1	30.9	157.8	51.6
	197 [XMI_BA11	400.00]	60037 [TBABA21F	400.00]	1	362.2	51.5	411.5	40.3	49.2	13.6
	198 [XMI_HA11	400.00]	60009 [THAMIT1	400.00]	1	495.1	77.1	578.7	58.2	83.6	16.9
	207 [XCM_ST11	400.00]	26112 [YSTIP 1	400.00]	1	93.3	8.8	178.8	-1.1	85.5	91.7

Table 13.10.5: Results of contingency (n-1) analysis in winter maximum 2015, scenario when power system of Bulgaria is self-balanced



<----- MONITORED BRANCH ----->				CONTINGENCY		RATING	FLOW	%
316*XTR_HN51	110.00	36050	0HNOVI51	110.00	1 SINGLE 196	89.6	113.1	129.5
316*XTR_HN51	110.00	36050	0HNOVI51	110.00	1 SINGLE 198	89.6	93.4	106.0
31210*LDIVAC2	220.00	156	XPA_DI21	220.00	1 SINGLE 707	320.1	399.2	120.2

MONITORED VOLTAGE REPORT:

SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
'BG220	RANGE SINGLE 100	12252 VOCHIF2	220.00	0.82938	0.96276	1.10000
'BG220	RANGE SINGLE 124	12286 VUZUND2	220.00	0.89713	1.00391	1.10000
'GR400	RANGE SINGLE 432	22759 GTH_AG11	400.00	1.05190	1.02509	1.05000
'GR400	RANGE SINGLE 432	23123 GKPATR11	400.00	1.05202	1.03803	1.05000
'GR400	RANGE SINGLE 432	23125 GKPATC11	400.00	1.05211	1.03800	1.05000
'GR400	RANGE SINGLE 432	23126 GKPATC12	400.00	1.05206	1.03812	1.05000
'GR400	RANGE SINGLE 432	23173 GDISTO11	400.00	1.05295	1.03776	1.05000
'GR400	RANGE SINGLE 432	23174 GDISTO12	400.00	1.05257	1.03789	1.05000
'GR400	RANGE SINGLE 432	23180 GAXELO12	400.00	1.05223	1.03857	1.05000
'GR400	RANGE SINGLE 432	23181 GAXELO11	400.00	1.05219	1.03878	1.05000
'GR400	RANGE SINGLE 433	23064 GK_MEG13	400.00	1.05370	1.04101	1.05000
'GR400	RANGE SINGLE 433	23066 GK_MEG11	400.00	1.05370	1.04101	1.05000
'GR400	RANGE SINGLE 433	23123 GKPATR11	400.00	1.05313	1.03803	1.05000
'GR400	RANGE SINGLE 433	23125 GKPATC11	400.00	1.05322	1.03800	1.05000
'GR400	RANGE SINGLE 433	23126 GKPATC12	400.00	1.05317	1.03812	1.05000
'GR400	RANGE SINGLE 433	23173 GDISTO11	400.00	1.05385	1.03776	1.05000
'GR400	RANGE SINGLE 433	23174 GDISTO12	400.00	1.05367	1.03789	1.05000
'GR400	RANGE SINGLE 433	23180 GAXELO12	400.00	1.05335	1.03857	1.05000
'GR400	RANGE SINGLE 433	23181 GAXELO11	400.00	1.05341	1.03878	1.05000
'GR400	RANGE SINGLE 462	23036 GK_KOR13	400.00	1.06311	1.01734	1.05000
'GR400	RANGE SINGLE 462	23068 GK_MEG14	400.00	1.06071	1.02936	1.05000
'GR400	RANGE SINGLE 463	23037 GK_KOR14	400.00	1.06311	1.01734	1.05000
'GR400	RANGE SINGLE 463	23067 GK_MEG12	400.00	1.06071	1.02936	1.05000
'GR400	RANGE SINGLE 473	23126 GKPATC12	400.00	1.06879	1.03812	1.05000
'GR400	RANGE SINGLE 473	23180 GAXELO12	400.00	1.06878	1.03857	1.05000
'GR400	RANGE SINGLE 473	23181 GAXELO11	400.00	1.06859	1.03878	1.05000
'GR400	RANGE SINGLE 475	23180 GAXELO12	400.00	1.06823	1.03857	1.05000
'GR400	RANGE SINGLE 475	23181 GAXELO11	400.00	1.06805	1.03878	1.05000
'RO220	RANGE SINGLE 567	28043 RSTUPA2	220.00	0.89191	0.97954	1.10000
'RO220	RANGE SINGLE 637	28855 RMOSTI2	220.00	0.88377	1.04059	1.10000
'RO220	RANGE SINGLE 642	28907 RSTILP2	220.00	0.84324	0.98186	1.10000
'RO220	RANGE SINGLE 670	28095 RVETIS2	220.00	0.89287	1.02018	1.10000
'RS400	RANGE SINGLE 739	34085 JSOMB31	400.00	0.87956	0.99410	1.05000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 196	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [0PODGD211 400.00] CKT 1
SINGLE 198	: OPEN LINE FROM BUS 116 [XTR_PE21 220.00] TO BUS 36027 [0HPERU21 220.00] CKT 1
SINGLE 707	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1

Table 13.10.6: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of Bulgaria is self-balanced

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1621.7	1723.7	0.0	0.0	0.0	-150.0	48.1	-150.0
AL	673.4	779.7	-204.5	0.0	474.9	107.5	465.7	
<b>20</b>	<b>8634.8</b>	<b>8411.0</b>	<b>0.0</b>	<b>15.8</b>	<b>0.0</b>	<b>1.2</b>	<b>206.8</b>	<b>0.0</b>
<b>BG</b>	<b>3578.2</b>	<b>3357.9</b>	<b>0.0</b>	<b>190.5</b>	<b>3324.1</b>	<b>476.8</b>	<b>2877.2</b>	
30	2949.0	2897.8	0.0	0.0	0.0	-0.1	51.3	0.0
BA	1011.5	1017.2	0.0	0.0	913.3	257.0	650.6	
35	45069.6	54409.8	0.0	1.1	0.0	-9741.4	400.2	-9740.0
IT	9770.5	11942.3	0.0	147.7	12380.4	-751.5	10812.5	
40	3427.1	4359.0	0.0	0.0	0.0	-1000.6	68.7	-1000.0
HR	517.2	1075.9	0.0	0.0	1532.5	214.3	759.5	
45	6098.1	7180.0	0.1	0.0	0.0	-1201.5	119.5	-1200.0

HU	1390.1	2128.1	178.5	-29.0	2401.0	-20.9	1534.4	
50	11748.1	11426.0	0.0	0.0	0.0	0.1	322.0	0.0
GR	3091.6	5724.7	203.5	9.4	6667.9	115.1	3693.1	
55	6304.4	-4356.2	0.0	4.7	0.0	10451.3	204.6	10450.0
UX	1309.0	622.8	0.0	12.4	2255.8	88.4	2841.1	
60	1938.2	2001.9	0.0	0.0	0.0	-99.9	36.0	-100.0
MK	751.6	752.3	-31.0	0.0	398.6	21.4	406.3	
65	1208.1	0.0	0.0	0.0	0.0	1199.9	8.3	1200.0
UA	-155.5	0.0	0.0	0.0	652.1	368.1	128.6	
70	13243.4	12110.2	0.0	90.9	0.0	801.7	240.6	800.0
RO	2808.2	4455.6	789.6	287.8	5647.6	-126.0	3048.8	
75	3950.2	2990.0	0.0	8.9	0.0	889.6	61.8	890.0
SI	1272.5	964.6	0.0	53.6	864.1	368.8	749.8	
80	77661.1	77342.9	0.0	0.0	0.0	-800.0	1118.2	-800.0
TR	9800.0	11034.0	996.9	0.0	22661.4	-199.4	20630.0	
90	7767.4	8298.8	0.0	17.3	0.0	-750.1	201.4	-750.0
RS	2878.5	2986.6	0.0	73.4	1733.0	-666.8	2218.2	
91	866.2	938.0	0.5	2.1	0.0	-100.3	25.9	-100.0
ME	353.6	346.6	-34.4	11.4	236.3	32.4	233.9	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-310.5	0.0	0.0	0.0	39.9	-285.0	14.5	
TOTALS	192988.7	189732.9	0.6	140.7	0.0	0.0	3114.4	0.0
	38739.8	47188.4	1898.6	757.1	62183.3	0.0	51064.2	



Figure 13.10.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of Bulgaria is self-balanced

Table 13.10.7: Branches loaded more then 80% of their thermal limits in monitored grid in winter maximum 2020, scenario when power system of Bulgaria is self-balanced

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I		
12274,VMI	2	220.00,	12474,VMI	1	400.00,	1	1,	-553.92,	-101.71,	563.18,	84.53

Table 13.10.8: Changes in power flow greater then 150 MW in area of SEE in winter maximum 2020, scenario when power system of Bulgaria is self-balanced

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 150.0 MW:											
IN WORKING CASE						IN BASE CASE					
X-----	FROM BUS	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
6	[XWE_BR12	400.00]	50009 [OWESTT1	400.00]	1	600.0	53.8	450.0	-9.5	-150.0	25.0
7	[XWE_LE11	400.00]	50009 [OWESTT1	400.00]	1	600.0	54.2	450.0	-23.2	-150.0	25.0
8	[XWI_GY11	400.00]	24067 [MGYOR 4	400.00]	1	336.1	-32.2	84.1	12.2	-252.0	75.0
8	[XWI_GY11	400.00]	50010 [OWIEN 1	400.00]	1	-336.1	32.2	-84.1	-12.2	252.0	75.0
24	[XSO_NI11	400.00]	12431 [VSOFI1	400.00]	1	-167.7	-99.0	-375.1	-72.7	-207.3	123.6
24	[XSO_NI11	400.00]	34020 [JNIS2 1	400.00]	1	167.7	99.0	375.1	72.7	207.3	123.6
74	[XER_SM11	400.00]	20030 [HERNES11	400.00]	1	-29.3	-46.6	126.3	-64.6	155.6	531.4
74	[XER_SM11	400.00]	34045 [JSMIT21	400.00]	1	29.3	46.6	-126.3	64.6	-155.6	531.4

80	[XRE_DI11	400.00]	31410	[LDIVAC1	400.00]	1	-356.5	-262.9	-511.6	-235.9	-155.1	43.5
80	[XRE_DI11	400.00]	53357	[IRDPV11	400.00]	1	356.5	262.9	511.6	235.9	155.1	43.5
181	[XVA_IS11	400.00]	12994	[VSVOBO14	400.00]	1	724.9	-63.9	441.0	64.2	-283.9	39.2
181	[XVA_IS11	400.00]	28974	[RMEDGI1	400.00]	1	-724.9	63.9	-441.0	-64.2	283.9	39.2
219	[XBE_OR11	400.00]	24013	[MBEKO 4	400.00]	1	-196.6	54.1	-33.8	24.0	162.8	82.8
219	[XBE_OR11	400.00]	28009	[RNADAB1B	400.00]	1	196.6	-54.1	33.8	-24.0	-162.8	82.8
12441	[VNPPBE1	400.00]	12452	[VOCIFL1	400.00]	1	193.4	37.1	38.2	99.7	-155.2	80.2
12452	[VOCIFL1	400.00]	12994	[VSVOBO14	400.00]	1	-63.0	37.7	-224.1	105.9	-161.1	255.9
12984	[VSVOBO5	110.00]	12994	[VSVOBO14	400.00]	1	-43.8	-10.5	110.0	-96.3	153.8	351.2
12984	[VSVOBO5	110.00]	12994	[VSVOBO14	400.00]	2	-43.8	-10.5	110.0	-96.3	153.8	351.2
12993	[VVIDNO14	400.00]	12994	[VSVOBO14	400.00]	1	-198.9	-84.1	81.4	-160.3	280.3	140.9
20030	[HERNES11	400.00]	20166	[HZERJA11	400.00]	1	84.1	-81.2	234.8	-88.1	150.7	179.3
24067	[MGYOR 4	400.00]	24763	[MGONYU1	400.00]	1	-285.3	-297.5	-465.3	-276.8	-180.0	63.1
24094	[MMART 4	400.00]	24766	[METYEK1	400.00]	1	275.4	-38.8	432.3	-55.9	156.9	57.0
24122	[MPAKS 4	400.00]	24148	[MSAFA 4	400.00]	1	528.9	44.9	334.7	36.1	-194.3	36.7
24763	[MGONYU1	400.00]	24765	[MOROE 11	400.00]	1	501.2	292.7	320.8	308.4	-180.4	36.0
24765	[MOROE 11	400.00]	24766	[METYEK1	400.00]	1	110.4	126.4	-49.5	146.0	-159.8	144.8
28031	[RBRASO1	400.00]	28034	[RSIBIU1	400.00]	1	-121.3	-101.9	32.6	-122.5	153.9	126.9
28973	[RCERNA1	400.00]	28974	[RMEDGI1	400.00]	1	642.8	77.0	450.9	142.1	-191.9	29.9
34040	[JRPMLA1	400.00]	34045	[JSMIT21	400.00]	1	328.3	-21.5	533.3	-23.6	205.0	62.4
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	1	-1213.6	164.7	-969.3	69.8	244.3	20.1
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	2	-1213.6	164.7	-969.3	69.8	244.3	20.1
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	1	-1421.2	153.2	-1023.0	92.2	398.2	28.0
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	2	-1421.2	153.2	-1023.0	92.2	398.2	28.0
50009	[OWESTT1	400.00]	50011	[OZELL 1	400.00]	1	1106.2	201.8	834.0	76.5	-272.1	24.6
50009	[OWESTT1	400.00]	50011	[OZELL 1	400.00]	2	1106.2	201.8	834.0	76.5	-272.1	24.6
50011	[OZELL 1	400.00]	50042	[OZELL 2	220.00]	1	-670.3	-143.1	-398.8	4.3	271.5	40.5
52049	[ICRDV111	400.00]	53531	[IUDOV11	400.00]	1	179.5	-251.2	-44.4	-162.0	-223.8	124.7

Table 13.10.9: Changes in power flow through tie-lines connecting Bulgaria to the rest of the system in winter maximum 2020, scenario when power system of Bulgaria is self-balanced

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:												
IN WORKING CASE						IN BASE CASE						
X	FROM BUS		X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
20	[XBG_TH11	400.00]	22366	[GK_LAG11	400.00]	1	80.4	-4.9	117.1	-12.9	36.6	45.6
21	[XDO_IS11	400.00]	28020	[RISACC1A	400.00]	1	-312.7	34.4	-229.2	-2.0	83.5	26.7
22	[XKO_TI11	400.00]	28001	[RTANTA1	400.00]	1	-125.3	56.2	-35.2	42.6	90.0	71.9
23	[XKO_TI12	400.00]	28001	[RTANTA1	400.00]	2	-125.5	56.2	-35.5	42.6	90.0	71.7
24	[XSO_NI11	400.00]	34020	[JNIS2 1	400.00]	1	167.7	99.0	375.1	72.7	207.3	123.6
181	[XVA_IS11	400.00]	28974	[RMEDGI1	400.00]	1	-724.9	63.9	-441.0	-64.2	283.9	39.2
197	[XMI_BA11	400.00]	60037	[TBABA21F	400.00]	1	257.6	48.2	278.0	36.4	20.4	7.9
198	[XMI_HA11	400.00]	60009	[THAMIT1	400.00]	1	408.0	95.2	439.0	79.8	31.1	7.6
207	[XCM_ST11	400.00]	26112	[YSTIP 1	400.00]	1	131.1	8.0	210.9	-3.3	79.8	60.9
214	[XMI_NS11	400.00]	22238	[GK_NSA11	400.00]	1	244.7	20.7	320.8	6.2	76.1	31.1

Table 13.10.10: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of Bulgaria is self-balanced

<	MONITORED BRANCH	>	CONTINGENCY	RATING	FLOW	%			
316	XTR_HN51	110.00	36050*OHNOVI51	110.00	1	BASE CASE	89.6	91.1	102.4
10010*	AELBS22	220.00	10125 ACEKIN2	220.00	1	SINGLE 19	370.0	386.4	103.0
10009*	AELBS12	220.00	10125 ACEKIN2	220.00	1	SINGLE 22	370.0	384.4	102.7
24034*	MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE 367	426.8	499.0	111.5
24094*	MMART 4	400.00	24096 MMART 21	220.00	1	SINGLE 367	500.0	507.7	101.5
24034*	MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE 368	426.8	502.6	112.3
24094*	MMART 4	400.00	24095 MMART 22	220.00	1	SINGLE 368	500.0	511.3	102.3
24034*	MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE 379	426.8	499.3	111.5
24094*	MMART 4	400.00	24096 MMART 21	220.00	1	SINGLE 379	500.0	508.0	101.6
24034*	MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE 380	426.8	502.9	112.3
24094*	MMART 4	400.00	24095 MMART 22	220.00	1	SINGLE 380	500.0	511.6	102.3
28040*	RLOTRU2	220.00	28366 RSIBIU2	220.00	1	SINGLE 621	333.4	393.1	112.0
28040*	RLOTRU2	220.00	28100 RSIBIU21	220.00	1	SINGLE 622	333.4	393.1	112.0
28040*	RLOTRU2	220.00	28366 RSIBIU2	220.00	1	SINGLE 719	333.4	392.8	111.5
28040*	RLOTRU2	220.00	28100 RSIBIU21	220.00	1	SINGLE 720	333.4	392.8	111.5
34100*	JBGD172	220.00	34111 JBGD8 22	220.00	2	SINGLE 819	445.8	466.8	105.5
34100*	JBGD172	220.00	34111 JBGD8 22	220.00	1	SINGLE 820	445.8	466.8	105.5
MONITORED VOLTAGE REPORT:									
SYSTEM									
'BG400			RANGE SINGLE 80	12473 VMI3 12	400.00	1.05324	1.03614	1.05000	0.90000
'BG220			RANGE SINGLE 134	12286 VUZUND2	220.00	0.89640	1.01550	1.10000	0.90000
'BG220			RANGE SINGLE 136	12282 VORFEJ2	220.00	1.10612	1.04892	1.10000	0.90000



'HR400	'	RANGE SINGLE	291	20260	HTEPLO	400.00	1.05294	1.04025	1.05000	0.90000
'HU220	'	RANGE SINGLE	356	24005	MALBF 22	220.00	0.89275	1.04262	1.10000	0.90000
'HU220	'	RANGE SINGLE	357	24006	MALBF 21	220.00	0.89462	1.04267	1.10000	0.90000
'GR400	'	RANGE SINGLE	499	23126	GKPATC12	400.00	1.05014	1.02520	1.05000	0.90000
'GR400	'	RANGE SINGLE	499	23180	GAXELO12	400.00	1.05013	1.02557	1.05000	0.90000
'RO220	'	RANGE SINGLE	691	28855	RMOSTI2	220.00	0.83363	1.02107	1.10000	0.90000
'RS400	'	RANGE SINGLE	796	34085	JSOMB31	400.00	0.86368	0.98993	1.05000	0.90000
'RS220	'	RANGE SINGLE	844	34200	JSABA32	220.00	0.88574	1.02023	1.10000	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 19	: OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	: OPEN LINE FROM BUS 10010 [AELBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 367	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 368	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 379	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 380	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 621	: OPEN LINE FROM BUS 28040 [RLOTU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	: OPEN LINE FROM BUS 28040 [RLOTU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 719	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 819	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 820	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2

## 13.11. Bosnia and Herzegovina's Power Balance Uncertainty

### 13.11.1. Bosnia and Herzegovina's Power System Is Self-Balanced

Table 13.11.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of BiH is self-balanced

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1338.3	1491.9	0.0	0.0	0.0	-200.0	46.4	-200.0
AL			476.5	689.7	-199.8	0.0	458.8	28.1	417.4	
20			8805.9	7603.7	0.0	14.4	0.0	1000.0	187.8	1000.0
BG			2908.1	3045.8	-44.9	120.9	2995.5	319.8	2462.0	
30			2654.9	2610.1	0.0	0.0	0.0	0.0	44.8	0.0
BA			670.3	724.5	0.0	0.0	904.0	336.2	513.7	
35			40751.2	49222.0	0.0	1.1	0.0	-8909.7	437.8	-8910.0
IT			7078.9	10816.5	0.0	-157.0	12570.5	-564.8	9554.8	
40			3099.4	3483.0	0.0	0.0	0.0	-434.9	51.4	-435.0
HR			346.4	1074.2	0.0	0.0	1409.8	14.8	667.3	
45			5391.4	6500.0	0.1	0.0	0.0	-1199.9	91.2	-1200.0
HU			955.5	1926.6	178.2	-29.6	2424.2	95.4	1209.1	
50			10298.1	10371.1	0.0	0.0	0.0	-350.0	277.0	-350.0
GR			2146.5	5312.0	170.2	9.3	6612.7	113.1	3140.8	
55			4395.1	-4593.5	0.0	4.9	0.0	8885.0	98.8	8886.0
UX			-61.6	637.5	0.0	12.8	2325.4	363.7	1249.9	
60			1501.7	1577.0	0.0	0.0	0.0	-100.0	24.7	-100.0
MK			454.4	573.6	-31.3	0.0	403.5	49.6	266.0	
65			1207.2	0.0	0.0	0.0	0.0	1200.0	7.2	1200.0
UA			-194.9	0.0	0.0	0.0	653.8	346.1	112.7	
70			10252.8	9416.9	0.0	88.4	0.0	545.0	202.6	545.0
RO			2508.0	4075.6	512.9	273.9	4617.4	-226.0	2489.0	
75			2990.4	2514.0	0.0	8.9	0.0	424.5	43.1	424.0
SI			944.4	811.0	0.0	54.2	610.8	181.6	508.4	
80			54592.8	54622.1	0.0	0.0	0.0	-800.0	770.8	-800.0
TR			4580.0	7792.0	1175.4	0.0	17195.5	-131.2	12939.2	
90			7713.9	7871.1	0.0	17.8	0.0	-360.0	185.0	-360.0
RS			2641.1	2853.5	0.0	76.5	1728.3	-630.2	2069.6	
91			628.4	805.2	0.5	1.9	0.0	-200.0	20.7	-200.0
ME			302.9	299.2	-35.0	10.9	239.3	66.8	200.3	
95			501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK			-387.1	0.0	0.0	0.0	40.0	-363.0	15.9	
101			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	

103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	156123.0	153494.7	0.6	137.3	0.0	0.0	2490.5	0.0
	25369.5	40631.6	1725.7	372.1	55189.7	0.0	37816.0	

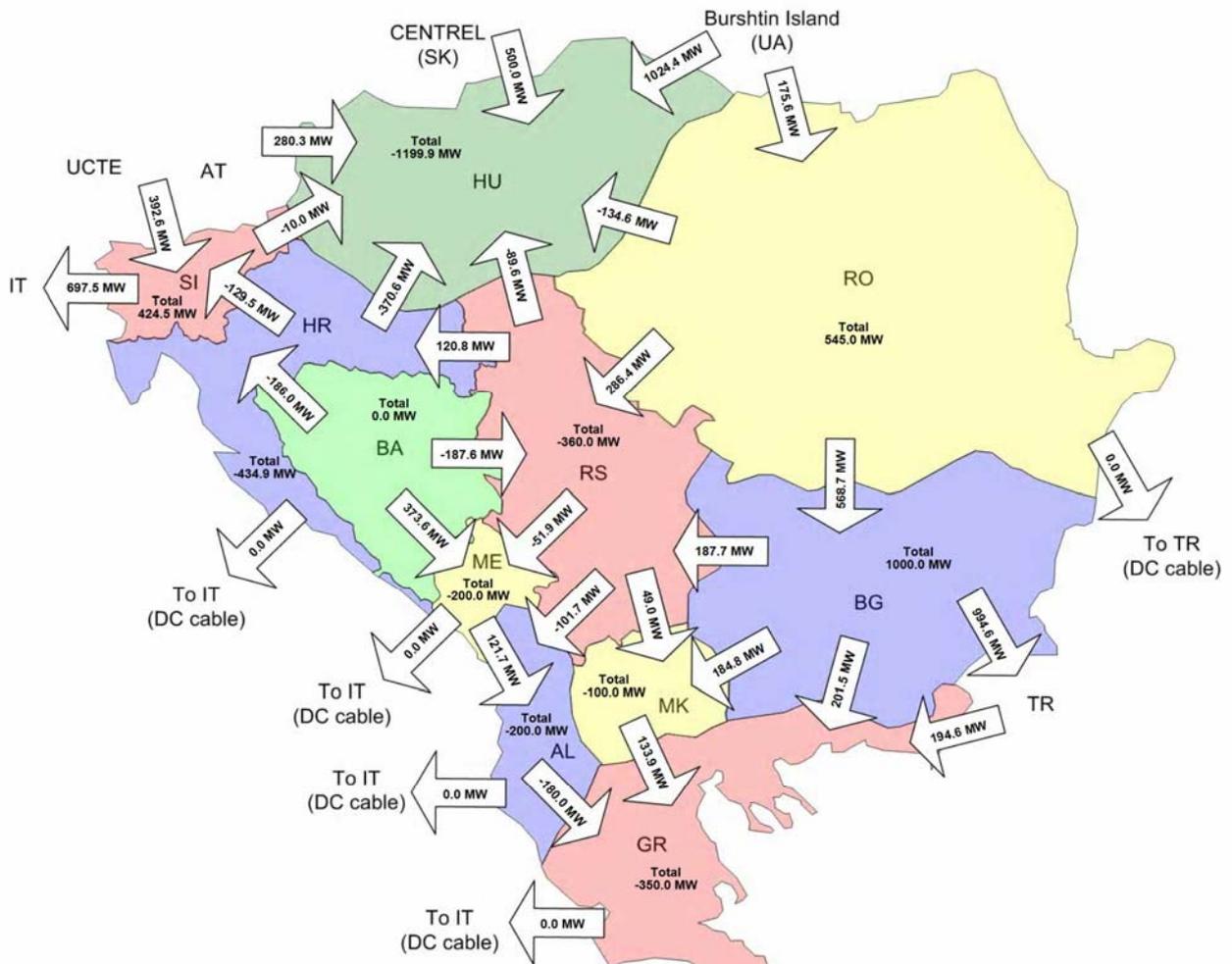


Figure 13.11.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of BiH is self-balanced

Table 13.11.2: Changes in power flow in area of SEE in winter maximum 2015, scenario when power system of BiH is self-balanced

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
71	[XME_DI11	400.00]	20078	[HMELIN11	400.00]	1	-302.0	-22.7	-447.4	-21.4	-145.4	48.2
71	[XME_DI11	400.00]	31410	[LDIVAC1	400.00]	1	302.0	22.7	447.4	21.4	145.4	48.2
80	[XRE_DI11	400.00]	31410	[LDIVAC1	400.00]	1	-518.5	-228.2	-730.1	-211.1	-211.6	40.8
80	[XRE_DI11	400.00]	52189	[IRDPV11	400.00]	1	518.5	228.2	730.1	211.1	211.6	40.8



'GR400	'	RANGE SINGLE	432	22759	GTH_AG11	400.00	1.05201	1.02528	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23123	GKPATR11	400.00	1.05216	1.03821	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23125	GKPATC11	400.00	1.05225	1.03818	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23126	GKPATC12	400.00	1.05220	1.03830	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23173	GDISTO11	400.00	1.05309	1.03794	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23174	GDISTO12	400.00	1.05271	1.03807	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23180	GAXELO12	400.00	1.05237	1.03875	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23181	GAXELO11	400.00	1.05233	1.03896	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23064	GK_MEG13	400.00	1.05387	1.04118	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23066	GK_MEG11	400.00	1.05387	1.04118	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23123	GKPATR11	400.00	1.05330	1.03821	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23125	GKPATC11	400.00	1.05339	1.03818	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23126	GKPATC12	400.00	1.05334	1.03830	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23173	GDISTO11	400.00	1.05402	1.03794	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23174	GDISTO12	400.00	1.05384	1.03807	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23180	GAXELO12	400.00	1.05352	1.03875	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23181	GAXELO11	400.00	1.05358	1.03896	1.05000	0.90000
'GR400	'	RANGE SINGLE	462	23036	GK_KOR13	400.00	1.06327	1.01750	1.05000	0.90000
'GR400	'	RANGE SINGLE	462	23068	GK_MEG14	400.00	1.06087	1.02952	1.05000	0.90000
'GR400	'	RANGE SINGLE	463	23037	GK_KOR14	400.00	1.06327	1.01750	1.05000	0.90000
'GR400	'	RANGE SINGLE	463	23067	GK_MEG12	400.00	1.06087	1.02952	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23126	GKPATC12	400.00	1.06902	1.03830	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23180	GAXELO12	400.00	1.06901	1.03875	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23181	GAXELO11	400.00	1.06882	1.03896	1.05000	0.90000
'GR400	'	RANGE SINGLE	475	23180	GAXELO12	400.00	1.06846	1.03875	1.05000	0.90000
'GR400	'	RANGE SINGLE	475	23181	GAXELO11	400.00	1.06828	1.03896	1.05000	0.90000
'RO220	'	RANGE SINGLE	567	28043	RSTUPA2	220.00	0.89319	0.98053	1.10000	0.90000
'RO220	'	RANGE SINGLE	637	28855	RMOSTI2	220.00	0.88218	1.04058	1.10000	0.90000
'RO220	'	RANGE SINGLE	642	28907	RSTILP2	220.00	0.84383	0.98225	1.10000	0.90000
'RO220	'	RANGE SINGLE	670	28095	RVETIS2	220.00	0.89834	1.02197	1.10000	0.90000
'RS400	'	RANGE SINGLE	739	34085	JSOMB31	400.00	0.87952	0.99505	1.05000	0.90000

**CONTINGENCY LEGEND:**  
**LABEL**                    **EVENTS**

SINGLE 196 : OPEN LINE FROM BUS 13 [XTR\_PG11                    400.00] TO BUS 36005 [0PODG211                    400.00] CKT 1  
SINGLE 707 : OPEN LINE FROM BUS 31410 [LDIVAC1                    400.00] TO BUS 80 [XRE\_DI11                    400.00] CKT 1

Table 13.11.5: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of BiH is self-balanced

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1622.1	1723.7	0.0	0.0	0.0	-150.0	48.3	-150.0
AL	668.4	779.7	-204.7	0.0	475.2	99.8	468.8	
20	9659.9	8411.0	0.0	15.5	0.0	1000.0	233.4	1000.0
BG	3519.1	3357.9	0.0	181.2	3279.7	197.9	3061.7	
30	2949.9	2897.8	0.0	0.0	0.0	0.0	52.0	0.0
BA	1003.0	1017.2	0.0	0.0	913.7	241.7	657.9	
35	45061.4	54409.8	0.0	1.1	0.0	-9740.0	390.6	-9740.0
IT	9595.0	11942.3	0.0	147.8	12393.6	-804.6	10703.3	
40	3428.0	4359.0	0.0	0.0	0.0	-1000.0	69.0	-1000.0
HR	505.6	1075.9	0.0	0.0	1534.6	202.9	761.4	
45	6093.4	7180.0	0.1	0.0	0.0	-1200.0	113.2	-1200.0
HU	1356.1	2128.1	178.6	-29.1	2405.1	0.8	1482.8	
50	11750.1	11426.0	0.0	0.0	0.0	0.0	324.0	0.0
GR	3126.0	5724.7	203.7	9.4	6663.2	125.5	3712.1	
55	5226.8	-4356.2	0.0	4.8	0.0	9449.7	128.4	9450.0
UX	352.8	622.8	0.0	12.7	2300.4	337.5	1680.1	
60	1940.2	2001.9	0.0	0.0	0.0	-100.0	38.2	-100.0

MK	762.7	752.3	-30.9	0.0	397.7	11.4	426.4	
65	1207.6	0.0	0.0	0.0	0.0	1200.0	7.6	1200.0
UA	-165.4	0.0	0.0	0.0	652.3	365.5	121.5	
70	13261.1	12110.2	0.0	90.2	0.0	800.1	260.6	800.0
RO	3117.7	4455.6	783.3	285.8	5601.8	-27.4	3222.1	
75	3949.8	2990.0	0.0	8.9	0.0	890.0	60.9	890.0
SI	1233.4	964.6	0.0	53.8	868.3	338.5	744.8	
80	77661.6	77342.9	0.0	0.0	0.0	-800.0	1118.7	-800.0
TR	9834.4	11034.0	996.9	0.0	22660.7	-171.2	20635.5	
90	7767.9	8298.8	0.0	17.3	0.0	-749.9	201.8	-750.0
RS	2892.7	2986.6	0.0	73.4	1732.0	-666.7	2231.4	
91	864.5	938.0	0.5	2.1	0.0	-100.0	23.9	-100.0
ME	349.8	346.6	-34.6	11.4	237.2	51.5	212.0	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-328.1	0.0	0.0	0.0	40.0	-303.0	14.8	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTALS	192945.3	189732.9	0.6	139.9	0.0	0.0	3071.8	0.0
	37823.1	47188.4	1892.4	746.3	62155.4	0.0	50136.7	



Figure 13.11.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of BiH is self-balanced

Table 13.11.6: Changes in power flow in area of SEE in winter maximum 2020, scenario when power system of BiH is self-balanced

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR
DELTA MW		%								
* NONE *										

Table 13.11.8: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of BiH is self-balanced

<----- MULTI-SECTION LINE ----->				<----- MONITORED BRANCH ----->						
--> CONTINGENCY	RATING	FLOW	%							
10010*AELBS22	220.00	10125 ACEKIN2	220.00	1	SINGLE	19	370.0	386.3	102.9	
10009*AELBS12	220.00	10125 ACEKIN2	220.00	1	SINGLE	22	370.0	384.2	102.6	
316 XTR_HN51	110.00	36050*OHNOVI51	110.00	1	SINGLE	207	89.6	95.9	108.3	
24034*MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE	367	426.8	517.4	115.6	
24094*MMART 4	400.00	24096 MMART 21	220.00	1	SINGLE	367	500.0	526.6	105.3	
24034*MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE	368	426.8	521.1	116.4	
24094*MMART 4	400.00	24095 MMART 22	220.00	1	SINGLE	368	500.0	530.3	106.1	
24034*MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE	379	426.8	517.6	115.6	
24094*MMART 4	400.00	24096 MMART 21	220.00	1	SINGLE	379	500.0	526.8	105.4	
24034*MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE	380	426.8	521.3	116.4	
24094*MMART 4	400.00	24095 MMART 22	220.00	1	SINGLE	380	500.0	530.6	106.1	



28040*RLOTRU2	220.00	28366	RSIBIU2	220.00	1	SINGLE	621	333.4	393.1	112.2
28040*RLOTRU2	220.00	28100	RSIBIU21	220.00	1	SINGLE	622	333.4	393.1	112.2
28040*RLOTRU2	220.00	28366	RSIBIU2	220.00	1	SINGLE	719	333.4	392.8	111.6
28040*RLOTRU2	220.00	28100	RSIBIU21	220.00	1	SINGLE	720	333.4	392.8	111.6
34100*JBGD172	220.00	34111	JBGD8 22	220.00	2	SINGLE	819	445.8	466.9	105.6
34100*JBGD172	220.00	34111	JBGD8 22	220.00	1	SINGLE	820	445.8	466.9	105.6

MONITORED VOLTAGE REPORT:

SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
'HU220	RANGE BASE CASE	24025 MDETK 2	220.00	1.05000	1.05000	0.90000
'BG400	RANGE SINGLE 80	12473 VMI3 12	400.00	1.05025	1.03248	0.90000
'BG220	RANGE SINGLE 134	12286 VUZUND2	220.00	0.88899	1.01045	0.90000
'BG220	RANGE SINGLE 136	12282 VORFEJ2	220.00	1.10518	1.04424	0.90000
'HU220	RANGE SINGLE 356	24005 MALBF 22	220.00	0.89275	1.04262	0.90000
'HU220	RANGE SINGLE 357	24006 MALBF 21	220.00	0.89461	1.04267	0.90000
'HU220	RANGE SINGLE 367	24095 MMART 22	220.00	1.06765	1.04951	0.90000
'HU220	RANGE SINGLE 368	24096 MMART 21	220.00	1.06760	1.04949	0.90000
'RO220	RANGE SINGLE 691	28855 RMOSTI2	220.00	0.82144	1.01447	0.90000
'RS400	RANGE SINGLE 796	34085 JSOMB31	400.00	0.86319	0.99028	0.90000
'RS220	RANGE SINGLE 844	34200 JSABA32	220.00	0.88362	1.01945	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 19	: OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	: OPEN LINE FROM BUS 10010 [AELBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 207	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [PODGD211 400.00] CKT 1
SINGLE 367	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 368	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 379	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 380	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 621	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 719	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 819	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 820	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2

### 13.11.2. Bosnia and Herzegovina's Power System Exports 1000 MW

Table 13.11.7: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of BiH exports 1000 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1338.6	1491.9	0.0	0.0	0.0	-200.0	46.7	-200.0
AL	478.4	689.7	-199.7	0.0	458.7	28.1	419.0	
20	8804.5	7603.7	0.0	14.4	0.0	1000.0	186.3	1000.0
BG	2894.4	3045.8	-44.9	120.9	2997.1	323.0	2446.6	
30	3667.4	2610.1	0.0	0.0	0.0	1000.1	57.1	1000.0
BA	771.8	724.5	0.0	0.0	912.6	276.6	683.4	
35	39771.3	49222.0	0.0	1.1	0.0	-9910.0	458.3	-9910.0
IT	7261.3	10816.5	0.0	-156.8	12554.1	-524.7	9680.4	
40	3106.6	3483.0	0.0	0.0	0.0	-434.9	58.5	-435.0
HR	416.7	1074.2	0.0	0.0	1401.9	11.0	733.4	
45	5393.6	6500.0	0.1	0.0	0.0	-1199.9	93.4	-1200.0
HU	996.7	1926.6	178.1	-29.6	2422.1	112.5	1231.2	
50	10298.1	10371.1	0.0	0.0	0.0	-350.0	277.0	-350.0
GR	2143.6	5312.0	170.2	9.3	6613.2	111.5	3140.1	
55	4401.5	-4593.5	0.0	4.8	0.0	8885.6	104.5	8886.0
UX	97.8	637.5	0.0	12.7	2312.6	404.9	1355.2	

60	1501.5	1577.0	0.0	0.0	0.0	-100.0	24.5	-100.0
MK	452.1	573.6	-31.4	0.0	403.7	49.6	264.1	
65	1207.0	0.0	0.0	0.0	0.0	1200.0	7.0	1200.0
UA	-196.6	0.0	0.0	0.0	653.8	346.2	111.0	
70	10255.7	9416.9	0.0	88.3	0.0	545.0	205.4	545.0
RO	2518.4	4075.6	512.8	273.8	4615.4	-243.2	2514.9	
75	3000.9	2514.0	0.0	8.8	0.0	424.1	54.0	424.0
SI	1045.9	811.0	0.0	53.7	604.2	177.1	608.3	
80	54592.6	54622.1	0.0	0.0	0.0	-800.0	770.6	-800.0
TR	4576.5	7792.0	1175.4	0.0	17195.6	-132.1	12936.7	
90	7713.2	7871.1	0.0	17.8	0.0	-360.0	184.3	-360.0
RS	2617.1	2853.5	0.0	76.6	1730.2	-641.4	2058.6	
91	628.9	805.2	0.5	1.9	0.0	-200.0	21.3	-200.0
ME	296.8	299.2	-35.0	10.9	239.3	56.7	204.3	
95	501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK	-380.1	0.0	0.0	0.0	40.0	-355.8	15.7	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	



Figure 13.11.3: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of BiH exports 1000 MW

Table 13.11.8: Changes in power flow in area of SEE in winter maximum 2015, scenario when power system of BiH exports 1000 MW

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
71	[XME_DI11	400.00]	20078	[HMELIN11	400.00]	1	-601.0	-20.6	-447.4	-21.4	153.6	25.6
71	[XME_DI11	400.00]	31410	[LDIVAC1	400.00]	1	601.0	20.6	447.4	21.4	-153.6	25.6
80	[XRE_DI11	400.00]	31410	[LDIVAC1	400.00]	1	-948.5	-191.1	-730.1	-211.1	218.4	23.0
80	[XRE_DI11	400.00]	52189	[IRDPV11	400.00]	1	948.5	191.1	730.1	211.1	-218.4	23.0
221	[XLI_CO11	400.00]	50005	[OLIENZ1	400.00]	A	-1086.9	-42.9	-982.5	-37.3	104.5	9.6
221	[XLI_CO11	400.00]	52049	[ICRD1111	400.00]	1	1086.9	42.9	982.5	37.3	-104.5	9.6
222	[XLI_CO12	400.00]	50005	[OLIENZ1	400.00]	B	-1086.9	-42.9	-982.5	-37.3	104.5	9.6
222	[XLI_CO12	400.00]	52049	[ICRD1111	400.00]	2	1086.9	42.9	982.5	37.3	-104.5	9.6
14003	[HE VISE	15.750]	14407	[WHEVIS1	400.00]	1	300.0	58.2	200.0	51.9	-100.0	33.3
14402	[WUGLJE1	400.00]	16402	[WTUZL61	400.00]	1	44.1	-52.0	180.7	-63.9	136.6	309.9
16009	[TUZ-G6	15.750]	16210	[WTUZL62	220.00]	1	190.0	71.8	0.0	0.0	-190.0	100.0
16210	[WTUZL62	220.00]	16211	[WTSTUZ2	220.00]	1	189.3	41.2	0.0	0.0	-189.3	100.0
18007	[CAPL-G2	15.700]	18205	[WHECAP2	220.00]	1	210.0	20.4	0.0	0.0	-210.0	100.0
18204	[WMOST42	220.00]	18205	[WHECAP2	220.00]	1	-198.5	5.5	-94.5	-4.0	103.9	52.4
18204	[WMOST42	220.00]	18205	[WHECAP2	220.00]	2	-198.5	5.5	-94.5	-4.0	103.9	52.4
20060	[HKONJS11	400.00]	20120	[HOBROV11	400.00]	1	106.3	-23.0	2.5	-21.4	-103.8	97.6
20078	[HMELIN11	400.00]	20120	[HOBROV11	400.00]	1	-224.7	-47.1	-111.8	-58.6	112.8	50.2
52010	[IAUR1111	400.00]	52154	[IMOS1111	400.00]	1	139.1	-79.2	300.2	-85.7	161.1	115.8
52010	[IAUR1111	400.00]	52154	[IMOS1111	400.00]	2	139.1	-79.2	300.2	-85.7	161.1	115.8
52010	[IAUR1111	400.00]	52259	[ITVN1111	400.00]	1	-214.6	23.3	-460.6	33.8	-246.0	114.6
52010	[IAUR1111	400.00]	52259	[ITVN1111	400.00]	2	-214.6	23.3	-460.6	33.8	-246.0	114.6
52019	[IBAS1111	400.00]	52034	[ICAL1111	400.00]	1	360.8	-23.2	254.7	-15.5	-106.1	29.4
52019	[IBAS1111	400.00]	52158	[IMRT1111	400.00]	1	-261.6	25.5	-155.5	13.6	106.1	40.6
52034	[ICAL1111	400.00]	52053	[ICSL1111	400.00]	1	307.4	-17.1	189.4	-1.8	-118.0	38.4



'GR400	'	RANGE SINGLE	432	23126	GKPATC12	400.00	1.05221	1.03832	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23173	GDISTO11	400.00	1.05311	1.03796	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23174	GDISTO12	400.00	1.05273	1.03809	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23180	GAXELO12	400.00	1.05239	1.03877	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23181	GAXELO11	400.00	1.05235	1.03898	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23064	GK_MEG13	400.00	1.05389	1.04120	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23066	GK_MEG11	400.00	1.05389	1.04120	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23123	GKPTR11	400.00	1.05332	1.03823	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23125	GKPATC11	400.00	1.05341	1.03821	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23126	GKPATC12	400.00	1.05336	1.03832	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23173	GDISTO11	400.00	1.05404	1.03796	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23174	GDISTO12	400.00	1.05386	1.03809	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23180	GAXELO12	400.00	1.05354	1.03877	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23181	GAXELO11	400.00	1.05360	1.03898	1.05000	0.90000
'GR400	'	RANGE SINGLE	462	23036	GK_KOR13	400.00	1.06329	1.01752	1.05000	0.90000
'GR400	'	RANGE SINGLE	462	23068	GK_MEG14	400.00	1.06089	1.02954	1.05000	0.90000
'GR400	'	RANGE SINGLE	463	23037	GK_KOR14	400.00	1.06329	1.01752	1.05000	0.90000
'GR400	'	RANGE SINGLE	463	23067	GK_MEG12	400.00	1.06089	1.02954	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23126	GKPATC12	400.00	1.06905	1.03832	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23180	GAXELO12	400.00	1.06904	1.03877	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23181	GAXELO11	400.00	1.06885	1.03898	1.05000	0.90000
'GR400	'	RANGE SINGLE	475	23180	GAXELO12	400.00	1.06849	1.03877	1.05000	0.90000
'GR400	'	RANGE SINGLE	475	23181	GAXELO11	400.00	1.06831	1.03898	1.05000	0.90000
'RO220	'	RANGE SINGLE	567	28043	RSTUPA2	220.00	0.89257	0.98004	1.10000	0.90000
'RO220	'	RANGE SINGLE	637	28855	RMOSTI2	220.00	0.88213	1.04040	1.10000	0.90000
'RO220	'	RANGE SINGLE	642	28907	RSTILP2	220.00	0.84352	0.98203	1.10000	0.90000
'RO220	'	RANGE SINGLE	670	28095	RVETIS2	220.00	0.89837	1.02177	1.10000	0.90000
'RS400	'	RANGE SINGLE	739	34085	JSOMB31	400.00	0.87936	0.99468	1.05000	0.90000

CONTINGENCY LEGEND:  
 LABEL           EVENTS

SINGLE 196	:	OPEN LINE FROM BUS 13 [XTR_PG11	400.00]	TO BUS 36005 [0PODG211	400.00]	CKT 1
SINGLE 269	:	OPEN LINE FROM BUS 71 [XME_DI11	400.00]	TO BUS 31410 [LDIVAC1	400.00]	CKT 1
SINGLE 344	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 345	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 356	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 357	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 707	:	OPEN LINE FROM BUS 31410 [LDIVAC1	400.00]	TO BUS 80 [XRE_DI11	400.00]	CKT 1

Table 13.11.11: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of BiH exports 1000 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1621.8	1723.7	0.0	0.0	0.0	-150.0	48.1	-150.0
AL	664.6	779.7	-204.9	0.0	475.9	99.6	466.1	
20	9657.7	8411.0	0.0	15.5	0.0	1000.0	231.2	1000.0
BG	3499.0	3357.9	0.0	181.3	3282.0	203.1	3038.7	
30	3966.1	2897.8	0.0	0.0	0.0	1000.1	68.2	1000.0
BA	1164.8	1017.2	0.0	0.0	923.2	224.8	846.0	
35	44087.4	54409.8	0.0	1.1	0.0	-10740.0	416.6	-10740.0
IT	10025.0	11942.3	0.0	147.6	12369.8	-800.5	11105.4	
40	3443.4	4359.0	0.0	0.0	0.0	-999.9	84.3	-1000.0
HR	587.2	1075.9	0.0	0.0	1520.2	146.4	885.1	
45	6098.8	7180.0	0.1	0.0	0.0	-1199.9	118.6	-1200.0
HU	1405.9	2128.1	178.4	-29.1	2399.5	-5.9	1534.0	
50	11749.6	11426.0	0.0	0.0	0.0	0.0	323.6	0.0
GR	3115.3	5724.7	203.7	9.4	6664.6	121.2	3707.2	
55	5234.1	-4356.2	0.0	4.8	0.0	9449.6	136.0	9450.0
UX	568.2	622.8	0.0	12.6	2284.6	420.1	1797.3	

60	1939.7	2001.9	0.0	0.0	0.0	-100.0	37.7	-100.0
MK	757.7	752.3	-30.9	0.0	398.2	11.4	421.8	
65	1207.5	0.0	0.0	0.0	0.0	1200.0	7.5	1200.0
UA	-161.2	0.0	0.0	0.0	652.2	370.4	120.5	
70	13266.2	12110.2	0.0	90.1	0.0	800.1	265.8	800.0
RO	3141.4	4455.6	782.8	285.5	5597.1	-55.6	3270.3	
75	3961.3	2990.0	0.0	8.8	0.0	890.0	72.6	890.0
SI	1371.3	964.6	0.0	52.9	853.0	340.4	866.5	
80	77661.5	77342.9	0.0	0.0	0.0	-800.0	1118.6	-800.0
TR	9831.5	11034.0	996.9	0.0	22660.8	-173.2	20634.6	
90	7766.8	8298.8	0.0	17.3	0.0	-750.0	200.7	-750.0
RS	2872.7	2986.6	0.0	73.4	1734.1	-668.3	2214.9	
91	864.2	938.0	0.5	2.1	0.0	-100.0	23.6	-100.0
ME	341.3	346.6	-34.7	11.5	237.9	45.5	210.4	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-304.9	0.0	0.0	0.0	39.9	-279.3	14.4	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTALS	193027.4	189732.9	0.6	139.7	0.0	0.0	3154.1	0.0
	38879.8	47188.4	1891.3	745.1	62093.0	0.0	51133.2	



Figure 13.11.4: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of BiH exports 1000 MW

Table 13.11.12: Changes in power flow in area of SEE in winter maximum 2020, scenario when power system of BiH exports 1000 MW

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	
71	[XME_DI11	400.00]	20078	[HMELIN11	400.00]	1	-450.4	-102.3	-210.7	-110.0	239.7	53.2
71	[XME_DI11	400.00]	31410	[LDIVAC1	400.00]	1	450.4	102.3	210.7	110.0	-239.7	53.2
80	[XRE_DI11	400.00]	31410	[LDIVAC1	400.00]	1	-807.2	-216.3	-511.6	-235.9	295.6	36.6
80	[XRE_DI11	400.00]	53357	[IRDPV11	400.00]	1	807.2	216.3	511.6	235.9	-295.6	36.6
14402	[TS UGLJEVIK	400.00]	16402	[TS TUZLA	400.00]	1	111.5	-35.8	337.7	-29.6	226.2	203.0
18006	[CAPL-G1	15.700]	18205	[HE CAPLJINA	220.00]	1	210.0	51.0	OUT OF SERVICE		-210.0	100.0
18007	[CAPL-G2	15.700]	18205	[HE CAPLJINA	220.00]	1	210.0	51.0	OUT OF SERVICE		-210.0	100.0
18204	[MO-4	220.00]	18205	[HE CAPLJINA	220.00]	1	-209.8	-17.5	0.0	-6.7	209.8	100.0
18204	[MO-4	220.00]	18205	[HE CAPLJINA	220.00]	2	-206.6	-17.4	0.0	-6.7	206.6	100.0
20078	[HMELIN11	400.00]	20120	[HOBROV11	400.00]	1	-353.1	16.9	-134.5	-6.7	218.5	61.9
52034	[ICALF111	400.00]	52053	[ICSLF111	400.00]	1	272.7	16.7	55.7	49.4	-217.0	79.6
52035	[ICAMV111	400.00]	52060	[IDUGV111	400.00]	1	780.8	-58.7	579.7	-46.7	-201.0	25.7
52049	[ICRDV111	400.00]	52271	[IVEZV111	400.00]	1	895.7	-126.2	590.2	-74.9	-305.5	34.1
52049	[ICRDV111	400.00]	53122	[II12V111	400.00]	1	1389.6	126.5	1107.6	113.1	-282.0	20.3
52049	[ICRDV111	400.00]	53531	[IUDOV11	400.00]	1	-331.3	-167.5	-44.4	-162.0	286.9	86.6
52059	[IDOLV111	400.00]	52184	[IPTOV111	400.00]	1	-248.9	-138.4	-451.6	-81.9	-202.7	81.4
52059	[IDOLV111	400.00]	52271	[IVEZV111	400.00]	1	-423.1	146.7	-126.0	67.0	297.0	70.2
52059	[IDOLV111	400.00]	52271	[IVEZV111	400.00]	2	-416.6	158.2	-123.3	70.3	293.3	70.4
52060	[IDUGV111	400.00]	52165	[IOSTM111	400.00]	1	-500.8	-390.9	-840.2	-290.8	-339.3	67.7
52060	[IDUGV111	400.00]	53160	[II49V111	400.00]	1	-109.1	284.5	168.9	188.3	278.0	254.8
52084	[IFNOR111	400.00]	53142	[II27R111	400.00]	1	-212.1	-41.5	-421.4	-4.1	-209.2	98.6
52137	[ILATR111	400.00]	52196	[IRMSR111	400.00]	1	10.7	-21.0	246.3	-8.0	235.6	999.9
52137	[ILATR111	400.00]	52276	[IVLMR111	400.00]	1	-32.6	-103.1	292.0	-92.1	324.6	994.6





28040*RLOTRU2	220.00	28366	RSIBIU2	220.00	1	SINGLE	621	333.4	393.0	112.3
28040*RLOTRU2	220.00	28100	RSIBIU21	220.00	1	SINGLE	622	333.4	393.0	112.3
28040*RLOTRU2	220.00	28366	RSIBIU2	220.00	1	SINGLE	719	333.4	392.9	111.7
28040*RLOTRU2	220.00	28100	RSIBIU21	220.00	1	SINGLE	720	333.4	392.9	111.7
31210*LDIVAC2	220.00	156	XPA_DI21	220.00	1	SINGLE	763	320.1	345.2	104.5
34100*JBGD172	220.00	34111	JBGD8 22	220.00	2	SINGLE	819	445.8	466.9	105.6
34100*JBGD172	220.00	34111	JBGD8 22	220.00	1	SINGLE	820	445.8	466.9	105.6
MONITORED VOLTAGE REPORT:										
SYSTEM		CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN			
'HU220	'	RANGE BASE CASE	24025 MDETK 2	220.00	1.05000	1.05000	1.05000	0.90000		
'BG400	'	RANGE SINGLE 80	12473 VMI3 12	400.00	1.05041	1.03270	1.05000	0.90000		
'BG220	'	RANGE SINGLE 134	12286 VUZUND2	220.00	0.88937	1.01069	1.10000	0.90000		
'BG220	'	RANGE SINGLE 136	12282 VORFEJ2	220.00	1.10524	1.04468	1.10000	0.90000		
'HU220	'	RANGE SINGLE 356	24005 MALBF 22	220.00	0.89275	1.04262	1.05000	0.90000		
'HU220	'	RANGE SINGLE 357	24006 MALBF 21	220.00	0.89461	1.04267	1.05000	0.90000		
'HU220	'	RANGE SINGLE 367	24095 MMART 22	220.00	1.06607	1.04917	1.05000	0.90000		
'HU220	'	RANGE SINGLE 368	24096 MMART 21	220.00	1.06603	1.04915	1.05000	0.90000		
'GR400	'	RANGE SINGLE 499	23126 GKPATC12	400.00	1.05006	1.02515	1.05000	0.90000		
'GR400	'	RANGE SINGLE 499	23180 GAXELO12	400.00	1.05005	1.02551	1.05000	0.90000		
'RO220	'	RANGE SINGLE 691	28855 RMOSTI2	220.00	0.82110	1.01415	1.10000	0.90000		
'RS400	'	RANGE SINGLE 796	34085 JSOMB31	400.00	0.86272	0.98967	1.05000	0.90000		
'RS220	'	RANGE SINGLE 844	34200 JSABA32	220.00	0.88466	1.01966	1.10000	0.90000		
CONTINGENCY LEGEND:										
LABEL	EVENTS									
SINGLE 19	:	OPEN LINE FROM BUS 10009 [AELBS12	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1				
SINGLE 22	:	OPEN LINE FROM BUS 10010 [AELBS22	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1				
SINGLE 207	:	OPEN LINE FROM BUS 13 [XTR_PG11	400.00]	TO BUS 36005 [0PODG211	400.00]	CKT 1				
SINGLE 367	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1				
SINGLE 368	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1				
SINGLE 379	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1				
SINGLE 380	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1				
SINGLE 621	:	OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1				
SINGLE 622	:	OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1				
SINGLE 719	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1				
SINGLE 720	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1				
SINGLE 763	:	OPEN LINE FROM BUS 31410 [LDIVAC1	400.00]	TO BUS 80 [XRE_DI11	400.00]	CKT 1				
SINGLE 819	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 1				
SINGLE 820	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 2				

## 13.12. Croatian Power Balance Uncertainty

### 13.12.1. Croatian Power System Is Self-Balanced

Table 13.12.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of Croatia is self-balanced

X-- AREA	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10 AL	1338.6 480.8	1491.9 689.7	0.0 -199.6	0.0 0.0	0.0 458.4	-200.0 29.8	46.7 419.3	-200.0
20 BG	8804.7 2896.1	7603.7 3045.8	0.0 -44.9	14.4 120.9	0.0 2996.9	1000.0 322.5	186.5 2448.7	1000.0
30 BA	3148.9 715.4	2610.1 724.5	0.0 0.0	0.0 0.0	0.0 910.3	490.0 337.4	48.8 563.8	490.0
35 IT	40263.3 7009.2	49222.0 10816.5	0.0 0.0	1.1 -157.0	0.0 12573.1	-9400.0 -548.5	440.3 9471.3	-9400.0
40 HR	3538.4 374.7	3483.0 1074.2	0.0 0.0	0.0 0.0	0.0 1406.3	0.1 -64.4	55.3 771.1	0.0
45 HU	5392.2 967.4	6500.0 1926.6	0.1 178.1	0.0 -29.6	0.0 2423.8	-1200.0 96.8	92.1 1219.3	-1200.0
50 GR	10298.1 2144.9	10371.1 5312.0	0.0 170.2	0.0 9.3	0.0 6613.0	-350.0 112.5	277.0 3140.2	-350.0
55 UX	3945.5 -216.9	-4593.5 637.5	0.0 0.0	4.9 12.8	0.0 2330.3	8450.6 462.2	83.6 1000.8	8451.0
60 MK	1501.5 452.7	1577.0 573.6	0.0 -31.4	0.0 0.0	0.0 403.7	-100.0 49.8	24.5 264.3	-100.0
65 UA	1207.1 -196.9	0.0 0.0	0.0 0.0	0.0 0.0	0.0 653.8	1200.0 345.6	7.1 111.3	1200.0
70 RO	10255.2 2515.7	9416.9 4075.6	0.0 512.8	88.3 273.8	0.0 4615.9	545.1 -240.0	204.8 2509.4	545.0
75 SI	2996.5 988.9	2514.0 811.0	0.0 0.0	8.8 54.0	0.0 608.0	424.1 164.3	49.6 567.6	424.0
80 TR	54592.6 4576.9	54622.1 7792.0	0.0 1175.4	0.0 0.0	0.0 17195.6	-800.0 -131.9	770.6 12937.0	-800.0
90 RS	7713.0 2622.6	7871.1 2853.5	0.0 0.0	17.8 76.6	0.0 1729.8	-360.0 -635.5	184.1 2057.9	-360.0
91 ME	628.9 299.5	805.2 299.2	0.5 -34.9	1.9 10.9	0.0 239.0	-200.0 60.0	21.3 203.3	-200.0
95 SK	501.4 -384.8	0.0 0.0	0.0 0.0	0.0 0.0	0.0 40.0	500.0 -360.6	1.4 15.9	500.0
101 XX (IT-GR)	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0

102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	156126.1	153494.7	0.6	137.2	0.0	0.0	2493.7	0.0
	25246.4	40631.6	1725.8	371.8	55197.9	0.0	37701.3	

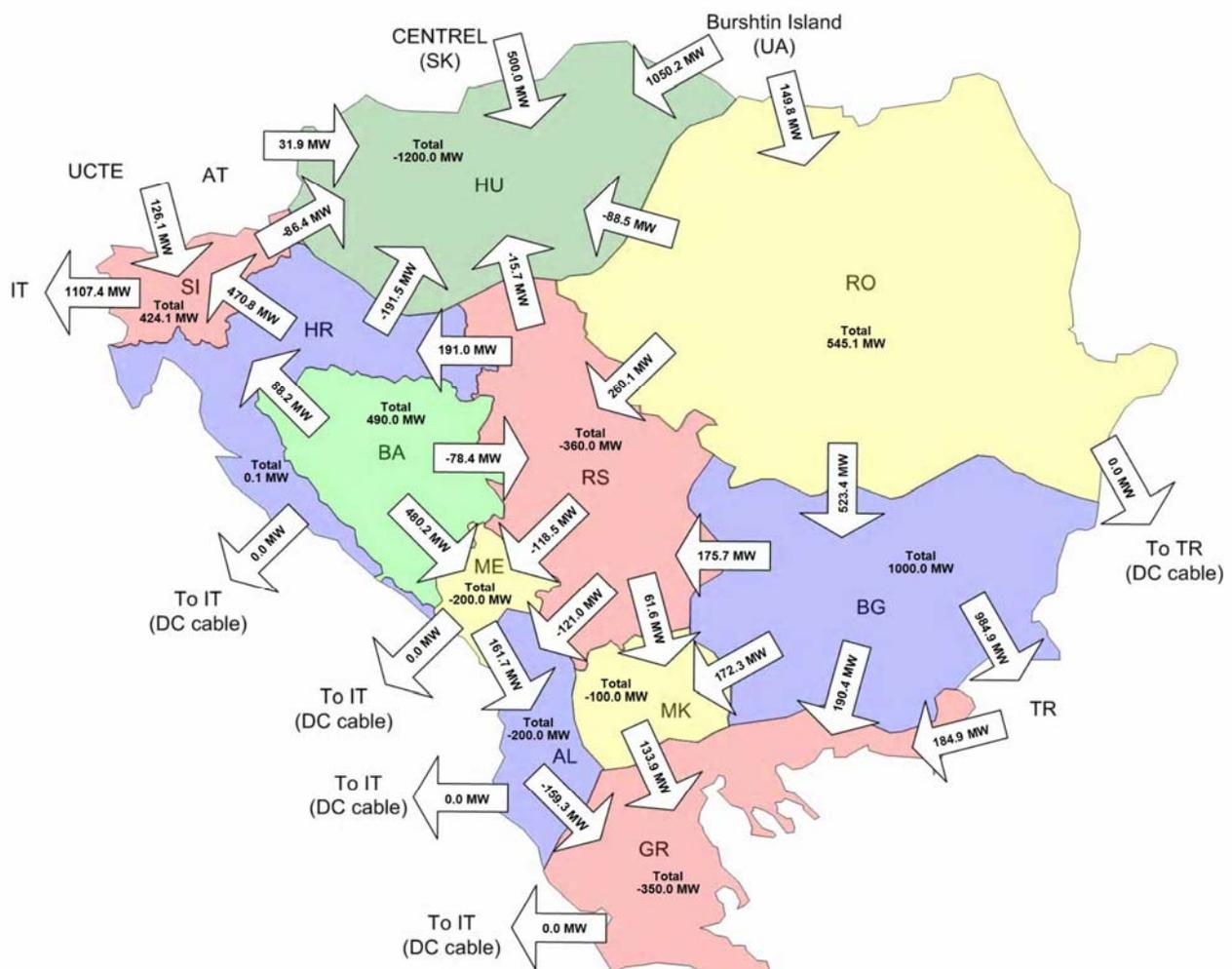


Figure 13.12.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of Croatia is self-balanced

Table 13.12.2: Changes in power flow in area of SEE in winter maximum 2015, scenario when power system of Croatia is self-balanced





24034*MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE 345	426.8	455.9	101.8
24034*MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE 356	426.8	452.7	101.1
24034*MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE 357	426.8	456.1	101.9
31210*LDIVAC2	220.00	156 XPA_DI21	220.00	1	SINGLE 707	320.1	629.0	191.0

MONITORED VOLTAGE REPORT:

SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
'HU220	RANGE BASE CASE	24025 MDETK 2	220.00	1.05000	1.05000	0.90000
'HU220	RANGE BASE CASE	24068 MGYOR 2	220.00	1.05889	1.05889	0.90000
'HU220	RANGE BASE CASE	24095 MMART 22	220.00	1.05064	1.05064	0.90000
'HU220	RANGE BASE CASE	24096 MMART 21	220.00	1.05060	1.05060	0.90000
'BG220	RANGE SINGLE 100	12252 VOCHIF2	220.00	0.81892	0.95882	0.90000
'BG220	RANGE SINGLE 124	12286 VUZUND2	220.00	0.89606	1.00470	0.90000
'GR400	RANGE SINGLE 432	22759 GTH_AG11	400.00	1.05202	1.02528	0.90000
'GR400	RANGE SINGLE 432	23123 GKPATR11	400.00	1.05217	1.03822	0.90000
'GR400	RANGE SINGLE 432	23125 GKPATC11	400.00	1.05226	1.03819	0.90000
'GR400	RANGE SINGLE 432	23126 GKPATC12	400.00	1.05221	1.03831	0.90000
'GR400	RANGE SINGLE 432	23173 GDISTO11	400.00	1.05310	1.03795	0.90000
'GR400	RANGE SINGLE 432	23174 GDISTO12	400.00	1.05272	1.03808	0.90000
'GR400	RANGE SINGLE 432	23180 GAXELO12	400.00	1.05238	1.03876	0.90000
'GR400	RANGE SINGLE 432	23181 GAXELO11	400.00	1.05234	1.03897	0.90000
'GR400	RANGE SINGLE 433	23064 GK_MEG13	400.00	1.05388	1.04119	0.90000
'GR400	RANGE SINGLE 433	23066 GK_MEG11	400.00	1.05388	1.04119	0.90000
'GR400	RANGE SINGLE 433	23123 GKPATR11	400.00	1.05331	1.03822	0.90000
'GR400	RANGE SINGLE 433	23125 GKPATC11	400.00	1.05340	1.03819	0.90000
'GR400	RANGE SINGLE 433	23126 GKPATC12	400.00	1.05335	1.03831	0.90000
'GR400	RANGE SINGLE 433	23173 GDISTO11	400.00	1.05403	1.03795	0.90000
'GR400	RANGE SINGLE 433	23174 GDISTO12	400.00	1.05385	1.03808	0.90000
'GR400	RANGE SINGLE 433	23180 GAXELO12	400.00	1.05353	1.03876	0.90000
'GR400	RANGE SINGLE 433	23181 GAXELO11	400.00	1.05359	1.03897	0.90000
'GR400	RANGE SINGLE 462	23036 GK_KOR13	400.00	1.06328	1.01751	0.90000
'GR400	RANGE SINGLE 462	23068 GK_MEG14	400.00	1.06088	1.02953	0.90000
'GR400	RANGE SINGLE 463	23037 GK_KOR14	400.00	1.06328	1.01751	0.90000
'GR400	RANGE SINGLE 463	23067 GK_MEG12	400.00	1.06088	1.02953	0.90000
'GR400	RANGE SINGLE 473	23126 GKPATC12	400.00	1.06903	1.03831	0.90000
'GR400	RANGE SINGLE 473	23180 GAXELO12	400.00	1.06903	1.03876	0.90000
'GR400	RANGE SINGLE 473	23181 GAXELO11	400.00	1.06884	1.03897	0.90000
'GR400	RANGE SINGLE 475	23180 GAXELO12	400.00	1.06848	1.03876	0.90000
'GR400	RANGE SINGLE 475	23181 GAXELO11	400.00	1.06829	1.03897	0.90000
'RO220	RANGE SINGLE 567	28043 RSTUPA2	220.00	0.89271	0.98015	0.90000
'RO220	RANGE SINGLE 637	28855 RMOSTI2	220.00	0.88218	1.04044	0.90000
'RO220	RANGE SINGLE 642	28907 RSTILP2	220.00	0.84359	0.98208	0.90000
'RO220	RANGE SINGLE 670	28095 RVETIS2	220.00	0.89842	1.02184	0.90000
'RS400	RANGE SINGLE 739	34085 JSOMB31	400.00	0.87945	0.99483	0.90000

CONTINGENCY LEGEND:  
LABEL EVENTS

SINGLE 196	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [0PODG211 400.00] CKT 1
SINGLE 269	: OPEN LINE FROM BUS 71 [XME_DI11 400.00] TO BUS 31410 [LDIVAC1 400.00] CKT 1
SINGLE 344	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 345	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 356	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 357	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 707	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1

Table 13.12.5: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of Croatia is self-balanced

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1621.9	1723.7	0.0	0.0	0.0	-150.0	48.2	-150.0
AL	670.4	779.7	-204.6	0.0	475.1	102.9	467.5	
20	9658.6	8411.0	0.0	15.5	0.0	1000.0	232.0	1000.0
BG	3507.5	3357.9	0.0	181.2	3281.0	201.7	3047.6	
30	2949.4	2897.8	0.0	0.0	0.0	0.0	51.6	0.0
BA	1022.5	1017.2	0.0	0.0	912.3	267.3	650.4	
35	45057.4	54409.8	0.0	1.1	0.0	-9740.0	386.6	-9740.0

IT	9519.6	11942.3	0.0	147.8	12400.2	-817.0	10646.8	
40	4437.6	4359.0	0.0	0.0	0.0	0.1	78.5	0.0
HR	568.9	1075.9	0.0	0.0	1529.6	21.1	1001.4	
45	6095.1	7180.0	0.1	0.0	0.0	-1199.9	114.9	-1200.0
HU	1364.1	2128.1	178.5	-29.1	2405.3	-7.8	1499.7	
50	11749.8	11426.0	0.0	0.0	0.0	0.0	323.7	0.0
GR	3121.2	5724.7	203.7	9.4	6663.8	124.5	3709.0	
55	4189.7	-4356.2	0.0	4.9	0.0	8449.5	91.6	8450.0
UX	-18.7	622.8	0.0	12.8	2322.7	532.7	1135.6	
60	1939.9	2001.9	0.0	0.0	0.0	-100.0	37.9	-100.0
MK	760.6	752.3	-30.9	0.0	397.9	12.2	423.7	
65	1207.5	0.0	0.0	0.0	0.0	1200.0	7.5	1200.0
UA	-164.6	0.0	0.0	0.0	652.3	366.9	120.7	
70	13264.2	12110.2	0.0	90.1	0.0	800.1	263.7	800.0
RO	3132.1	4455.6	783.0	285.6	5599.0	-43.7	3250.5	
75	3951.9	2990.0	0.0	8.9	0.0	890.1	63.0	890.0
SI	1235.1	964.6	0.0	53.8	868.0	316.2	768.5	
80	77661.5	77342.9	0.0	0.0	0.0	-800.0	1118.6	-800.0
TR	9832.6	11034.0	996.9	0.0	22660.7	-172.4	20634.9	
90	7767.1	8298.8	0.0	17.3	0.0	-749.9	201.0	-750.0
RS	2894.1	2986.6	0.0	73.4	1732.3	-654.7	2221.1	
91	864.2	938.0	0.5	2.1	0.0	-100.0	23.5	-100.0
ME	351.1	346.6	-34.5	11.4	236.9	54.5	210.1	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-329.6	0.0	0.0	0.0	40.0	-304.5	14.9	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTALS	192917.2	189732.9	0.6	139.9	0.0	0.0	3043.7	0.0
	37466.8	47188.4	1892.0	746.3	62177.2	0.0	49802.5	



Figure 13.12.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of Croatia is self-balanced

Table 13.12.6: Changes in power flow in area of SEE in winter maximum 2020, scenario when power system of Croatia is self-balanced

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
8	[XWI_GY11	400.00]	24067	[MGYOR 4	400.00]	1	-78.8	38.2	84.1	12.2	163.0	206.7
8	[XWI_GY11	400.00]	50010	[OWIEN 1	400.00]	1	78.8	-38.2	-84.1	-12.2	-163.0	206.7
9	[XKA_MA11	400.00]	31420	[LMARIB1	400.00]	1	87.6	-20.6	258.7	-53.8	171.1	195.4
9	[XKA_MA11	400.00]	50004	[OKAINA1	400.00]	1	-87.6	20.6	-258.7	53.8	-171.1	195.4
71	[XME_DI11	400.00]	20078	[HMELIN11	400.00]	1	-504.1	-73.2	-210.7	-110.0	293.4	58.2
71	[XME_DI11	400.00]	31410	[LDIVAC1	400.00]	1	504.1	73.2	210.7	110.0	-293.4	58.2
80	[XRE_DI11	400.00]	31410	[LDIVAC1	400.00]	1	-717.8	-200.5	-511.6	-235.9	206.2	28.7
80	[XRE_DI11	400.00]	53357	[IRDPV11	400.00]	1	717.8	200.5	511.6	235.9	-206.2	28.7
221	[XLI_CO11	400.00]	50005	[OLIENZ1	400.00]	A	-816.8	-73.6	-1009.3	-29.7	-192.5	23.6
221	[XLI_CO11	400.00]	52049	[ICRDV111	400.00]	1	816.8	73.6	1009.3	29.7	192.5	23.6
222	[XLI_CO12	400.00]	50005	[OLIENZ1	400.00]	B	-816.8	-73.6	-1009.3	-29.7	-192.5	23.6
222	[XLI_CO12	400.00]	52049	[ICRDV111	400.00]	2	816.8	73.6	1009.3	29.7	192.5	23.6
20078	[HMELIN11	400.00]	20120	[HOBROV11	400.00]	1	-339.4	29.9	-134.5	-6.7	204.8	60.4
20139	[HTERIJ21	220.00]	20211	[HTERIJG1	20.0000]	1	-320.0	-45.2	-134.7	-51.9	185.3	57.9
20254	[HTEZATG1	22.0000]	20256	[HTEZATON	400.00]	1	400.0	-37.8	233.1	-61.4	-166.9	41.7
20258	[HTESLAG1	22.0000]	20259	[HTESLA	400.00]	1	400.0	-52.3	248.7	-64.7	-151.3	37.8
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	1	-619.1	1.3	-969.3	69.8	-350.1	56.6
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	2	-619.1	1.3	-969.3	69.8	-350.1	56.6
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	1	-507.5	42.7	-1023.0	92.2	-515.5	101.6
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	2	-507.5	42.7	-1023.0	92.2	-515.5	101.6
50009	[OWESTT1	400.00]	50024	[OWESTT2	220.00]	1	322.6	-137.2	127.1	-155.2	-195.5	60.6
50011	[OZELL 1	400.00]	50042	[OZELL 2	220.00]	1	447.1	75.2	-398.8	4.3	-845.9	189.2
52049	[ICRDV111	400.00]	53531	[IUDOV11	400.00]	1	-323.4	-68.3	-44.4	-162.0	279.1	86.3



Table 13.12.7: Changes in power flow greater then 50 MW through tie-lines in area of interest in winter maximum 2020, scenario when power system of Croatia is self-balanced

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%
11	[XMO_K011	400.00]	18401 [MO-4	400.00]	1	-9.6	28.3	-74.9	37.4	-65.2	676.1	9.2	32.4
12	[XUG_ER11	400.00]	14402 [TS UGLJEVIK	400.00]	1	30.8	46.8	73.4	44.3	42.5	138.0	-2.6	5.5
71	[XME_DI11	400.00]	31410 [LDIVAC1	400.00]	1	504.1	73.2	210.7	110.0	-293.4	58.2	36.8	50.3
72	[XTU_KR11	400.00]	31415 [LKRSKO1	400.00]	1	-117.5	-4.9	-206.1	7.8	-88.6	75.4	12.7	258.4
73	[XTU_KR12	400.00]	31415 [LKRSKO1	400.00]	2	-117.5	-4.9	-206.1	7.8	-88.6	75.4	12.7	258.4
74	[XER_SM11	400.00]	34045 [JSMIT21	400.00]	1	-140.7	64.6	-126.3	64.6	14.4	10.3	0.0	0.0
110	[XGR_DA21	220.00]	16203 [GRADACAC	220.00]	1	3.2	-13.8	7.9	-14.4	4.7	143.5	-0.7	5.0
111	[XPR_MR21	220.00]	14201 [PRIJEDOR 2	220.00]	1	33.2	14.5	42.9	15.7	9.8	29.4	1.2	8.0
112	[XRA_ZA21	220.00]	18200 [HE RAMA	220.00]	1	-55.6	-7.2	-72.3	-3.9	-16.7	30.0	3.3	46.0
113	[XPR_ME21	220.00]	14201 [PRIJEDOR 2	220.00]	1	-17.0	-1.2	-7.4	-1.6	9.5	56.2	-0.4	31.0
114	[XTU_DA21	220.00]	16209 [TE TUZLA	220.00]	1	-71.2	-54.9	-64.6	-56.1	6.6	9.3	-1.2	2.1
152	[XZE_CI21	220.00]	31220 [LCIRKO2	220.00]	1	21.4	-12.7	0.1	-7.1	-21.3	99.4	5.6	44.1
153	[XPE_DI21	220.00]	31210 [LDIVAC2	220.00]	1	130.0	-1.5	62.8	7.2	-67.1	51.7	8.8	571.3
217	[XER_PE11	400.00]	24141 [MPECS 4	400.00]	1	-67.3	-10.4	-146.0	-0.6	-78.7	116.9	9.8	94.2
218	[XER_PE12	400.00]	24141 [MPECS 4	400.00]	2	-67.3	-10.4	-146.0	-0.6	-78.7	116.9	9.8	94.2
502	[XCI_PI12	400.00]	204 [XZE_HE11	400.00]	1	12.5	-13.7	100.7	-28.2	88.2	707.4	-14.6	106.4
502	[XCI_PI12	400.00]	31435 [LCIRKO11	400.00]	B	-12.5	13.7	-100.7	28.2	-88.2	707.4	14.6	106.4
20003	[HBILIC21	220.00]	20002 [HBILIC51	110.00]	1	55.4	25.6	55.6	25.3	0.2	0.4	-0.3	1.0
20003	[HBILIC21	220.00]	20002 [HBILIC51	110.00]	2	55.4	25.6	55.6	25.3	0.2	0.4	-0.3	1.0
20003	[HBILIC21	220.00]	20002 [HBILIC51	110.00]	3	55.4	25.6	55.6	25.3	0.2	0.4	-0.3	1.0
20020	[HDAKOV21	220.00]	20018 [HDAKOV51	110.00]	1	33.9	36.3	28.3	37.3	-5.6	16.6	0.9	2.6
20020	[HDAKOV21	220.00]	20018 [HDAKOV51	110.00]	2	33.9	36.3	28.3	37.3	-5.6	16.6	0.9	2.6
20030	[HERNES11	400.00]	20029 [HERNES51	110.00]	1	113.3	14.0	119.3	13.9	5.9	5.2	-0.1	0.5
20030	[HERNES11	400.00]	20029 [HERNES51	110.00]	2	113.3	14.0	119.3	13.9	5.9	5.2	-0.1	0.5
20030	[HERNES11	400.00]	20029 [HERNES51	110.00]	3	113.3	14.0	119.3	13.9	5.9	5.2	-0.1	0.5
20045	[HE SENJ	220.00]	20044 [HESENJ	110.00]	1	-35.7	-58.6	-33.4	-58.9	2.3	6.4	-0.3	0.4
20049	[HE ZAKUC	220.00]	20048 [HEZAKUCA	110.00]	1	40.3	11.5	42.1	12.1	1.8	4.4	0.5	4.5
20059	[HKONJS21	220.00]	20058 [HKONJS51	110.00]	1	61.6	33.7	63.5	34.0	1.8	3.0	0.3	1.0
20059	[HKONJS21	220.00]	20058 [HKONJS51	110.00]	2	61.6	33.7	63.5	34.0	1.8	3.0	0.3	1.0
20075	[HMEDUR21	220.00]	20074 [HMEDUR51	110.00]	1	85.2	30.9	75.5	33.2	-9.6	11.3	2.3	7.5
20077	[HMELIN21	220.00]	20076 [HMELIN51	110.00]	1	70.8	-0.7	67.0	0.1	-3.8	5.4	0.9	117.7
20077	[HMELIN21	220.00]	20076 [HMELIN51	110.00]	2	70.8	-0.7	67.0	0.1	-3.8	5.4	0.9	117.7
20082	[HMRACL21	220.00]	20081 [HMRACL51	110.00]	1	93.6	8.9	76.5	11.7	-17.1	18.2	2.8	30.8
20082	[HMRACL21	220.00]	20081 [HMRACL51	110.00]	3	93.6	8.9	76.5	11.7	-17.1	18.2	2.8	30.8
20101	[HPEHLI21	220.00]	20100 [HPEHLI51	110.00]	1	73.8	40.8	71.6	42.5	-2.2	3.0	1.6	4.0
20101	[HPEHLI21	220.00]	20100 [HPEHLI51	110.00]	2	73.8	40.8	71.6	42.5	-2.2	3.0	1.6	4.0
20104	[HPLAT_21	220.00]	118 [XTR_PL21	220.00]	1	53.4	-19.9	4.2	-2.4	-49.2	92.1	17.5	88.0
20104	[HPLAT_21	220.00]	119 [XTR_PL22	220.00]	2	53.4	-19.9	4.2	-2.4	-49.2	92.1	17.5	88.0
20104	[HPLAT_21	220.00]	20103 [HPLAT_51	110.00]	1	22.4	-27.0	17.9	-23.8	-4.5	20.1	3.2	11.7
20104	[HPLAT_21	220.00]	20244 [HEDUBRG5	14.400]	2	-108.8	42.3	0.0	0.0	108.8	100.0	-42.3	100.0
20120	[HOBROV11	400.00]	20119 [HRHEOB51	110.00]	1	149.2	45.4	123.9	47.3	-25.3	17.0	1.8	4.0
20120	[HOBROV11	400.00]	20208 [HRHEOBG1	15.750]	1	-138.6	28.5	-82.7	27.0	55.9	40.4	-1.5	5.3
20120	[HOBROV11	400.00]	20209 [HRHEOBG2	15.750]	2	-138.0	28.5	-41.4	24.9	96.6	70.0	-3.5	12.4
20138	[HTEPLO21	220.00]	20137 [HTEPLO51	110.00]	1	61.3	-14.6	56.2	-13.5	-5.2	8.4	1.1	7.7
20138	[HTEPLO21	220.00]	20137 [HTEPLO51	110.00]	2	61.3	-14.6	56.2	-13.5	-5.2	8.4	1.1	7.7
20138	[HTEPLO21	220.00]	20248 [HTEPLOG2	13.800]	1	-200.0	15.8	-103.6	4.2	96.4	48.2	-11.6	73.5
20139	[HTERIJ21	220.00]	20211 [HTERIJG1	20.000]	1	-320.0	-45.2	-134.7	-51.9	185.3	57.9	-6.7	14.8
20141	[HTE SI21	220.00]	20140 [HTESIS51	110.00]	1	153.6	50.6	134.9	53.3	-18.7	12.2	2.7	5.3
20141	[HTE SI21	220.00]	20212 [HTESISG3	15.750]	2	-250.0	-94.1	-145.1	-113.1	104.9	42.0	-19.0	20.2
20141	[HTE SI21	220.00]	3WINDTR [KTEBT1	] WND 1 1		-228.5	66.3	-217.6	63.2	10.9	4.8	-3.1	4.7
20147	[HTUMBR11	400.00]	20146 [HTUMBR51	110.00]	1	137.5	63.5	156.6	61.7	19.2	13.9	-1.8	2.8
20147	[HTUMBR11	400.00]	20146 [HTUMBR51	110.00]	2	137.5	63.5	156.6	61.7	19.2	13.9	-1.8	2.8
20147	[HTUMBR11	400.00]	20146 [HTUMBR51	110.00]	3	142.8	65.9	162.7	64.1	19.9	13.9	-1.9	2.8
20166	[HZERJA11	400.00]	204 [XZE_HE11	400.00]	1	-12.5	-45.5	-100.5	-29.2	-88.0	706.5	16.3	35.8
20166	[HZERJA11	400.00]	205 [XZE_HE12	400.00]	2	-129.0	-43.4	-167.7	-35.9	-38.7	30.0	7.6	17.4
20166	[HZERJA11	400.00]	20169 [HZERJA51	110.00]	1	161.3	31.3	173.8	30.3	12.6	7.8	-1.0	3.1
20166	[HZERJA11	400.00]	20169 [HZERJA51	110.00]	2	161.3	31.3	173.8	30.3	12.6	7.8	-1.0	3.1
20245	[HZAGVO21	220.00]	20266 [HZAGVO51	110.00]	1	61.7	29.1	65.8	29.9	4.1	6.6	0.8	2.7
20246	[HVODNJ21	220.00]	20156 [HVODNJ51	110.00]	1	57.1	29.7	54.3	30.7	-2.8	4.9	1.0	3.5
20246	[HVODNJ21	220.00]	20156 [HVODNJ51	110.00]	2	57.1	29.7	54.3	30.7	-2.8	4.9	1.0	3.5
20247	[HVRBO221	220.00]	20157 [HVRBOR51	110.00]	1	77.1	-36.6	78.4	-36.3	1.3	1.7	0.3	0.8
20247	[HVRBO221	220.00]	20157 [HVRBOR51	110.00]	2	77.1	-36.6	78.4	-36.3	1.3	1.7	0.3	0.8
20256	[HTEZATON	400.00]	20254 [HTEZATG1	22.000]	1	-400.0	81.6	-233.1	77.2	166.9	41.7	-4.4	5.4
20259	[HTESLA	400.00]	20258 [HTESLAG1	22.000]	1	-399.5	96.4	-248.5	82.6	151.0	37.8	-13.8	14.3
20262	[HNSELA21	220.00]	20263 [HNSELA51	110.00]	1	50.7	43.7	50.6	44.5	-0.1	0.1	0.8	1.7

Table 13.12.8: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of Croatia is self-balanced

<-----	MONITORED BRANCH	>-----	CONTINGENCY	RATING	FLOW	%
10010*	AELBS22	220.00	10125 ACEKIN2	220.00	1 SINGLE 19	370.0 386.3 102.9
10009*	AELBS12	220.00	10125 ACEKIN2	220.00	1 SINGLE 22	370.0 384.3 102.6
316	XTR_HN51	110.00	36050*OHNOVI51	110.00	1 SINGLE 207	89.6 102.7 116.5
24034*	MDUME 2	220.00	24096 MMART 21	220.00	1 SINGLE 367	426.8 525.6 117.4
24094*	MMART 4	400.00	24096 MMART 21	220.00	1 SINGLE 367	500.0 534.8 107.0
24034*	MDUME 2	220.00	24095 MMART 22	220.00	1 SINGLE 368	426.8 529.4 118.2
24094*	MMART 4	400.00	24095 MMART 22	220.00	1 SINGLE 368	500.0 538.6 107.7
24034*	MDUME 2	220.00	24096 MMART 21	220.00	1 SINGLE 379	426.8 525.8 117.4
24094*	MMART 4	400.00	24096 MMART 21	220.00	1 SINGLE 379	500.0 535.0 107.0
24034*	MDUME 2	220.00	24095 MMART 22	220.00	1 SINGLE 380	426.8 529.6 118.3
24094*	MMART 4	400.00	24095 MMART 22	220.00	1 SINGLE 380	500.0 538.9 107.8
28040*	RLOTRU2	220.00	28366 RSIBIU2	220.00	1 SINGLE 621	333.4 393.1 112.3



28040*RLOTRU2	220.00	28100	RSIBIU21	220.00	1	SINGLE	622	333.4	393.1	112.3
28040*RLOTRU2	220.00	28366	RSIBIU2	220.00	1	SINGLE	719	333.4	392.9	111.7
28040*RLOTRU2	220.00	28100	RSIBIU21	220.00	1	SINGLE	720	333.4	392.9	111.7
34100*JBGD172	220.00	34111	JBGD8 22	220.00	2	SINGLE	819	445.8	466.9	105.6
34100*JBGD172	220.00	34111	JBGD8 22	220.00	1	SINGLE	820	445.8	466.9	105.6

MONITORED VOLTAGE REPORT:

SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
'HU220	RANGE BASE CASE	24025 MDETK 2	220.00	1.05000	1.05000	0.90000
'HU220	RANGE BASE CASE	24068 MGYOR 2	220.00	1.05179	1.05179	0.90000
'BG400	RANGE SINGLE 80	12473 VMI3 12	400.00	1.05034	1.03261	0.90000
'BG220	RANGE SINGLE 134	12286 VUZUND2	220.00	0.88921	1.01059	0.90000
'BG220	RANGE SINGLE 136	12282 VORFEJ2	220.00	1.10521	1.04449	0.90000
'HU220	RANGE SINGLE 356	24005 MALBF 22	220.00	0.89275	1.04262	0.90000
'HU220	RANGE SINGLE 357	24006 MALBF 21	220.00	0.89461	1.04267	0.90000
'HU220	RANGE SINGLE 367	24095 MMART 22	220.00	1.06732	1.04940	0.90000
'HU220	RANGE SINGLE 368	24096 MMART 21	220.00	1.06728	1.04938	0.90000
'GR400	RANGE SINGLE 499	23126 GKPATC12	400.00	1.05001	1.02511	0.90000
'GR400	RANGE SINGLE 499	23180 GAXELO12	400.00	1.05000	1.02548	0.90000
'RO220	RANGE SINGLE 691	28855 RMOSTI2	220.00	0.82123	1.01427	0.90000
'RS400	RANGE SINGLE 796	34085 JSOMB31	400.00	0.86269	0.98986	0.90000
'RS220	RANGE SINGLE 844	34200 JSABA32	220.00	0.88342	1.01930	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 19	: OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	: OPEN LINE FROM BUS 10010 [AELBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 207	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [OPODG211 400.00] CKT 1
SINGLE 367	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 368	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 379	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 380	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 621	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 719	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 819	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 820	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2

### 13.12.2. Croatian Power System Imports 1000 MW

Table 13.12.9: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of Croatia imports 1000 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1338.3	1491.9	0.0	0.0	0.0	-200.0	46.4	-200.0
AL	476.0	689.7	-199.8	0.0	458.9	27.6	417.4	
20	8805.9	7603.7	0.0	14.4	0.0	1000.3	187.5	1000.0
BG	2904.7	3045.8	-44.9	120.9	2995.9	320.3	2458.5	
30	3149.5	2610.1	0.0	0.0	0.0	490.2	49.2	490.0
BA	729.9	724.5	0.0	0.0	907.6	336.7	576.2	
35	40270.4	49222.0	0.0	1.1	0.0	-9398.0	445.3	-9400.0
IT	7123.8	10816.5	0.0	-156.9	12562.9	-510.9	9538.0	
40	2536.8	3483.0	0.0	0.0	0.0	-999.0	52.8	-1000.0
HR	295.2	1074.2	0.0	0.0	1401.4	10.7	611.7	
45	5392.5	6500.0	0.1	0.0	0.0	-1199.7	92.1	-1200.0
HU	990.9	1926.6	178.2	-29.6	2421.7	120.5	1217.0	
50	10298.1	10371.1	0.0	0.0	0.0	-350.0	277.0	-350.0
GR	2145.3	5312.0	170.2	9.3	6612.9	112.4	3140.6	

55	4990.5	-4593.5	0.0	4.8	0.0	9447.0	132.3	9451.0
UX	463.7	637.5	0.0	12.6	2299.9	256.5	1857.0	
60	1501.7	1577.0	0.0	0.0	0.0	-100.0	24.7	-100.0
MK	453.7	573.6	-31.4	0.0	403.6	49.4	265.6	
65	1207.2	0.0	0.0	0.0	0.0	1200.0	7.2	1200.0
UA	-195.2	0.0	0.0	0.0	653.8	346.3	112.3	
70	10253.1	9416.9	0.0	88.4	0.0	544.6	203.2	545.0
RO	2509.5	4075.6	512.9	273.9	4617.1	-230.1	2494.4	
75	2993.3	2514.0	0.0	8.8	0.0	424.3	46.3	424.0
SI	1021.4	811.0	0.0	53.8	606.2	224.1	538.7	
80	54592.8	54622.1	0.0	0.0	0.0	-800.0	770.8	-800.0
TR	4579.2	7792.0	1175.4	0.0	17195.5	-131.4	12938.7	
90	7713.8	7871.1	0.0	17.8	0.0	-359.7	184.6	-360.0
RS	2627.9	2853.5	0.0	76.6	1729.2	-638.5	2065.6	
91	628.6	805.2	0.5	1.9	0.0	-200.0	20.9	-200.0
ME	299.4	299.2	-35.0	10.9	239.5	62.3	201.4	
95	501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK	-380.3	0.0	0.0	0.0	40.0	-356.0	15.8	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTALS	156173.9	153494.7	0.6	137.2	0.0	0.0	2541.5	0.0
	26045.3	40631.6	1725.6	371.6	55146.2	0.0	38448.9	

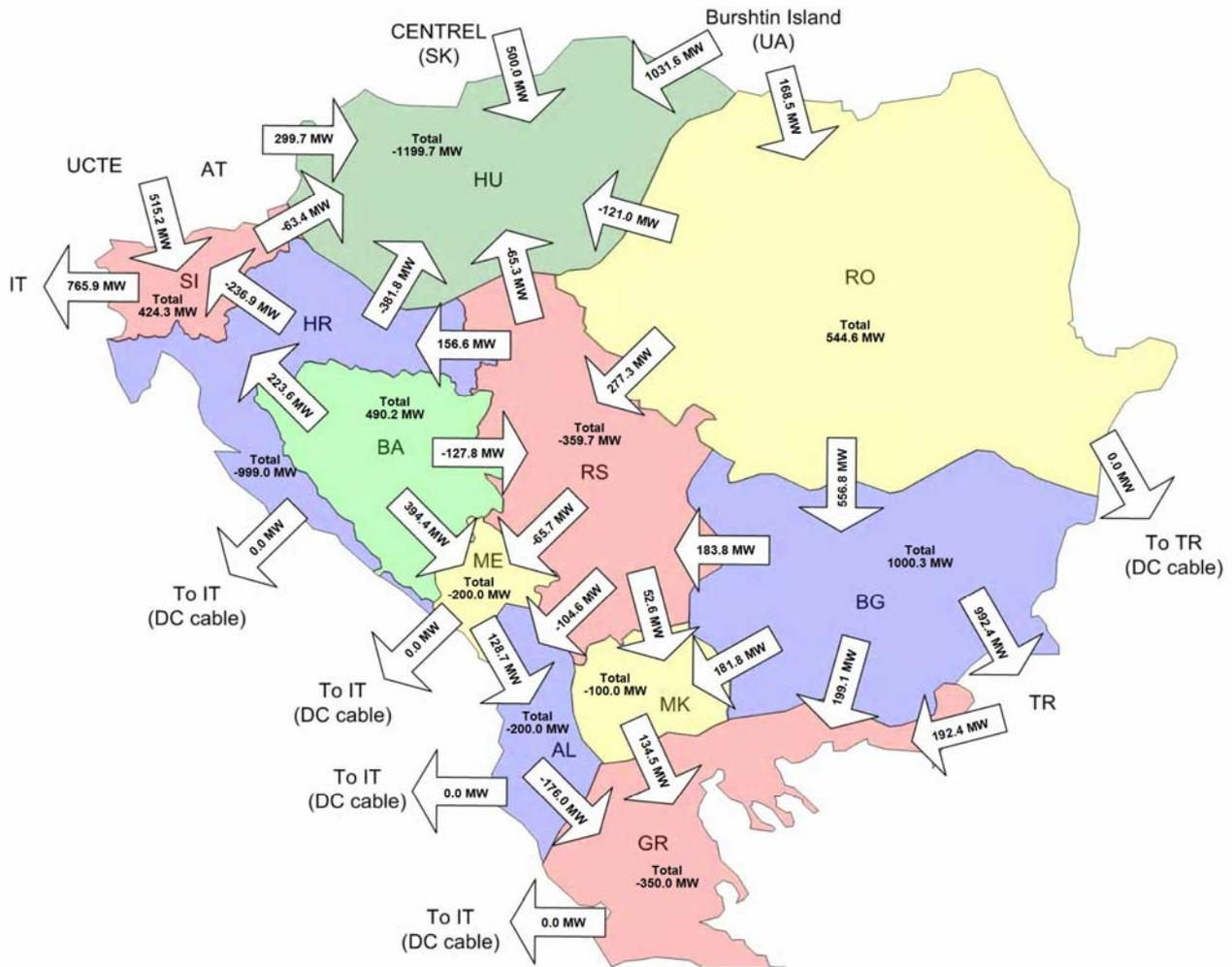


Figure 13.12.3: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of Croatia imports 1000 MW

Table 13.12.10: Changes in power flow in area of SEE in winter maximum 2015, scenario when power system of Croatia imports 1000 MW

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	
9	[XKA_Ma11	400.00]	31420	[LMARIB1	400.00]	1	202.2	-64.5	83.0	-45.4	-119.2	59.0
9	[XKA_Ma11	400.00]	50004	[OKAINA1	400.00]	1	-202.2	64.5	-83.0	45.4	119.2	59.0
71	[XME_Di11	400.00]	20078	[HMELIN11	400.00]	1	-313.9	-27.8	-447.4	-21.4	-133.5	42.5
71	[XME_Di11	400.00]	31410	[LDIVAC1	400.00]	1	313.9	27.8	447.4	21.4	133.5	42.5
80	[XRE_Di11	400.00]	31410	[LDIVAC1	400.00]	1	-577.1	-234.6	-730.1	-211.1	-153.0	26.5
80	[XRE_Di11	400.00]	52189	[IRDPV11	400.00]	1	577.1	234.6	730.1	211.1	153.0	26.5
20082	[HMRAQL21	220.00]	20141	[HTE SI21	220.00]	1	22.6	19.1	-124.6	-2.1	-147.2	650.1
20139	[HTERIJ21	220.00]	20211	[HTERIJG1	20.000]	1	-112.0	-89.3	-230.0	-80.6	-118.0	105.4
20141	[HTE SI21	220.00]	20212	[HTESISG3	15.750]	2	0.0	0.0	-140.0	-90.1	-140.0	999.9
20141	[HTE SI21	220.00]	3WNDTR	[KTEBT1	] WND 1	1	-70.0	-9.0	-210.0	24.7	-140.0	200.0
20238	[HKTESIG1	15.750]	3WNDTR	[KTEBT1	] WND 2	1	0.0	0.0	140.0	8.6	140.0	999.9
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	1	-1072.5	102.9	-880.0	51.8	192.5	17.9
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	2	-1072.5	102.9	-880.0	51.8	192.5	17.9
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	1	-1229.7	124.0	-936.2	78.3	293.5	23.9
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	2	-1229.7	124.0	-936.2	78.3	293.5	23.9
50009	[OWESTT1	400.00]	50024	[OWESTT2	220.00]	1	-253.2	-125.3	-139.5	-130.0	113.7	44.9
50011	[OZELL 1	400.00]	50042	[OZELL 2	220.00]	1	-1090.8	40.6	-609.5	64.7	481.3	44.1
52049	[ICRD1111	400.00]	52265	[IUDOV11	400.00]	1	203.2	-102.4	73.0	-53.7	-130.3	64.1

Table 13.12.11: Changes in power flow greater than 50 MW through tie-lines in area of interest in winter maximum 2015, scenario when power system of Croatia imports 1000 MW

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%	
11	[XMO_Ko11	400.00]	18401	[WMOST41	400.00]	1	-105.4	-30.4	-96.7	-30.9	8.7	8.2	-0.5	1.6
12	[XUG_ER11	400.00]	14402	[WUGLJE1	400.00]	1	2.4	14.8	-18.1	22.0	-20.5	861.7	7.1	47.9

71	[XME_DI11	400.00]	31410	[LDIVAC1	400.00]	1	313.9	27.8	447.4	21.4	133.5	42.5	-6.4	22.9	
72	[XTU_KR11	400.00]	31415	[LKRSK01	400.00]	1	-254.5	11.1	-198.5	13.8	56.0	22.0	2.7	24.5	
73	[XTU_KR12	400.00]	31415	[LKRSK01	400.00]	2	-254.5	11.1	-198.5	13.8	56.0	22.0	2.7	24.5	
74	[XER_SM11	400.00]	34045	[JSMIT21	400.00]	1	-156.6	59.8	-164.9	62.2	-8.2	5.2	2.5	4.1	
110	[XGR_DA21	220.00]	16203	[WGRADC2	220.00]	1	-10.4	-28.1	-11.6	-27.1	-1.2	11.3	1.0	3.7	
111	[XPR_MR21	220.00]	14201	[WPRIJED2	220.00]	1	-9.9	-14.2	-0.8	-12.8	9.0	91.5	1.4	9.7	
112	[XRA_ZA21	220.00]	18200	[WHRAMA2	220.00]	1	-66.5	-8.1	-69.3	-8.7	-2.9	4.3	-0.5	6.6	
113	[XPR_ME21	220.00]	14201	[WPRIJED2	220.00]	1	-36.6	-25.7	21.1	-16.9	57.7	157.6	8.9	34.4	
114	[XTU_DA21	220.00]	16209	[WTETU22	220.00]	1	-65.1	-56.0	-66.3	-54.7	-1.2	1.8	1.3	2.4	
152	[XZE_CI21	220.00]	31220	[LCIRKO2	220.00]	1	-17.6	6.4	9.0	5.0	26.6	151.4	-1.3	20.9	
153	[XPE_DI21	220.00]	31210	[LDIVAC2	220.00]	1	108.6	-3.8	148.6	-7.4	40.0	36.8	-3.6	93.4	
217	[XER_PE11	400.00]	24141	[MPECS 4	400.00]	1	-130.6	15.1	-101.0	15.5	29.6	22.6	0.4	3.0	
218	[XER_PE12	400.00]	24141	[MPECS 4	400.00]	2	-130.6	15.1	-101.0	15.5	29.6	22.6	0.4	3.0	
502	[XCI_PI12	400.00]	204	[XZE_HE11	400.00]	1	98.3	-1.6	27.5	-1.4	-70.8	72.0	0.2	13.0	
502	[XCI_PI12	400.00]	31435	[LCIRKO11	400.00]	B	-98.3	1.6	-27.5	1.4	70.8	72.0	-0.2	13.0	
20003	[HBILIC21	220.00]	20002	[HBILIC51	110.00]	1	53.0	24.8	52.4	24.7	-0.6	1.1	-0.2	0.6	
20003	[HBILIC21	220.00]	20002	[HBILIC51	110.00]	2	53.0	24.8	52.4	24.7	-0.6	1.1	-0.2	0.6	
20003	[HBILIC21	220.00]	20002	[HBILIC51	110.00]	3	53.0	24.8	52.4	24.7	-0.6	1.1	-0.2	0.6	
20020	[HDAKOV21	220.00]	20018	[HDAKOV51	110.00]	1	37.7	44.2	38.9	43.0	1.2	3.1	-1.2	2.7	
20020	[HDAKOV21	220.00]	20018	[HDAKOV51	110.00]	2	37.7	44.2	38.9	43.0	1.2	3.1	-1.2	2.7	
20030	[HERNES11	400.00]	20029	[HERNESS1	110.00]	1	81.5	25.1	73.6	24.4	-8.0	9.8	-0.6	2.5	
20030	[HERNES11	400.00]	20029	[HERNESS1	110.00]	2	81.5	25.1	73.6	24.4	-8.0	9.8	-0.6	2.5	
20030	[HERNES11	400.00]	20029	[HERNESS1	110.00]	3	81.5	25.1	73.6	24.4	-8.0	9.8	-0.6	2.5	
20045	[HE_SENJ	220.00]	20044	[HESENJ	110.00]	1	-19.9	7.5	-16.3	9.9	3.6	18.2	2.4	31.9	
20059	[HKONJS21	220.00]	20058	[HKONJS51	110.00]	1	49.2	31.4	48.9	31.5	-0.3	0.6	0.0	0.1	
20059	[HKONJS21	220.00]	20058	[HKONJS51	110.00]	2	49.2	31.4	48.9	31.5	-0.3	0.6	0.0	0.1	
20075	[HMEDUR21	220.00]	20074	[HMEDUR51	110.00]	1	53.6	29.8	70.6	32.3	17.0	31.8	2.5	8.6	
20077	[HMELIN21	220.00]	20076	[HMELIN51	110.00]	1	63.3	26.8	63.7	26.4	0.4	0.6	-0.4	1.5	
20077	[HMELIN21	220.00]	20076	[HMELIN51	110.00]	2	63.3	26.8	63.7	26.4	0.4	0.6	-0.4	1.5	
20082	[HMRACL21	220.00]	20081	[HMRACL51	110.00]	1	48.4	35.2	56.7	39.2	8.3	17.1	4.0	11.3	
20082	[HMRACL21	220.00]	20081	[HMRACL51	110.00]	2	49.3	35.9	57.8	39.9	8.4	17.1	4.1	11.3	
20082	[HMRACL21	220.00]	20081	[HMRACL51	110.00]	3	49.3	35.9	57.8	39.9	8.4	17.1	4.1	11.3	
20101	[HPEHLI21	220.00]	20100	[HPEHLI51	110.00]	1	62.2	31.4	62.3	30.8	0.2	0.2	-0.6	1.8	
20101	[HPEHLI21	220.00]	20100	[HPEHLI51	110.00]	2	62.2	31.4	62.3	30.8	0.2	0.2	-0.6	1.8	
20104	[HPLAT_21	220.00]	118	[XTR_PL21	220.00]	1	52.2	-37.2	54.7	-37.2	2.5	4.7	0.0	0.1	
20104	[HPLAT_21	220.00]	119	[XTR_PL22	220.00]	2	52.2	-37.2	54.7	-37.2	2.5	4.7	0.0	0.1	
20104	[HPLAT_21	220.00]	20103	[HPLAT_51	110.00]	1	-14.3	62.2	-14.4	62.2	-0.1	0.5	0.0	0.0	
20120	[HOBROV11	400.00]	20119	[HRHEOB51	110.00]	1	100.2	12.0	97.2	10.7	-3.1	3.0	-1.3	11.1	
20120	[HOBROV11	400.00]	20208	[HRHEOBG1	15.750]	1	-67.8	30.7	-106.9	34.5	-39.1	57.6	3.8	12.4	
20138	[HTEPLO21	220.00]	20137	[HTEPLO51	110.00]	1	67.3	-18.1	70.3	-18.3	3.0	4.5	-0.2	1.4	
20138	[HTEPLO21	220.00]	20137	[HTEPLO51	110.00]	2	67.3	-18.1	70.3	-18.3	3.0	4.5	-0.2	1.4	
20139	[HTERIJ21	220.00]	20211	[HTERIJG1	20.000]	1	-112.0	-89.2	-230.0	-80.6	-118.0	105.4	8.6	9.7	
20141	[HTE_SI21	220.00]	20140	[HTESIS51	110.00]	1	75.5	39.8	132.1	56.7	56.6	75.0	16.9	42.5	
20141	[HTE_SI21	220.00]	20212	[HTESISG3	15.750]	2	0.0	0.0	-140.0	-90.1	-140.0	999.9	-90.1	999.9	
20141	[HTE_SI21	220.00]	3WNDR	[KTEBT1	]	WND 1	1	-70.0	-9.0	-210.0	24.7	-140.0	200.9	33.7	374.0
20147	[HTUMBR11	400.00]	20146	[HTUMBR51	110.00]	1	130.9	28.6	93.1	26.6	-37.8	28.9	-1.9	6.8	
20147	[HTUMBR11	400.00]	20146	[HTUMBR51	110.00]	2	130.9	28.6	93.1	26.6	-37.8	28.9	-1.9	6.8	
20147	[HTUMBR11	400.00]	20146	[HTUMBR51	110.00]	3	136.1	29.7	96.8	27.7	-39.3	28.9	-2.0	6.8	
20166	[HZERJA11	400.00]	204	[XZE_HE11	400.00]	1	-98.1	-55.8	-27.5	-58.1	70.7	72.0	-2.3	4.1	
20166	[HZERJA11	400.00]	205	[XZE_HE12	400.00]	2	-120.4	-63.4	-69.3	-61.8	51.2	42.5	1.6	2.5	
20166	[HZERJA11	400.00]	20169	[HZERJA51	110.00]	1	147.7	43.3	110.8	42.8	-37.0	25.0	-0.6	1.3	
20166	[HZERJA11	400.00]	20169	[HZERJA51	110.00]	2	147.7	43.3	110.8	42.8	-37.0	25.0	-0.6	1.3	
20246	[HVODNJ21	220.00]	20156	[HVODNJ51	110.00]	1	51.1	21.7	52.7	21.5	1.7	3.3	-0.3	1.2	
20246	[HVODNJ21	220.00]	20156	[HVODNJ51	110.00]	2	51.1	21.7	52.7	21.5	1.7	3.3	-0.3	1.2	
20247	[HVRBO221	220.00]	20157	[HVRBOR51	110.00]	1	65.5	48.0	65.4	48.1	-0.1	0.1	0.2	0.4	
20247	[HVRBO221	220.00]	20157	[HVRBOR51	110.00]	2	65.5	48.0	65.4	48.1	-0.1	0.1	0.2	0.4	
20460	[HIMOTS2	220.00]	20161	[HIMOTS51	110.00]	1	60.4	27.7	60.1	27.8	-0.3	0.5	0.1	0.5	

Table 13.12.12: Results of contingency (n-1) analysis in winter maximum 2015, scenario when power system of Croatia imports 1000 MW

MONITORED BRANCH	CONTINGENCY	RATING	FLOW	%			
316*XTR_HN51	110.00 36050 OHNOVI51 110.00 1 SINGLE 196	89.6	91.9	104.1			
24034*MDUME 2	220.00 24095 MMART 22 220.00 1 SINGLE 345	426.8	449.4	100.4			
24034*MDUME 2	220.00 24095 MMART 22 220.00 1 SINGLE 357	426.8	449.5	100.4			
31210*LDIVAC2	220.00 156 XPA_DI21 220.00 1 SINGLE 707	320.1	445.9	134.4			
<b>MONITORED VOLTAGE REPORT:</b>							
SYSTEM	CONTINGENCY	BUSS	V-CONT	V-INIT	V-MAX	V-MIN	
'HU220	RANGE BASE CASE	24025 MDETK 2	220.00	1.05000	1.05000	1.05000	0.90000
'HU220	RANGE BASE CASE	24068 MGYOR 2	220.00	1.05562	1.05562	1.05000	0.90000
'HU220	RANGE BASE CASE	24095 MMART 22	220.00	1.05068	1.05068	1.05000	0.90000
'HU220	RANGE BASE CASE	24096 MMART 21	220.00	1.05064	1.05064	1.05000	0.90000
'BG220	RANGE SINGLE 100	12252 VOCHIF2	220.00	0.81882	0.95873	1.10000	0.90000
'BG220	RANGE SINGLE 124	12286 VUZUND2	220.00	0.89592	1.00461	1.10000	0.90000
'GR400	RANGE SINGLE 432	22759 GTH_AG11	400.00	1.05202	1.02528	1.05000	0.90000
'GR400	RANGE SINGLE 432	23123 GKPATR11	400.00	1.05217	1.03822	1.05000	0.90000
'GR400	RANGE SINGLE 432	23125 GKPATC11	400.00	1.05226	1.03819	1.05000	0.90000
'GR400	RANGE SINGLE 432	23126 GKPATC12	400.00	1.05220	1.03831	1.05000	0.90000
'GR400	RANGE SINGLE 432	23173 GDISTO11	400.00	1.05310	1.03795	1.05000	0.90000
'GR400	RANGE SINGLE 432	23174 GDISTO12	400.00	1.05272	1.03808	1.05000	0.90000
'GR400	RANGE SINGLE 432	23180 GAXELO12	400.00	1.05238	1.03876	1.05000	0.90000
'GR400	RANGE SINGLE 432	23181 GAXELO11	400.00	1.05234	1.03897	1.05000	0.90000
'GR400	RANGE SINGLE 433	23064 GK_MEG13	400.00	1.05388	1.04119	1.05000	0.90000
'GR400	RANGE SINGLE 433	23066 GK_MEG11	400.00	1.05388	1.04119	1.05000	0.90000
'GR400	RANGE SINGLE 433	23123 GKPATR11	400.00	1.05331	1.03822	1.05000	0.90000
'GR400	RANGE SINGLE 433	23125 GKPATC11	400.00	1.05340	1.03819	1.05000	0.90000

'GR400	'	RANGE SINGLE	433	23126	GKPATC12	400.00	1.05335	1.03831	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23173	GDISTO11	400.00	1.05403	1.03795	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23174	GDISTO12	400.00	1.05385	1.03808	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23180	GAXELO12	400.00	1.05353	1.03876	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23181	GAXELO11	400.00	1.05359	1.03897	1.05000	0.90000
'GR400	'	RANGE SINGLE	462	23036	GK_KOR13	400.00	1.06328	1.01751	1.05000	0.90000
'GR400	'	RANGE SINGLE	462	23068	GK_MEG14	400.00	1.06088	1.02953	1.05000	0.90000
'GR400	'	RANGE SINGLE	463	23037	GK_KOR14	400.00	1.06328	1.01751	1.05000	0.90000
'GR400	'	RANGE SINGLE	463	23067	GK_MEG12	400.00	1.06088	1.02953	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23126	GKPATC12	400.00	1.06903	1.03831	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23180	GAXELO12	400.00	1.06903	1.03876	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23181	GAXELO11	400.00	1.06883	1.03897	1.05000	0.90000
'GR400	'	RANGE SINGLE	475	23180	GAXELO12	400.00	1.06847	1.03876	1.05000	0.90000
'GR400	'	RANGE SINGLE	475	23181	GAXELO11	400.00	1.06829	1.03897	1.05000	0.90000
'RO220	'	RANGE SINGLE	567	28043	RSTUPA2	220.00	0.89307	0.98043	1.10000	0.90000
'RO220	'	RANGE SINGLE	637	28855	RMOSTI2	220.00	0.88213	1.04055	1.10000	0.90000
'RO220	'	RANGE SINGLE	642	28907	RSTILP2	220.00	0.84377	0.98220	1.10000	0.90000
'RO220	'	RANGE SINGLE	670	28095	RVETIS2	220.00	0.89840	1.02196	1.10000	0.90000
'RS400	'	RANGE SINGLE	739	34085	JSOMB31	400.00	0.87971	0.99510	1.05000	0.90000

CONTINGENCY LEGEND:  
 LABEL                      EVENTS

SINGLE 196 : OPEN LINE FROM BUS 13 [XTR\_PG11      400.00] TO BUS 36005 [0PODG211      400.00] CKT 1  
 SINGLE 345 : OPEN LINE FROM BUS 24034 [MDUME 2      220.00] TO BUS 24096 [MMART 21      220.00] CKT 1  
 SINGLE 357 : OPEN LINE FROM BUS 24094 [MMART 4      400.00] TO BUS 24096 [MMART 21      220.00] CKT 1  
 SINGLE 707 : OPEN LINE FROM BUS 31410 [LDIVAC1      400.00] TO BUS 80 [XRE\_DI11      400.00] CKT 1

Table 13.12.13: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of Croatia imports 1000 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1622.1	1723.7	0.0	0.0	0.0	-150.0	48.3	-150.0
AL	668.4	779.7	-204.7	0.0	475.2	99.8	468.8	
20	9659.9	8411.0	0.0	15.5	0.0	1000.0	233.4	1000.0
BG	3519.1	3357.9	0.0	181.2	3279.7	197.9	3061.7	
30	2949.9	2897.8	0.0	0.0	0.0	0.0	52.0	0.0
BA	1003.0	1017.2	0.0	0.0	913.7	241.7	657.9	
35	45061.4	54409.8	0.0	1.1	0.0	-9740.0	390.6	-9740.0
IT	9595.0	11942.3	0.0	147.8	12393.6	-804.6	10703.3	
40	3428.0	4359.0	0.0	0.0	0.0	-1000.0	69.0	-1000.0
HR	505.6	1075.9	0.0	0.0	1534.6	202.9	761.4	
45	6093.4	7180.0	0.1	0.0	0.0	-1200.0	113.2	-1200.0
HU	1356.1	2128.1	178.6	-29.1	2405.1	0.8	1482.8	
50	11750.1	11426.0	0.0	0.0	0.0	0.0	324.0	0.0
GR	3126.0	5724.7	203.7	9.4	6663.2	125.5	3712.1	
55	5226.8	-4356.2	0.0	4.8	0.0	9449.7	128.4	9450.0
UX	352.8	622.8	0.0	12.7	2300.4	337.5	1680.1	
60	1940.2	2001.9	0.0	0.0	0.0	-100.0	38.2	-100.0
MK	762.7	752.3	-30.9	0.0	397.7	11.4	426.4	
65	1207.6	0.0	0.0	0.0	0.0	1200.0	7.6	1200.0
UA	-165.4	0.0	0.0	0.0	652.3	365.5	121.5	
70	13261.1	12110.2	0.0	90.2	0.0	800.1	260.6	800.0
RO	3117.7	4455.6	783.3	285.8	5601.8	-27.4	3222.1	

75	3949.8	2990.0	0.0	8.9	0.0	890.0	60.9	890.0
SI	1233.4	964.6	0.0	53.8	868.3	338.5	744.8	
80	77661.6	77342.9	0.0	0.0	0.0	-800.0	1118.7	-800.0
TR	9834.4	11034.0	996.9	0.0	22660.7	-171.2	20635.5	
90	7767.9	8298.8	0.0	17.3	0.0	-749.9	201.8	-750.0
RS	2892.7	2986.6	0.0	73.4	1732.0	-666.7	2231.4	
91	864.5	938.0	0.5	2.1	0.0	-100.0	23.9	-100.0
ME	349.8	346.6	-34.6	11.4	237.2	51.5	212.0	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-328.1	0.0	0.0	0.0	40.0	-303.0	14.8	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTALS	192945.3	189732.9	0.6	139.9	0.0	0.0	3071.8	0.0
	37823.0	47188.4	1892.4	746.3	62155.4	0.0	50136.6	

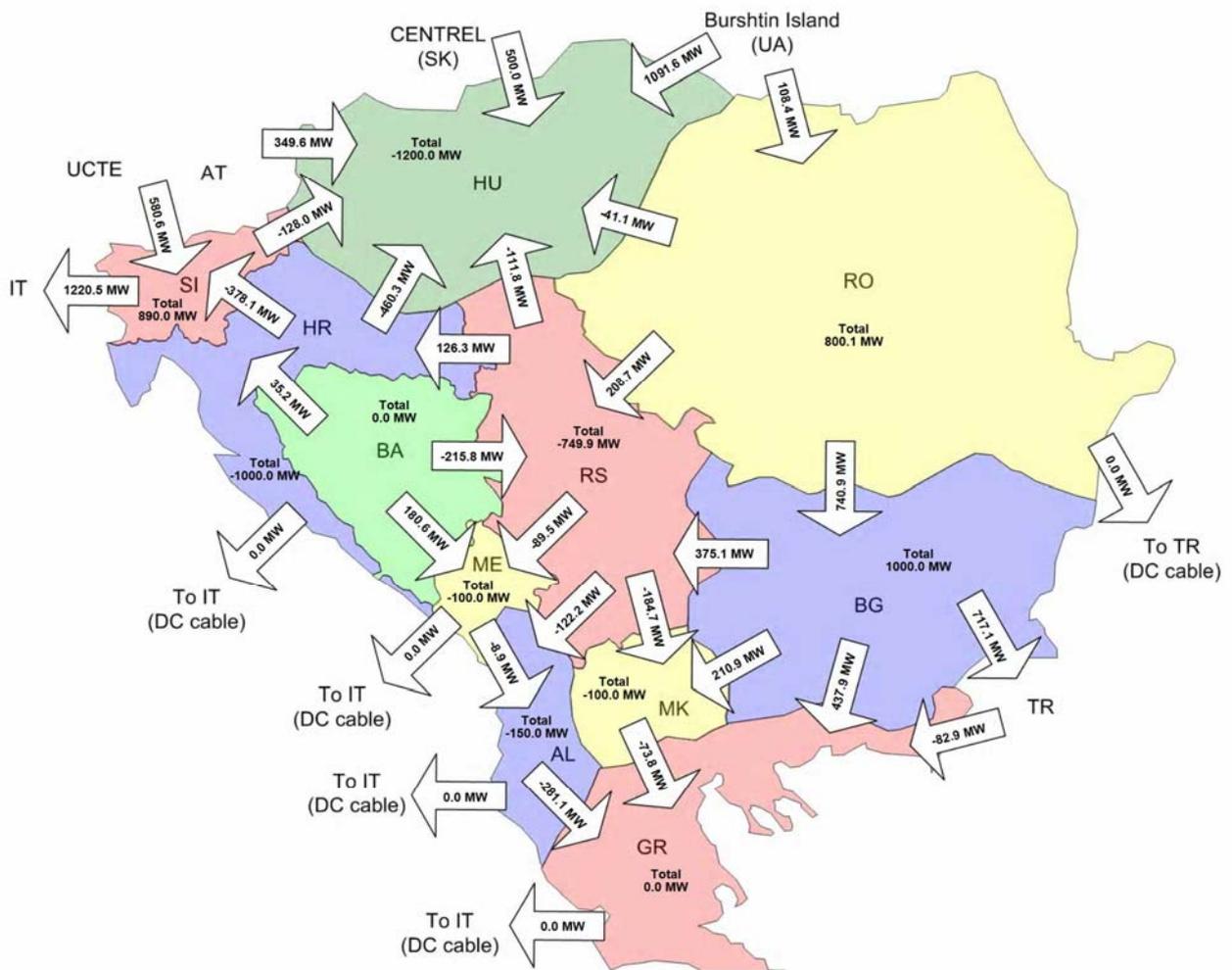


Figure 13.12.4: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of Croatia imports 1000 MW

Table 13.12.14: Changes in power flow in area of SEE in winter maximum 2020, scenario when power system of Croatia imports 1000 MW

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
--------	----------	--------	--------	--------	--------	-----	----	------	----	------	----------	---

Table 13.12.15: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of Croatia imports 1000 MW

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%
10010*	AELBS22	220.00	10125 ACEKIN2	220.00	1 SINGLE 19	370.0 386.3 102.9
10009*	AELBS12	220.00	10125 ACEKIN2	220.00	1 SINGLE 22	370.0 384.2 102.6
316	XTR_HN51	110.00	36050*OHNOVI51	110.00	1 SINGLE 207	89.6 95.9 108.3
24034*	MDUME 2	220.00	24096 MMART 21	220.00	1 SINGLE 367	426.8 517.4 115.6
24094*	MMART 4	400.00	24096 MMART 21	220.00	1 SINGLE 367	500.0 526.6 105.3
24034*	MDUME 2	220.00	24095 MMART 22	220.00	1 SINGLE 368	426.8 521.1 116.4
24094*	MMART 4	400.00	24095 MMART 22	220.00	1 SINGLE 368	500.0 530.3 106.1
24034*	MDUME 2	220.00	24096 MMART 21	220.00	1 SINGLE 379	426.8 517.6 115.6
24094*	MMART 4	400.00	24096 MMART 21	220.00	1 SINGLE 379	500.0 526.8 105.4
24034*	MDUME 2	220.00	24095 MMART 22	220.00	1 SINGLE 380	426.8 521.3 116.4
24094*	MMART 4	400.00	24095 MMART 22	220.00	1 SINGLE 380	500.0 530.6 106.1
28040*	RLOTRU2	220.00	28366 RSIBIU2	220.00	1 SINGLE 621	333.4 393.1 112.2
28040*	RLOTRU2	220.00	28100 RSIBIU21	220.00	1 SINGLE 622	333.4 393.1 112.2
28040*	RLOTRU2	220.00	28366 RSIBIU2	220.00	1 SINGLE 719	333.4 392.8 111.6
28040*	RLOTRU2	220.00	28100 RSIBIU21	220.00	1 SINGLE 720	333.4 392.8 111.6



34100*JBGD172	220.00	34111	JBGD8	22	220.00	2	SINGLE	819	445.8	466.9	105.6
34100*JBGD172	220.00	34111	JBGD8	22	220.00	1	SINGLE	820	445.8	466.9	105.6

MONITORED VOLTAGE REPORT:

SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
'HU220	' RANGE BASE CASE	24025 MDETK 2	220.00	1.05000	1.05000	0.90000
'BG400	' RANGE SINGLE 80	12473 VMI3 12	400.00	1.05025	1.03248	0.90000
'BG220	' RANGE SINGLE 134	12286 VUZUND2	220.00	0.88899	1.01045	0.90000
'BG220	' RANGE SINGLE 136	12282 VORFEJ2	220.00	1.10518	1.04424	0.90000
'HU220	' RANGE SINGLE 356	24005 MALBF 22	220.00	0.89275	1.04262	0.90000
'HU220	' RANGE SINGLE 357	24006 MALBF 21	220.00	0.89461	1.04267	0.90000
'HU220	' RANGE SINGLE 367	24095 MMART 22	220.00	1.06765	1.04951	0.90000
'HU220	' RANGE SINGLE 368	24096 MMART 21	220.00	1.06760	1.04949	0.90000
'RO220	' RANGE SINGLE 691	28855 RMOSTI2	220.00	0.82144	1.01447	0.90000
'RS400	' RANGE SINGLE 796	34085 JSOMB31	400.00	0.86319	0.99028	0.90000
'RS220	' RANGE SINGLE 844	34200 JSABA32	220.00	0.88362	1.01945	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 19	: OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	: OPEN LINE FROM BUS 10010 [AELBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 207	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [OPODG211 400.00] CKT 1
SINGLE 367	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 368	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 379	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 380	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 621	: OPEN LINE FROM BUS 28040 [RLOTU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	: OPEN LINE FROM BUS 28040 [RLOTU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 719	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 819	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 820	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2

## 13.13. Macedonian Power Balance Uncertainty

### 13.13.1. Macedonian Power System Is Self-Balanced

Table 13.13.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of Macedonia is self-balanced

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1338.2	1491.9	0.0	0.0	0.0	-200.0	46.4	-200.0
AL	473.9	689.7	-199.9	0.0	459.2	26.4	416.9	
20	8804.2	7603.7	0.0	14.4	0.0	999.8	186.2	1000.0
BG	2893.0	3045.8	-44.9	121.0	2997.2	323.1	2445.3	
30	3147.5	2610.1	0.0	0.0	0.0	490.0	47.3	490.0
BA	697.0	724.5	0.0	0.0	911.2	321.3	562.4	
35	40264.5	49222.0	0.0	1.1	0.0	-9400.1	441.5	-9400.0
IT	7031.8	10816.5	0.0	-157.0	12570.8	-543.8	9486.9	
40	3100.4	3483.0	0.0	0.0	0.0	-434.9	52.3	-435.0
HR	362.7	1074.2	0.0	0.0	1408.1	15.7	681.0	
45	5391.9	6500.0	0.1	0.0	0.0	-1200.0	91.7	-1200.0
HU	964.1	1926.6	178.2	-29.6	2423.7	97.4	1215.3	
50	10298.3	10371.1	0.0	0.0	0.0	-349.9	277.2	-350.0
GR	2146.4	5312.0	170.2	9.3	6612.9	111.3	3142.6	
55	4293.3	-4593.5	0.0	4.8	0.0	8785.9	96.1	8786.0
UX	-60.4	637.5	0.0	12.8	2323.1	400.0	1212.4	
60	1604.0	1577.0	0.0	0.0	0.0	0.2	26.8	0.0
MK	463.0	573.6	-31.3	0.0	403.5	35.1	289.1	
65	1207.1	0.0	0.0	0.0	0.0	1200.0	7.1	1200.0
UA	-196.8	0.0	0.0	0.0	653.8	345.5	111.5	
70	10254.9	9416.9	0.0	88.3	0.0	545.1	204.5	545.0
RO	2513.1	4075.6	512.8	273.8	4616.3	-239.5	2506.6	
75	2994.7	2514.0	0.0	8.8	0.0	424.1	47.8	424.0
SI	983.7	811.0	0.0	54.0	608.3	175.4	551.6	
80	54592.5	54622.1	0.0	0.0	0.0	-800.0	770.6	-800.0
TR	4575.9	7792.0	1175.4	0.0	17195.6	-132.0	12936.1	
90	7712.3	7871.1	0.0	17.8	0.0	-360.1	183.5	-360.0
RS	2615.3	2853.5	0.0	76.6	1730.4	-638.4	2054.0	
91	628.0	805.2	0.5	1.9	0.0	-200.1	20.4	-200.0
ME	295.5	299.2	-35.1	10.9	239.8	62.8	197.4	
95	501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK	-384.7	0.0	0.0	0.0	40.0	-360.5	15.9	
TOTALS	156133.3	153494.7	0.6	137.2	0.0	0.0	2500.8	0.0
	25373.5	40631.6	1725.4	371.9	55194.0	0.0	37824.9	



Figure 13.13.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of Macedonia is self-balanced

Table 13.13.2: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2015, scenario when power system of Macedonia is self-balanced

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I
***** NONE *****									

Table 13.13.3: Changes in power flow greater than 50 MW in area of SEE in winter maximum 2015, scenario when power system of Macedonia is self-balanced

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 50.0 MW:												
IN WORKING CASE					IN BASE CASE							
X-----	FROM BUS	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	1	-885.7	71.5	-936.2	78.3	-50.5	5.7
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	2	-885.7	71.5	-936.2	78.3	-50.5	5.7
50011	[OZELL 1	400.00]	50042	[OZELL 2	220.00]	1	-526.8	68.5	-609.5	64.7	-82.7	15.7



Table 13.13.4: Changes in power flow through tie-lines connecting Macedonia to the rest of the system, in winter maximum 2015, scenario when power system of Macedonia is self-balanced

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:												
IN WORKING CASE			IN BASE CASE									
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
69	[XTH_DU11	400.00]	22347	[GKYT_T11	400.00]	1	136.7	22.4	129.0	23.2	-7.6	5.6
81	[XSK_KB11	400.00]	34072	[JKURO21	400.00]	1	25.0	23.5	-10.6	28.8	-35.6	142.1
206	[XFL_BI11	400.00]	22559	[GAHS_F11	400.00]	1	31.6	-44.3	5.6	-40.9	-26.0	82.2
208	[XST_NI11	400.00]	34087	[JVRAN31	400.00]	1	-30.2	34.6	-45.3	37.1	-15.1	49.8
26112	[YSTIP 1	400.00]	207	[XCM_ST11	400.00]	1	-162.6	-37.2	-178.4	-34.3	-15.8	9.7

Table 13.13.5: Results of contingency (n-1) analysis in winter maximum 2015, scenario when power system of Macedonia is self-balanced

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%				
316	XTR_HN51	110.00	36050 OHNOVI51	110.00	1	SINGLE	196	89.6	91.2	103.2
24034	MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE	344	426.8	450.7	100.7
24034	MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE	345	426.8	454.1	101.4
24034	MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE	356	426.8	450.9	100.7
24034	MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE	357	426.8	454.2	101.5
31210	LDIVAC2	220.00	156 XPA_DI21	220.00	1	SINGLE	707	320.1	565.1	171.0

MONITORED VOLTAGE REPORT:										
SYSTEM	CONTINGENCY	<-----	B U S	----->	V-CONT	V-INIT	V-MAX	V-MIN		
'BG220	'	RANGE SINGLE 100	12252	VOCHIF2	220.00	0.81898	0.95885	1.10000	0.90000	
'BG220	'	RANGE SINGLE 124	12286	VUZUND2	220.00	0.89604	1.00474	1.10000	0.90000	
'GR400	'	RANGE SINGLE 432	22759	GTH_AG11	400.00	1.05201	1.02527	1.05000	0.90000	
'GR400	'	RANGE SINGLE 432	23123	GKPATR11	400.00	1.05216	1.03820	1.05000	0.90000	
'GR400	'	RANGE SINGLE 432	23125	GKPATC11	400.00	1.05225	1.03818	1.05000	0.90000	
'GR400	'	RANGE SINGLE 432	23126	GKPATC12	400.00	1.05219	1.03829	1.05000	0.90000	
'GR400	'	RANGE SINGLE 432	23173	GDISTO11	400.00	1.05309	1.03793	1.05000	0.90000	
'GR400	'	RANGE SINGLE 432	23174	GDISTO12	400.00	1.05271	1.03807	1.05000	0.90000	
'GR400	'	RANGE SINGLE 432	23180	GAXELO12	400.00	1.05237	1.03874	1.05000	0.90000	
'GR400	'	RANGE SINGLE 432	23181	GAXELO11	400.00	1.05233	1.03896	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23064	GK_MEG13	400.00	1.05386	1.04117	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23066	GK_MEG11	400.00	1.05386	1.04117	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23123	GKPATR11	400.00	1.05330	1.03820	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23125	GKPATC11	400.00	1.05339	1.03818	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23126	GKPATC12	400.00	1.05333	1.03829	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23173	GDISTO11	400.00	1.05402	1.03793	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23174	GDISTO12	400.00	1.05384	1.03807	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23180	GAXELO12	400.00	1.05351	1.03874	1.05000	0.90000	
'GR400	'	RANGE SINGLE 433	23181	GAXELO11	400.00	1.05357	1.03896	1.05000	0.90000	
'GR400	'	RANGE SINGLE 462	23036	GK_KOR13	400.00	1.06327	1.01750	1.05000	0.90000	
'GR400	'	RANGE SINGLE 462	23068	GK_MEG14	400.00	1.06087	1.02952	1.05000	0.90000	
'GR400	'	RANGE SINGLE 463	23037	GK_KOR14	400.00	1.06327	1.01750	1.05000	0.90000	
'GR400	'	RANGE SINGLE 463	23067	GK_MEG12	400.00	1.06087	1.02952	1.05000	0.90000	
'GR400	'	RANGE SINGLE 473	23126	GKPATC12	400.00	1.06901	1.03829	1.05000	0.90000	
'GR400	'	RANGE SINGLE 473	23180	GAXELO12	400.00	1.06901	1.03874	1.05000	0.90000	
'GR400	'	RANGE SINGLE 473	23181	GAXELO11	400.00	1.06881	1.03896	1.05000	0.90000	
'GR400	'	RANGE SINGLE 475	23180	GAXELO12	400.00	1.06845	1.03874	1.05000	0.90000	
'GR400	'	RANGE SINGLE 475	23181	GAXELO11	400.00	1.06827	1.03896	1.05000	0.90000	
'RO220	'	RANGE SINGLE 567	28043	RSTUPA2	220.00	0.89279	0.98021	1.10000	0.90000	
'RO220	'	RANGE SINGLE 637	28855	RMOSTI2	220.00	0.88221	1.04047	1.10000	0.90000	
'RO220	'	RANGE SINGLE 642	28907	RSTILP2	220.00	0.84364	0.98211	1.10000	0.90000	
'RO220	'	RANGE SINGLE 670	28095	RVETIS2	220.00	0.89848	1.02188	1.10000	0.90000	
'RS400	'	RANGE SINGLE 739	34085	JSOMB31	400.00	0.87962	0.99500	1.05000	0.90000	

CONTINGENCY LEGEND:											
LABEL	EVENTS										
SINGLE 100	: OPEN LINE FROM BUS 12250 [VGORIA2	220.00]	TO BUS 12252 [VOCHIF2	220.00]	CKT	1					
SINGLE 124	: OPEN LINE FROM BUS 12275 [VMI3 2	220.00]	TO BUS 12286 [VUZUND2	220.00]	CKT	1					
SINGLE 196	: OPEN LINE FROM BUS 13 [XTR_PG11	400.00]	TO BUS 36005 [OPODG211	400.00]	CKT	1					
SINGLE 344	: OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT	1					
SINGLE 345	: OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT	1					
SINGLE 356	: OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT	1					
SINGLE 357	: OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT	1					
SINGLE 432	: OPEN LINE FROM BUS 22759 [GTH_AG11	400.00]	TO BUS 23172 [GDISTO13	400.00]	CKT	1					
SINGLE 433	: OPEN LINE FROM BUS 22759 [GTH_AG11	400.00]	TO BUS 23173 [GDISTO11	400.00]	CKT	1					
SINGLE 462	: OPEN LINE FROM BUS 23033 [GKYT_K11	400.00]	TO BUS 23036 [GK_KOR13	400.00]	CKT	1					

SINGLE 463	:	OPEN LINE FROM BUS 23033 [GKYT_K11	400.00]	TO BUS 23037 [GK_KOR14	400.00]	CKT 1
SINGLE 473	:	OPEN LINE FROM BUS 23123 [GKPATR11	400.00]	TO BUS 23126 [GKPATC12	400.00]	CKT 1
SINGLE 475	:	OPEN LINE FROM BUS 23126 [GKPATC12	400.00]	TO BUS 23180 [GAXELO12	400.00]	CKT 1
SINGLE 670	:	OPEN LINE FROM BUS 28039 [RROSIO1	400.00]	TO BUS 28094 [RROSIO2	220.00]	CKT 1
SINGLE 707	:	OPEN LINE FROM BUS 31410 [LDIVAC1	400.00]	TO BUS 80 [XRE_DI11	400.00]	CKT 1
SINGLE 739	:	OPEN LINE FROM BUS 34050 [JSUBO31	400.00]	TO BUS 34085 [JSOMB31	400.00]	CKT 1

Table 13.13.6: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of Macedonia is self-balanced

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1622.2	1723.7	0.0	0.0	0.0	-150.0	48.5	-150.0
AL	667.7	779.7	-204.7	0.0	475.3	98.0	469.9	
20	9658.8	8411.0	0.0	15.5	0.0	1000.0	232.2	1000.0
BG	3508.5	3357.9	0.0	181.2	3280.9	200.8	3049.5	
30	2950.2	2897.8	0.0	0.0	0.0	0.0	52.3	0.0
BA	1003.6	1017.2	0.0	0.0	913.6	240.0	660.1	
35	45060.9	54409.8	0.0	1.1	0.0	-9740.0	390.0	-9740.0
IT	9583.1	11942.3	0.0	147.8	12394.6	-807.9	10695.5	
40	3428.6	4359.0	0.0	0.0	0.0	-999.9	69.6	-1000.0
HR	507.7	1075.9	0.0	0.0	1534.3	199.8	766.3	
45	6093.5	7180.0	0.1	0.0	0.0	-1200.0	113.4	-1200.0
HU	1358.2	2128.1	178.6	-29.1	2405.1	0.9	1484.8	
50	11749.9	11426.0	0.0	0.0	0.0	0.0	323.9	0.0
GR	3121.8	5724.7	203.7	9.4	6663.8	122.9	3711.2	
55	5121.6	-4356.2	0.0	4.8	0.0	9349.7	123.3	9350.0
UX	290.9	622.8	0.0	12.7	2303.5	360.9	1598.0	
60	2040.4	2001.9	0.0	0.0	0.0	0.0	38.4	0.0
MK	762.8	752.3	-30.9	0.0	398.0	5.4	432.7	
65	1207.5	0.0	0.0	0.0	0.0	1200.0	7.5	1200.0
UA	-165.1	0.0	0.0	0.0	652.3	366.1	121.2	
70	13262.8	12110.2	0.0	90.2	0.0	800.1	262.3	800.0
RO	3125.6	4455.6	783.1	285.7	5600.3	-36.2	3237.6	
75	3949.9	2990.0	0.0	8.9	0.0	890.0	61.0	890.0
SI	1231.9	964.6	0.0	53.8	868.4	335.7	746.3	
80	77661.5	77342.9	0.0	0.0	0.0	-800.0	1118.6	-800.0
TR	9832.6	11034.0	996.9	0.0	22660.7	-172.3	20634.9	
90	7767.6	8298.8	0.0	17.3	0.0	-749.9	201.4	-750.0
RS	2891.0	2986.6	0.0	73.4	1732.4	-664.5	2227.9	
91	864.3	938.0	0.5	2.1	0.0	-100.0	23.7	-100.0
ME	349.3	346.6	-34.6	11.4	237.3	53.6	209.6	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-328.1	0.0	0.0	0.0	40.0	-303.0	14.8	

TOTALS	192941.0	189732.9	0.6	139.9	0.0	0.0	3067.5	0.0
	37741.5	47188.4	1892.1	746.3	62160.4	0.0	50060.4	



Figure 13.13.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of Macedonia is self-balanced

Table 13.13.7: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2020, scenario when power system of Macedonia is self-balanced

FRMBUS,	FROMBUSNAME,	TOBUS,	TOBUSNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I		
12274,VMI	2	220.00,	12474,VMI	1	400.00,	1,	1,	-530.20,	-109.75,	541.44,	81.65

Table 13.13.8: Changes in power flow greater than 50 MW in area of SEE in winter maximum 2020, scenario when power system of Macedonia is self-balanced

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 50.0 MW:												
IN WORKING CASE						IN BASE CASE						
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	1	-970.9	85.3	-1023.0	92.2	-52.0	5.4



50008 [OTAUER1 400.00]	50011 [OZELL 1 400.00]	2	-970.9	85.3	-1023.0	92.2	-52.0	5.4
50011 [OZELL 1 400.00]	50042 [OZELL 2 220.00]	1	-313.2	11.3	-398.8	4.3	-85.6	27.3
208 [XST_NI11 400.00]	34087 [JVRAN31 400.00]	1	51.2	26.6	35.3	28.1	-15.9	31.1
26112 [YSTIP 1 400.00]	207 [XCM_ST11 400.00]	1	-193.5	-31.7	-210.3	-29.4	-16.8	8.7

Table 13.13.9: Changes in power flow through tie-lines connecting Macedonia to the rest of the system in winter maximum 2020, scenario when power system of Macedonia is self-balanced

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:										
IN WORKING CASE					IN BASE CASE					
X-----	FROM BUS	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW %
	69 [XTH_DU11 400.00]		22347 [GKYT_T11 400.00]		1	15.3	20.6	1.5	20.7	-13.9 90.5
	81 [XSK_KB11 400.00]		34072 [JUROS21 400.00]		1	186.4	10.2	149.5	13.1	-36.9 19.8
	206 [XFL_B111 400.00]		22559 [GAHS_F11 400.00]		1	-58.9	-53.8	-75.3	-53.8	-16.4 27.8
	208 [XST_NI11 400.00]		34087 [JVRAN31 400.00]		1	51.2	26.6	35.3	28.1	-15.9 31.1
	26112 [YSTIP 1 400.00]		207 [XCM_ST11 400.00]		1	-193.5	-31.7	-210.3	-29.4	-16.8 8.7

Table 13.13.10: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of Macedonia is self-balanced

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%
10010*AELBS22	220.00	10125 ACEKIN2	220.00 1 SINGLE 19	370.0	386.3	102.9
10009*AELBS12	220.00	10125 ACEKIN2	220.00 1 SINGLE 22	370.0	384.2	102.6
316 XTR_HN51	110.00	36050*OHNOVI51	110.00 1 SINGLE 207	89.6	93.7	105.7
24034*MDUME 2	220.00	24096 MMART 21	220.00 1 SINGLE 367	426.8	519.3	116.0
24094*MMART 4	400.00	24096 MMART 21	220.00 1 SINGLE 367	500.0	528.5	105.7
24034*MDUME 2	220.00	24095 MMART 22	220.00 1 SINGLE 368	426.8	523.0	116.8
24094*MMART 4	400.00	24095 MMART 22	220.00 1 SINGLE 368	500.0	532.3	106.5
24034*MDUME 2	220.00	24096 MMART 21	220.00 1 SINGLE 379	426.8	519.5	116.0
24094*MMART 4	400.00	24096 MMART 21	220.00 1 SINGLE 379	500.0	528.7	105.7
24034*MDUME 2	220.00	24095 MMART 22	220.00 1 SINGLE 380	426.8	523.3	116.9
24094*MMART 4	400.00	24095 MMART 22	220.00 1 SINGLE 380	500.0	532.5	106.5
28040*RLOTRU2	220.00	28366 RSIBIU2	220.00 1 SINGLE 621	333.4	393.1	112.3
28040*RLOTRU2	220.00	28100 RSIBIU21	220.00 1 SINGLE 622	333.4	393.1	112.3
28040*RLOTRU2	220.00	28366 RSIBIU2	220.00 1 SINGLE 719	333.4	392.9	111.7
28040*RLOTRU2	220.00	28100 RSIBIU21	220.00 1 SINGLE 720	333.4	392.9	111.7
34100*JBGD172	220.00	34111 JBGD8 22	220.00 2 SINGLE 819	445.8	466.9	105.6
34100*JBGD172	220.00	34111 JBGD8 22	220.00 1 SINGLE 820	445.8	466.9	105.6

MONITORED VOLTAGE REPORT:										
SYSTEM		CONTINGENCY	<-----	B U S	----->	V-CONT	V-INIT	V-MAX	V-MIN	
'BG400	'	RANGE SINGLE 80	12473	VMI3	12	400.00	1.05033	1.03260	1.05000	0.90000
'BG220	'	RANGE SINGLE 134	12286	VUZUND2		220.00	0.88919	1.01058	1.10000	0.90000
'BG220	'	RANGE SINGLE 136	12282	VORFEJ2		220.00	1.10521	1.04446	1.10000	0.90000
'HU220	'	RANGE SINGLE 356	24005	MALBF 22		220.00	0.89275	1.04262	1.10000	0.90000
'HU220	'	RANGE SINGLE 357	24006	MALBF 21		220.00	0.89462	1.04267	1.10000	0.90000
'RO220	'	RANGE SINGLE 691	28855	RMOSTI2		220.00	0.82128	1.01433	1.10000	0.90000
'RS400	'	RANGE SINGLE 796	34085	JSOMB31		400.00	0.86300	0.99017	1.05000	0.90000
'RS220	'	RANGE SINGLE 844	34200	JSABA32		220.00	0.88331	1.01934	1.10000	0.90000

CONTINGENCY LEGEND:									
LABEL	EVENTS								
SINGLE 19	:	OPEN LINE FROM BUS 10009 [AELBS12	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1			
SINGLE 22	:	OPEN LINE FROM BUS 10010 [AELBS22	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1			
SINGLE 80	:	OPEN LINE FROM BUS 12471 [VMI3 11	400.00]	TO BUS 12473 [VMI3 12	400.00]	CKT 1			
SINGLE 134	:	OPEN LINE FROM BUS 12275 [VMI3 2	220.00]	TO BUS 12286 [VUZUND2	220.00]	CKT 1			
SINGLE 136	:	OPEN LINE FROM BUS 12280 [VALEKO2	220.00]	TO BUS 12282 [VORFEJ2	220.00]	CKT 1			
SINGLE 207	:	OPEN LINE FROM BUS 13 [XTR_PG11	400.00]	TO BUS 36005 [OPDGD211	400.00]	CKT 1			
SINGLE 356	:	OPEN LINE FROM BUS 24005 [MALBF 22	220.00]	TO BUS 24034 [MDUME 2	220.00]	CKT 1			
SINGLE 357	:	OPEN LINE FROM BUS 24006 [MALBF 21	220.00]	TO BUS 24034 [MDUME 2	220.00]	CKT 1			
SINGLE 367	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1			
SINGLE 368	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1			
SINGLE 379	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1			
SINGLE 380	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1			
SINGLE 621	:	OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1			
SINGLE 622	:	OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1			
SINGLE 691	:	OPEN LINE FROM BUS 28855 [RMOSTI2	220.00]	TO BUS 28935 [RRAC.M2	220.00]	CKT 1			
SINGLE 719	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1			
SINGLE 720	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1			
SINGLE 796	:	OPEN LINE FROM BUS 34050 [JSUBO31	400.00]	TO BUS 34085 [JSOMB31	400.00]	CKT 1			

SINGLE 819	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 1
SINGLE 820	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 2
SINGLE 844	:	OPEN LINE FROM BUS 34170 [JOBREN2	220.00]	TO BUS 34200 [JSABA32	220.00]	CKT 1

### 13.13.2. Macedonian Power System Imports 300 MW

Table 13.13.11: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of Macedonia imports 300 MW

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1338.8	1491.9	0.0	0.0	0.0	-200.0	46.9	-200.0
AL			483.4	689.7	-199.5	0.0	457.9	30.4	420.7	
20			8807.4	7603.7	0.0	14.4	0.0	1000.0	189.3	1000.0
BG			2930.4	3045.8	-44.9	120.8	2992.7	322.8	2478.5	
30			3148.6	2610.1	0.0	0.0	0.0	490.0	48.4	490.0
BA			704.2	724.5	0.0	0.0	910.8	326.0	564.6	
35			40265.9	49222.0	0.0	1.1	0.0	-9400.0	442.8	-9400.0
IT			7060.8	10816.5	0.0	-156.9	12568.2	-534.2	9503.6	
40			3098.4	3483.0	0.0	0.0	0.0	-435.0	50.4	-435.0
HR			354.6	1074.2	0.0	0.0	1409.0	23.9	665.5	
45			5391.8	6500.0	0.1	0.0	0.0	-1200.0	91.7	-1200.0
HU			956.7	1926.6	178.2	-29.6	2423.7	92.5	1212.7	
50			10298.0	10371.1	0.0	0.0	0.0	-350.0	276.9	-350.0
GR			2190.9	5312.0	170.2	9.3	6606.0	151.6	3140.1	
55			4607.6	-4593.5	0.0	4.8	0.0	9085.9	110.4	9086.0
UX			132.2	637.5	0.0	12.7	2315.0	336.5	1460.5	
60			1300.2	1577.0	0.0	0.0	0.0	-300.0	23.2	-300.0
MK			407.3	573.6	-31.2	0.0	400.8	16.5	249.3	
65			1207.2	0.0	0.0	0.0	0.0	1200.0	7.2	1200.0
UA			-194.6	0.0	0.0	0.0	653.8	346.4	112.8	
70			10252.8	9416.9	0.0	88.4	0.0	545.0	202.6	545.0
RO			2513.2	4075.6	512.9	273.9	4617.0	-221.4	2489.2	
75			2993.5	2514.0	0.0	8.8	0.0	424.0	46.6	424.0
SI			981.8	811.0	0.0	54.0	608.4	184.5	540.7	
80			54593.2	54622.1	0.0	0.0	0.0	-800.0	771.2	-800.0
TR			4587.1	7792.0	1175.4	0.0	17195.4	-127.9	12943.0	
90			7715.7	7871.1	0.0	17.7	0.0	-360.0	186.9	-360.0
RS			2645.1	2853.5	0.0	76.5	1727.3	-643.0	2085.5	
91			629.7	805.2	0.5	1.9	0.0	-200.0	22.0	-200.0
ME			304.2	299.2	-34.9	10.9	238.8	55.8	212.1	
95			501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0

SK	-384.8	0.0	0.0	0.0	40.0	-360.6	15.9	
TOTALS	156150.2	153494.7	0.6	137.2	0.0	0.0	2517.8	0.0
	25672.7	40631.6	1726.2	371.6	55164.9	0.0	38094.5	

Table 13.13.12: Branches loaded more then 80% of their thermal limits in monitored grid in winter maximum 2015, scenario when power system of Macedonia imports 300 MW

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I
***** NONE *****									



Figure 13.13.3: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of Macedonia imports 300MW

Table 13.13.13: Changes in power flow greater then 50 MW in area of SEE in winter maximum 2015, scenario when power system of Macedonia imports 300MW

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 100.0 MW:
IN WORKING CASE      IN BASE CASE



X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
81	[XSK_KB11	400.00]	26111	[YSK 5 1	400.00]	1	72.0	-28.9	10.6	-28.8	-61.4	85.3
81	[XSK_KB11	400.00]	34072	[JKURO21	400.00]	1	-72.0	28.9	-10.6	28.8	61.4	85.3
206	[XFL_BI11	400.00]	22559	[GAHS_F11	400.00]	1	-63.1	-67.3	5.6	-40.9	68.8	108.9
206	[XFL_BI11	400.00]	26005	[YBITOL1	400.00]	1	63.1	67.3	-5.6	40.9	-68.8	108.9
26004	[YBITOL52	110.00]	26005	[YBITOL1	400.00]	1	-85.1	-42.3	-0.7	-15.5	84.4	99.2
26004	[YBITOL52	110.00]	26005	[YBITOL1	400.00]	2	-83.0	-41.3	-0.6	-15.2	82.4	99.2
26004	[YBITOL52	110.00]	26301	[YBT 2 91	15.750]	1	0.0	0.0	-199.5	-59.2	-199.5	999.9
26005	[YBITOL1	400.00]	26022	[YDUBRO1	400.00]	1	116.2	40.2	171.9	50.7	55.7	48.0
26022	[YDUBRO1	400.00]	26112	[YSTIP 1	400.00]	1	-138.9	10.9	-84.2	8.3	54.8	39.4
34070	[JTKOSB1	400.00]	34072	[JKURO21	400.00]	1	246.5	-23.4	191.2	-25.5	-55.3	22.4
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	1	-945.8	68.9	-880.0	51.8	65.8	7.0
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	2	-945.8	68.9	-880.0	51.8	65.8	7.0
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	1	-1041.1	93.7	-936.2	78.3	104.9	10.1
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	2	-1041.1	93.7	-936.2	78.3	104.9	10.1
50011	[OZELL 1	400.00]	50042	[OZELL 2	220.00]	1	-781.5	56.9	-609.5	64.7	172.0	22.0

Table 13.13.14: Changes in power flow through tie-lines connecting Macedonia to the rest of the system, in winter maximum 2015, scenario when power system of Macedonia imports 300 MW

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:												
IN WORKING CASE			IN BASE CASE									
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
69	[XTH_DU11	400.00]	22347	[GKYT_T11	400.00]	1	119.9	16.7	129.0	23.2	9.1	7.6
81	[XSK_KB11	400.00]	34072	[JKURO21	400.00]	1	-72.0	28.9	-10.6	28.8	61.4	85.3
206	[XFL_BI11	400.00]	22559	[GAHS_F11	400.00]	1	-63.1	-67.3	5.6	-40.9	68.8	108.9
208	[XST_NI11	400.00]	34087	[JVRAN31	400.00]	1	-75.8	38.4	-45.3	37.1	30.5	40.2
26112	[YSTIP 1	400.00]	207	[XCM_ST11	400.00]	1	-208.5	-33.8	-178.4	-34.3	30.1	14.4

Table 13.13.15: Results of contingency (n-1) analysis in winter maximum 2015, scenario when power system of Macedonia imports 300 MW

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%				
316*XTR_HN51	110.00	36050	OHNOVI51	110.00	1	SINGLE	196	89.6	98.6	112.1
24034*MDUME 2	220.00	24095	MMART 22	220.00	1	SINGLE	345	426.8	448.7	100.2
24034*MDUME 2	220.00	24095	MMART 22	220.00	1	SINGLE	357	426.8	448.8	100.2
31210*LDIVAC2	220.00	156	XPA_DI21	220.00	1	SINGLE	707	320.1	519.6	156.9

MONITORED VOLTAGE REPORT:										
SYSTEM	CONTINGENCY	<-----	B U S	----->	V-CONT	V-INIT	V-MAX	V-MIN		
'BG220	'	RANGE SINGLE	100	12252	VOCHIF2	220.00	0.81845	0.95847	1.10000	0.90000
'BG220	'	RANGE SINGLE	124	12286	VUZUND2	220.00	0.89553	1.00434	1.10000	0.90000
'GR400	'	RANGE SINGLE	432	22759	GTH_AG11	400.00	1.05180	1.02493	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23123	GKPATR11	400.00	1.05188	1.03786	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23125	GKPATC11	400.00	1.05198	1.03784	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23126	GKPATC12	400.00	1.05192	1.03795	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23173	GDISTO11	400.00	1.05282	1.03759	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23174	GDISTO12	400.00	1.05244	1.03772	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23180	GAXELO12	400.00	1.05209	1.03840	1.05000	0.90000
'GR400	'	RANGE SINGLE	432	23181	GAXELO11	400.00	1.05205	1.03861	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23064	GK_MEG13	400.00	1.05354	1.04085	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23066	GK_MEG11	400.00	1.05354	1.04085	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23123	GKPATR11	400.00	1.05296	1.03786	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23125	GKPATC11	400.00	1.05305	1.03784	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23126	GKPATC12	400.00	1.05300	1.03795	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23173	GDISTO11	400.00	1.05368	1.03759	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23174	GDISTO12	400.00	1.05350	1.03772	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23180	GAXELO12	400.00	1.05318	1.03840	1.05000	0.90000
'GR400	'	RANGE SINGLE	433	23181	GAXELO11	400.00	1.05323	1.03861	1.05000	0.90000
'GR400	'	RANGE SINGLE	462	23036	GK_KOR13	400.00	1.06297	1.01721	1.05000	0.90000
'GR400	'	RANGE SINGLE	462	23068	GK_MEG14	400.00	1.06057	1.02923	1.05000	0.90000
'GR400	'	RANGE SINGLE	463	23037	GK_KOR14	400.00	1.06297	1.01721	1.05000	0.90000
'GR400	'	RANGE SINGLE	463	23067	GK_MEG12	400.00	1.06057	1.02923	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23126	GKPATC12	400.00	1.06854	1.03795	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23180	GAXELO12	400.00	1.06854	1.03840	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23181	GAXELO11	400.00	1.06835	1.03861	1.05000	0.90000
'GR400	'	RANGE SINGLE	475	23180	GAXELO12	400.00	1.06799	1.03840	1.05000	0.90000
'GR400	'	RANGE SINGLE	475	23181	GAXELO11	400.00	1.06780	1.03861	1.05000	0.90000
'RO220	'	RANGE SINGLE	567	28043	RSTUPA2	220.00	0.89310	0.98046	1.10000	0.90000
'RO220	'	RANGE SINGLE	637	28855	RMOSTI2	220.00	0.88216	1.04054	1.10000	0.90000
'RO220	'	RANGE SINGLE	642	28907	RSTILP2	220.00	0.84378	0.98221	1.10000	0.90000
'RO220	'	RANGE SINGLE	670	28095	RVETIS2	220.00	0.89819	1.02197	1.10000	0.90000

'RS400		RANGE SINGLE 739	34085 JSOMB31	400.00	0.87999	0.99517	1.05000	0.90000
CONTINGENCY LEGEND:								
LABEL EVENTS								
SINGLE 100	:	OPEN LINE FROM BUS 12250 [VGORIA2	220.00]	TO BUS 12252 [VOCHIF2	220.00]	CKT 1		
SINGLE 124	:	OPEN LINE FROM BUS 12275 [VMI3 2	220.00]	TO BUS 12286 [VUZUND2	220.00]	CKT 1		
SINGLE 196	:	OPEN LINE FROM BUS 13 [XTR_PG11	400.00]	TO BUS 36005 [OPODGT11	400.00]	CKT 1		
SINGLE 345	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1		
SINGLE 357	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1		
SINGLE 432	:	OPEN LINE FROM BUS 22759 [GTH_AG11	400.00]	TO BUS 23172 [GDISTO13	400.00]	CKT 1		
SINGLE 433	:	OPEN LINE FROM BUS 22759 [GTH_AG11	400.00]	TO BUS 23173 [GDISTO11	400.00]	CKT 1		
SINGLE 462	:	OPEN LINE FROM BUS 23033 [GKYT_K11	400.00]	TO BUS 23036 [GK_KOR13	400.00]	CKT 1		
SINGLE 463	:	OPEN LINE FROM BUS 23033 [GKYT_K11	400.00]	TO BUS 23037 [GK_KOR14	400.00]	CKT 1		
SINGLE 473	:	OPEN LINE FROM BUS 23123 [GKPATR11	400.00]	TO BUS 23126 [GKPATC12	400.00]	CKT 1		
SINGLE 475	:	OPEN LINE FROM BUS 23126 [GKPATC12	400.00]	TO BUS 23180 [GAXELO12	400.00]	CKT 1		
SINGLE 567	:	OPEN LINE FROM BUS 28043 [RSTUPA2	220.00]	TO BUS 28044 [RBRADU2	220.00]	CKT 1		
SINGLE 637	:	OPEN LINE FROM BUS 28855 [RMOSTI2	220.00]	TO BUS 28935 [RRAC.M2	220.00]	CKT 1		
SINGLE 642	:	OPEN LINE FROM BUS 28906 [RTELEA2	220.00]	TO BUS 28907 [RSTILP2	220.00]	CKT 1		
SINGLE 670	:	OPEN LINE FROM BUS 28039 [RROSIO1	400.00]	TO BUS 28094 [RROSIO2	220.00]	CKT 1		
SINGLE 707	:	OPEN LINE FROM BUS 31410 [LDIVAC1	400.00]	TO BUS 80 [XRE_DI11	400.00]	CKT 1		
SINGLE 739	:	OPEN LINE FROM BUS 34050 [JSUBO31	400.00]	TO BUS 34085 [JSOMB31	400.00]	CKT 1		

Table 13.13.16: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of Macedonia imports 300 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1621.8	1723.7	0.0	0.0	0.0	-150.0	48.1	-150.0
AL	672.2	779.7	-204.5	0.0	474.7	104.8	466.9	
20	9662.4	8411.0	0.0	15.5	0.0	1000.0	235.8	1000.0
BG	3549.1	3357.9	0.0	181.1	3276.0	197.3	3088.8	
30	2949.5	2897.8	0.0	0.0	0.0	0.0	51.7	0.0
BA	1004.8	1017.2	0.0	0.0	913.7	246.1	655.3	
35	45062.6	54409.8	0.0	1.1	0.0	-9740.0	391.8	-9740.0
IT	9622.5	11942.3	0.0	147.7	12391.5	-796.4	10720.5	
40	3427.1	4359.0	0.0	0.0	0.0	-1000.0	68.1	-1000.0
HR	504.5	1075.9	0.0	0.0	1534.7	208.6	754.6	
45	6093.4	7180.0	0.1	0.0	0.0	-1200.0	113.3	-1200.0
HU	1355.4	2128.1	178.7	-29.1	2404.9	0.5	1482.1	
50	11750.6	11426.0	0.0	0.0	0.0	0.0	324.6	0.0
GR	3181.9	5724.7	203.9	9.3	6656.3	169.6	3717.0	
55	5438.2	-4356.2	0.0	4.8	0.0	9649.8	139.8	9650.0
UX	497.4	622.8	0.0	12.6	2293.3	288.2	1867.0	
60	1737.7	2001.9	0.0	0.0	0.0	-300.0	35.7	-300.0
MK	711.9	752.3	-30.8	0.0	394.7	-31.9	415.8	
65	1207.6	0.0	0.0	0.0	0.0	1200.0	7.6	1200.0
UA	-165.4	0.0	0.0	0.0	652.3	364.8	122.2	
70	13257.9	12110.2	0.0	90.2	0.0	800.1	257.4	800.0
RO	3105.5	4455.6	783.5	286.0	5604.4	-8.5	3193.3	
75	3949.6	2990.0	0.0	8.9	0.0	890.0	60.8	890.0
SI	1238.8	964.6	0.0	53.8	867.7	344.9	743.2	
80	77661.7	77342.9	0.0	0.0	0.0	-800.0	1118.8	-800.0
TR	9840.0	11034.0	996.9	0.0	22660.6	-167.2	20637.0	

90	7769.1	8298.8	0.0	17.3	0.0	-750.0	203.0	-750.0
RS	2907.3	2986.6	0.0	73.3	1730.1	-665.6	2243.1	
91	865.1	938.0	0.5	2.1	0.0	-100.0	24.4	-100.0
ME	351.4	346.6	-34.5	11.4	236.7	46.6	218.0	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-327.0	0.0	0.0	0.0	40.0	-301.8	14.8	
TOTALS	192955.7	189732.9	0.6	139.9	0.0	0.0	3082.2	0.0
	38050.5	47188.4	1893.1	746.1	62131.5	0.0	50339.6	

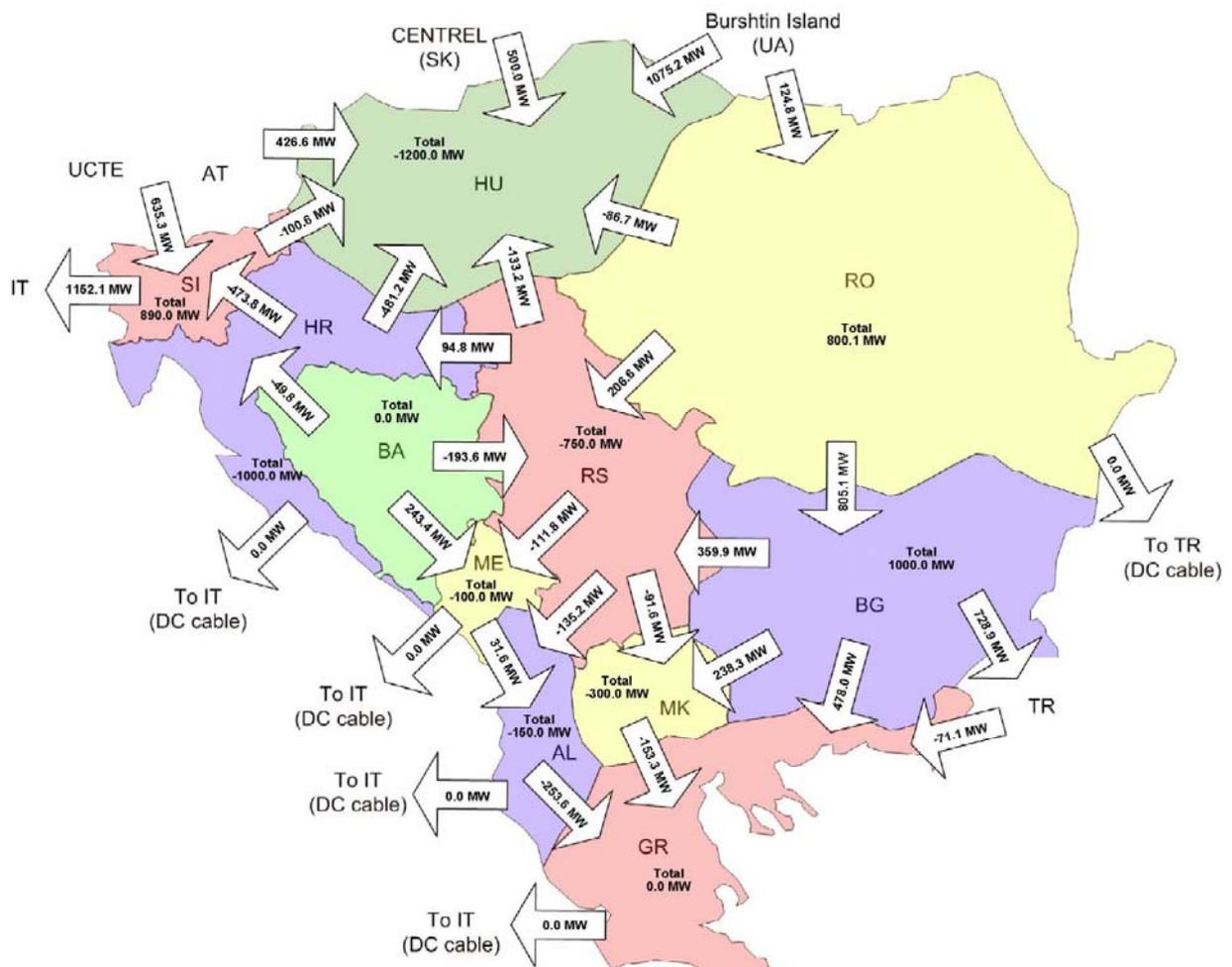


Figure 13.13.4: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of Macedonia imports 300 MW

Table 13.13.17: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2020, scenario when power system of Macedonia imports 300 MW

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I		
12274,VMI	2	220.00,	12474,VMI	1	400.00,	1,	1,	-526.13,	-109.98,	537.51,	81.10

Table 13.13.18: Changes in power flow greater then 50 MW in area of SEE in winter maximum 2020, scenario when power system of Macedonia imports 300 MW

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 50.0 MW:												
IN WORKING CASE		IN BASE CASE										
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
	81 [XSK_KB11	400.00]	26111 [YSK 5 1	400.00]	1		-85.7	-11.5	-149.5	-13.1	-63.8	74.4
	81 [XSK_KB11	400.00]	34072 [JUROS21	400.00]	1		85.7	11.5	149.5	13.1	63.8	74.4
	206 [XFL_BI11	400.00]	22559 [GAHS_F11	400.00]	1		-144.1	-88.0	-75.3	-53.8	68.9	47.8
	206 [XFL_BI11	400.00]	26005 [YBITOL1	400.00]	1		144.1	88.0	75.3	53.8	-68.9	47.8
	26004 [YBITOL52	110.00]	26301 [YBT 2 G1	15.750]	1		20.0	12.7	-189.6	-54.4	-209.6	999.9
	26004 [YBITOL52	110.00]	3WNDTR [BITOLA	]	WND 2 2		-138.1	-42.9	-52.8	-14.7	85.3	61.8
	26004 [YBITOL52	110.00]	3WNDTR [BITOLA	]	WND 2 1		-142.3	-44.0	-54.4	-15.1	87.9	61.8
	26005 [YBITOL1	400.00]	26145 [YMARIO1	400.00]	1		-83.3	47.1	-29.8	72.1	53.5	64.2
	26005 [YBITOL1	400.00]	3WNDTR [BITOLA	]	WND 1 2		138.7	51.7	52.9	16.0	-85.7	61.8
	26005 [YBITOL1	400.00]	3WNDTR [BITOLA	]	WND 1 1		142.1	52.9	54.3	16.3	-87.9	61.8
	26022 [YDUBR01	400.00]	26112 [YSTIP 1	400.00]	1		-49.0	14.5	2.2	14.2	51.2	104.4
	26022 [YDUBR01	400.00]	26145 [YMARIO1	400.00]	2		-348.5	-67.6	-401.6	-76.7	-53.0	15.2
	50005 [OLIENZ1	400.00]	50008 [OTAUER1	400.00]	1		-1035.6	87.6	-969.3	69.8	66.4	6.4
	50005 [OLIENZ1	400.00]	50008 [OTAUER1	400.00]	2		-1035.6	87.6	-969.3	69.8	66.4	6.4
	50008 [OTAUER1	400.00]	50011 [OZELL 1	400.00]	1		-1127.5	107.4	-1023.0	92.2	104.5	9.3
	50008 [OTAUER1	400.00]	50011 [OZELL 1	400.00]	2		-1127.5	107.4	-1023.0	92.2	104.5	9.3
	50011 [OZELL 1	400.00]	50042 [OZELL 2	220.00]	1		-570.6	-9.7	-398.8	4.3	171.9	30.1

Table 13.13.19: Changes in power flow through tie-lines connecting Macedonia to the rest of the system in winter maximum 2020, scenario when power system of Macedonia imports 300 MW

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:												
IN WORKING CASE		IN BASE CASE										
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
	69 [XTH_DU11	400.00]	22347 [GKYT_T11	400.00]	1		-9.1	14.5	1.5	20.7	10.6	116.0
	81 [XSK_KB11	400.00]	34072 [JUROS21	400.00]	1		85.7	11.5	149.5	13.1	63.8	74.4
	206 [XFL_BI11	400.00]	22559 [GAHS_F11	400.00]	1		-144.1	-88.0	-75.3	-53.8	68.9	47.8
	208 [XST_NI11	400.00]	34087 [JVRAN31	400.00]	1		5.9	28.4	35.3	28.1	29.4	499.8
	26112 [YSTIP 1	400.00]	207 [XCM_ST11	400.00]	1		-237.5	-29.1	-210.3	-29.4	27.2	11.5

Table 13.13.20: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of Macedonia imports 300 MW

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%
10010	*AELBS22	220.00	10125 ACEKIN2	220.00 1	SINGLE 19	370.0 386.4 103.0
10009	*AELBS12	220.00	10125 ACEKIN2	220.00 1	SINGLE 22	370.0 384.4 102.7
316	XTR_HN51	110.00	36050 *OHNOVI51	110.00 1	SINGLE 207	89.6 100.3 113.5
24034	*MDUME 2	220.00	24096 MMART 21	220.00 1	SINGLE 367	426.8 513.6 114.7
24094	*MMART 4	400.00	24096 MMART 21	220.00 1	SINGLE 367	500.0 522.8 104.6
24034	*MDUME 2	220.00	24095 MMART 22	220.00 1	SINGLE 368	426.8 517.3 115.6
24094	*MMART 4	400.00	24095 MMART 22	220.00 1	SINGLE 368	500.0 526.6 105.3
24034	*MDUME 2	220.00	24096 MMART 21	220.00 1	SINGLE 379	426.8 513.8 114.8
24094	*MMART 4	400.00	24096 MMART 21	220.00 1	SINGLE 379	500.0 523.0 104.6
24034	*MDUME 2	220.00	24095 MMART 22	220.00 1	SINGLE 380	426.8 517.6 115.6
24094	*MMART 4	400.00	24095 MMART 22	220.00 1	SINGLE 380	500.0 526.8 105.4
28040	*RLOTU2	220.00	28366 RSIBIU2	220.00 1	SINGLE 621	333.4 393.1 112.2
28040	*RLOTU2	220.00	28100 RSIBIU21	220.00 1	SINGLE 622	333.4 393.1 112.2
28040	*RLOTU2	220.00	28366 RSIBIU2	220.00 1	SINGLE 719	333.4 392.8 111.6
28040	*RLOTU2	220.00	28100 RSIBIU21	220.00 1	SINGLE 720	333.4 392.8 111.6
34100	*JBGD172	220.00	34111 JBGD8 22	220.00 2	SINGLE 819	445.8 466.9 105.5
34100	*JBGD172	220.00	34111 JBGD8 22	220.00 1	SINGLE 820	445.8 466.9 105.5

MONITORED VOLTAGE REPORT:										
SYSTEM		CONTINGENCY	<-----	B U S	----->	V-CONT	V-INIT	V-MAX	V-MIN	
'BG400	'	RANGE SINGLE 80	12473	VMI3	12	400.00	1.05001	1.03215	1.05000	0.90000
'BG220	'	RANGE SINGLE 134	12286	VUZUND2		220.00	0.88840	1.01009	1.10000	0.90000
'BG220	'	RANGE SINGLE 136	12282	VORFEJ2		220.00	1.10511	1.04358	1.10000	0.90000
'HU220	'	RANGE SINGLE 356	24005	MALBF 22		220.00	0.89275	1.04262	1.10000	0.90000
'HU220	'	RANGE SINGLE 357	24006	MALBF 21		220.00	0.89462	1.04267	1.10000	0.90000
'RO220	'	RANGE SINGLE 691	28855	RMOSTI2		220.00	0.82173	1.01473	1.10000	0.90000
'RS400	'	RANGE SINGLE 796	34085	JSOMB31		400.00	0.86340	0.99040	1.05000	0.90000
'RS220	'	RANGE SINGLE 844	34200	JSABA32		220.00	0.88403	1.01958	1.10000	0.90000

**CONTINGENCY LEGEND:**

LABEL	EVENTS
SINGLE 19	: OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	: OPEN LINE FROM BUS 10010 [AELBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 80	: OPEN LINE FROM BUS 12471 [VMI3 11 400.00] TO BUS 12473 [VMI3 12 400.00] CKT 1
SINGLE 134	: OPEN LINE FROM BUS 12275 [VMI3 2 220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 136	: OPEN LINE FROM BUS 12275 [VMI3 2 220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 207	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [0PODG211 400.00] CKT 1
SINGLE 356	: OPEN LINE FROM BUS 24005 [MALBF 22 220.00] TO BUS 24034 [MDUME 2 220.00] CKT 1
SINGLE 357	: OPEN LINE FROM BUS 24006 [MALBF 21 220.00] TO BUS 24034 [MDUME 2 220.00] CKT 1
SINGLE 367	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 368	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 379	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 380	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 621	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 691	: OPEN LINE FROM BUS 28855 [RMOSTI2 220.00] TO BUS 28935 [RRAC.M2 220.00] CKT 1
SINGLE 719	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 796	: OPEN LINE FROM BUS 34050 [JSUBO31 400.00] TO BUS 34085 [JSOMB31 400.00] CKT 1
SINGLE 819	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 820	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2
SINGLE 844	: OPEN LINE FROM BUS 34170 [JOBREN2 220.00] TO BUS 34200 [JSABA32 220.00] CKT 1

## 13.14. Montenegrin Power Balance Uncertainty

### 13.14.1. Montenegrin Power System Imports 300 MW

Table 13.14.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of Montenegro imports 300 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1338.3	1491.9	0.0	0.0	0.0	-200.0	46.4	-200.0
AL	476.4	689.7	-199.8	0.0	458.9	27.9	417.4	
20	8806.3	7603.7	0.0	14.4	0.0	1000.4	187.7	1000.0
BG	2906.6	3045.8	-44.9	120.9	2995.7	319.0	2461.5	
30	3149.0	2610.1	0.0	0.0	0.0	490.9	48.0	490.0
BA	700.6	724.5	0.0	0.0	911.0	322.2	565.0	
35	40265.4	49222.0	0.0	1.1	0.0	-9399.6	441.9	-9400.0
IT	7040.4	10816.5	0.0	-157.0	12570.0	-541.5	9492.3	
40	3099.1	3483.0	0.0	0.0	0.0	-435.4	51.5	-435.0
HR	358.2	1074.2	0.0	0.0	1408.5	18.6	674.0	
45	5391.4	6500.0	0.1	0.0	0.0	-1200.1	91.4	-1200.0
HU	958.5	1926.6	178.2	-29.6	2424.2	95.1	1212.4	
50	10298.2	10371.1	0.0	0.0	0.0	-350.0	277.0	-350.0
GR	2146.0	5312.0	170.2	9.3	6612.8	112.8	3140.7	
55	4394.3	-4593.5	0.0	4.8	0.0	8882.7	100.3	8886.0
UX	-3.7	637.5	0.0	12.8	2320.6	380.1	1286.5	
60	1501.8	1577.0	0.0	0.0	0.0	-99.9	24.7	-100.0
MK	454.0	573.6	-31.3	0.0	403.5	49.2	266.0	
65	1307.5	0.0	0.0	0.0	0.0	1300.0	7.5	1300.0
UA	-205.6	0.0	0.0	0.0	653.8	333.3	114.9	
70	10252.3	9416.9	0.0	88.4	0.0	544.7	202.3	545.0

RO	2503.8	4075.6	512.9	274.0	4618.2	-227.6	2487.1	
75	2993.9	2514.0	0.0	8.8	0.0	423.7	47.4	424.0
SI	982.4	811.0	0.0	54.0	608.4	178.1	547.6	
80	54592.9	54622.1	0.0	0.0	0.0	-799.9	770.8	-800.0
TR	4579.8	7792.0	1175.4	0.0	17195.5	-131.3	12939.2	
90	7714.3	7871.1	0.0	17.8	0.0	-359.5	184.8	-360.0
RS	2619.9	2853.5	0.0	76.6	1729.8	-649.0	2068.7	
91	530.1	805.2	0.5	1.9	0.0	-297.9	20.3	-300.0
ME	293.7	299.2	-35.0	10.9	239.4	74.2	183.9	
95	501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK	-385.5	0.0	0.0	0.0	40.0	-361.4	15.9	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTALS	156135.9	153494.7	0.6	137.3	0.0	0.0	2503.4	0.0
	25425.5	40631.6	1725.7	371.9	55190.4	0.0	37873.0	

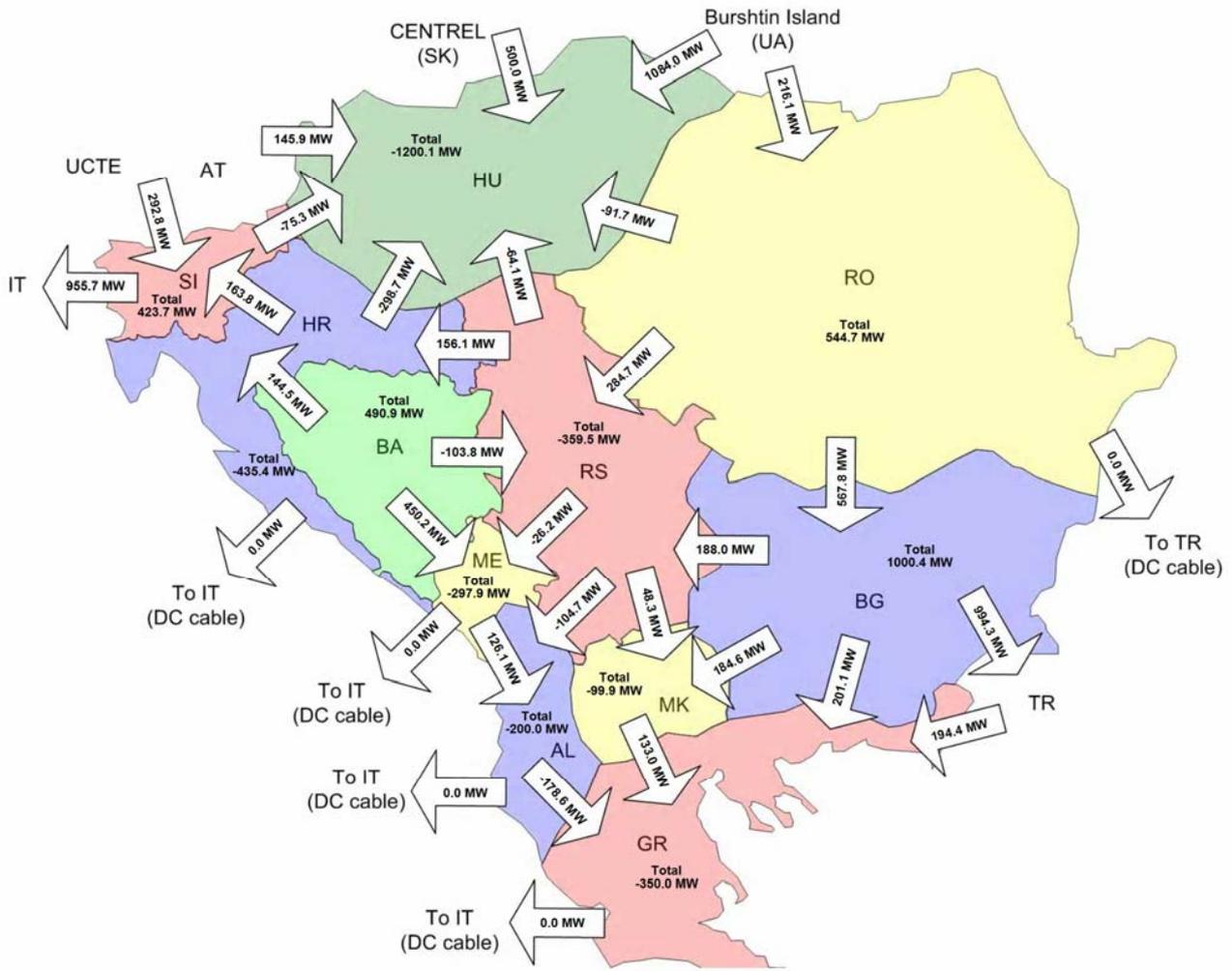


Figure 13.14.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of Montenegro imports 300 MW

Table 13.14.2: Changes in power flow in area of SEE in winter maximum 2015, scenario when power system of Montenegro imports 300 MW

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
84	[XRO_MU11	400.00]	28039	[RROSIO1	400.00]	1	216.1	50.7	160.8	57.2	-55.2	25.6
84	[XRO_MU11	400.00]	65001	[UMUKACH	400.00]	1	-216.1	-50.7	-160.8	-57.2	55.2	25.6
36023	[0TPLJE21	220.00]	36512	[0TPLJEG2	15.750]	1	-123.6	-73.7	-203.3	-65.5	-79.7	64.5

Table 13.14.3: Changes in power flow greater than 50 MW through tie-lines in area of interest in winter maximum 2015, scenario when power system of Montenegro imports 300 MW

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%
36001	[ORIBAR11	400.00]	184	[XRI_PE11	400.00]	1	171.9	34.9	190.2	33.7	18.3	10.7	-1.2	3.4
36001	[ORIBAR11	400.00]	36045	[0BPOLJ51	110.00]	A	36.5	-11.5	35.3	-11.5	-1.2	3.3	0.0	0.2
36005	[0PODG211	400.00]	13	[XTR_PG11	400.00]	1	-288.1	-100.3	-278.0	-102.8	10.1	3.5	-2.5	2.5
36005	[0PODG211	400.00]	220	[XKA_PG11	400.00]	1	122.2	-29.3	129.1	-29.3	6.9	5.6	0.0	0.1
36005	[0PODG211	400.00]	36120	[0PODG251	110.00]	1	140.0	97.2	135.9	97.3	-4.2	3.0	0.1	0.1
36005	[0PODG211	400.00]	36120	[0PODG251	110.00]	2	140.0	97.2	135.8	97.3	-4.2	3.0	0.1	0.1
36015	[0PODG121	220.00]	88	[XVD_PO21	220.00]	1	3.9	8.9	8.5	8.5	4.6	116.7	-0.3	3.8
36015	[0PODG121	220.00]	36095	[0PODG151	110.00]	1	62.0	6.1	61.2	6.2	-0.7	1.2	0.1	2.2
36015	[0PODG121	220.00]	36095	[0PODG151	110.00]	2	69.8	6.5	69.0	6.6	-0.8	1.2	0.2	2.4
36020	[0MOJKO21	220.00]	36090	[0MOJKO51	110.00]	1	60.8	29.1	62.6	28.8	1.8	3.0	-0.2	0.8
36023	[0TPLJE21	220.00]	182	[XPL_BB21	220.00]	1	-126.2	54.6	-107.7	50.0	18.5	14.6	-4.7	8.5
36023	[0TPLJE21	220.00]	183	[XPL_BI21	220.00]	1	-16.2	54.1	-1.7	51.4	14.5	89.3	-2.7	5.0
36023	[0TPLJE21	220.00]	36125	[0PLJE251	110.00]	1	70.0	28.8	72.7	28.2	2.7	3.9	-0.7	2.4
36023	[0TPLJE21	220.00]	36512	[0TPLJEG2	15.750]	1	-123.6	-73.7	-203.3	-65.5	-79.7	64.5	8.2	11.1
36025	[0HPIVA21	220.00]	115	[XSA_PI21	220.00]	1	38.2	-11.9	50.3	-12.5	12.1	31.8	-0.6	5.4



36027 [OHPERU21	220.00]	116 [XTR_PE21	220.00]	1	-113.4	-38.0	-106.6	-38.9	6.8	6.0	-0.9	2.2
36027 [OHPERU21	220.00]	36030 [OHPERU51	110.00]	1	56.2	40.7	50.4	40.2	-5.8	10.3	-0.5	1.3

Table 13.14.4: Results of contingency (n-1) analysis in winter maximum 2015, scenario when power system of Montenegro imports 300 MW

MULTI-SECTION LINE				MONITORED BRANCH								
CONTINGENCY	RATING	FLOW	%									
316*XTR_HN51	110.00	36050 OHNOVI51	110.00	1	SINGLE	196	89.6	95.3	108.1			
24034*MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE	344	426.8	452.0	101.0			
24034*MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE	345	426.8	455.3	101.7			
24034*MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE	356	426.8	452.1	101.0			
24034*MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE	357	426.8	455.4	101.7			
31210*LDIVAC2	220.00	156 XPA_DI21	220.00	1	SINGLE	707	320.1	547.9	165.7			

MONITORED VOLTAGE REPORT:										
SYSTEM	CONTINGENCY	B U S			V-CONT	V-INIT	V-MAX	V-MIN		
'HU220	RANGE BASE CASE	24025	MDETK 2	220.00	1.05000	1.05000	1.05000	0.90000		
'HU220	RANGE BASE CASE	24068	MGYOR 2	220.00	1.05780	1.05780	1.05000	0.90000		
'HU220	RANGE BASE CASE	24095	MMART 22	220.00	1.05067	1.05067	1.05000	0.90000		
'HU220	RANGE BASE CASE	24096	MMART 21	220.00	1.05063	1.05063	1.05000	0.90000		
'BG220	RANGE SINGLE 100	12252	VOCHIF2	220.00	0.81881	0.95872	1.10000	0.90000		
'BG220	RANGE SINGLE 124	12286	VUZUND2	220.00	0.89588	1.00459	1.10000	0.90000		
'GR400	RANGE SINGLE 432	22759	GTH_AG11	400.00	1.05202	1.02528	1.05000	0.90000		
'GR400	RANGE SINGLE 432	23123	GKPTR11	400.00	1.05216	1.03821	1.05000	0.90000		
'GR400	RANGE SINGLE 432	23125	GKPATC11	400.00	1.05226	1.03819	1.05000	0.90000		
'GR400	RANGE SINGLE 432	23126	GKPATC12	400.00	1.05220	1.03830	1.05000	0.90000		
'GR400	RANGE SINGLE 432	23173	GDISTO11	400.00	1.05310	1.03794	1.05000	0.90000		
'GR400	RANGE SINGLE 432	23174	GDISTO12	400.00	1.05272	1.03807	1.05000	0.90000		
'GR400	RANGE SINGLE 432	23180	GAXELO12	400.00	1.05237	1.03875	1.05000	0.90000		
'GR400	RANGE SINGLE 432	23181	GAXELO11	400.00	1.05234	1.03896	1.05000	0.90000		
'GR400	RANGE SINGLE 433	23064	GK_MEG13	400.00	1.05387	1.04118	1.05000	0.90000		
'GR400	RANGE SINGLE 433	23066	GK_MEG11	400.00	1.05387	1.04118	1.05000	0.90000		
'GR400	RANGE SINGLE 433	23123	GKPTR11	400.00	1.05331	1.03821	1.05000	0.90000		
'GR400	RANGE SINGLE 433	23125	GKPATC11	400.00	1.05340	1.03819	1.05000	0.90000		
'GR400	RANGE SINGLE 433	23126	GKPATC12	400.00	1.05334	1.03830	1.05000	0.90000		
'GR400	RANGE SINGLE 433	23173	GDISTO11	400.00	1.05403	1.03794	1.05000	0.90000		
'GR400	RANGE SINGLE 433	23174	GDISTO12	400.00	1.05384	1.03807	1.05000	0.90000		
'GR400	RANGE SINGLE 433	23180	GAXELO12	400.00	1.05352	1.03875	1.05000	0.90000		
'GR400	RANGE SINGLE 433	23181	GAXELO11	400.00	1.05358	1.03896	1.05000	0.90000		
'GR400	RANGE SINGLE 462	23036	GK_KOR13	400.00	1.06328	1.01750	1.05000	0.90000		
'GR400	RANGE SINGLE 462	23068	GK_MEG14	400.00	1.06088	1.02953	1.05000	0.90000		
'GR400	RANGE SINGLE 463	23037	GK_KOR14	400.00	1.06328	1.01750	1.05000	0.90000		
'GR400	RANGE SINGLE 463	23067	GK_MEG12	400.00	1.06088	1.02953	1.05000	0.90000		
'GR400	RANGE SINGLE 473	23126	GKPATC12	400.00	1.06902	1.03830	1.05000	0.90000		
'GR400	RANGE SINGLE 473	23180	GAXELO12	400.00	1.06902	1.03875	1.05000	0.90000		
'GR400	RANGE SINGLE 473	23181	GAXELO11	400.00	1.06883	1.03896	1.05000	0.90000		
'GR400	RANGE SINGLE 475	23180	GAXELO12	400.00	1.06847	1.03875	1.05000	0.90000		
'GR400	RANGE SINGLE 475	23181	GAXELO11	400.00	1.06828	1.03896	1.05000	0.90000		
'RO220	RANGE SINGLE 567	28043	RSTUPA2	220.00	0.89332	0.98063	1.10000	0.90000		
'RO220	RANGE SINGLE 637	28855	RMOSTI2	220.00	0.88222	1.04062	1.10000	0.90000		
'RO220	RANGE SINGLE 642	28907	RSTILP2	220.00	0.84390	0.98229	1.10000	0.90000		
'RO220	RANGE SINGLE 670	28095	RVETIS2	220.00	0.89870	1.02220	1.10000	0.90000		
'RS400	RANGE SINGLE 739	34085	JSOMB31	400.00	0.88013	0.99542	1.05000	0.90000		

CONTINGENCY LEGEND:									
LABEL	EVENTS								
SINGLE 196	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [0PODG211 400.00] CKT 1								
SINGLE 344	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1								
SINGLE 345	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1								
SINGLE 356	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1								
SINGLE 357	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1								
SINGLE 707	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1								

Table 13.14.5: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of Montenegro imports 300 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1622.4	1723.7	0.0	0.0	0.0	-150.0	48.7	-150.0

AL	679.4	779.7	-204.2	0.0	473.6	105.6	471.9		
20	9661.6	8411.0	0.0	15.5	0.0	999.9	235.1	1000.0	
BG	3538.2	3357.9	0.0	181.1	3277.4	196.0	3080.6		
30	2950.2	2897.8	0.0	0.0	0.0	0.0	52.3	0.0	
BA	1026.6	1017.2	0.0	0.0	911.4	260.1	660.8		
35	45061.5	54409.8	0.0	1.1	0.0	-9740.1	390.7	-9740.0	
IT	9597.0	11942.3	0.0	147.8	12393.5	-804.1	10704.6		
40	3428.2	4359.0	0.0	0.0	0.0	-1000.0	69.2	-1000.0	
HR	514.1	1075.9	0.0	0.0	1533.6	208.3	763.5		
45	6093.7	7180.0	0.1	0.0	0.0	-1200.0	113.6	-1200.0	
HU	1361.3	2128.1	178.7	-29.1	2405.1	0.8	1488.0		
50	11750.4	11426.0	0.0	0.0	0.0	0.0	324.4	0.0	
GR	3139.7	5724.7	203.8	9.4	6661.4	133.5	3716.0		
55	5227.2	-4356.2	0.0	4.8	0.0	9450.0	128.5	9450.0	
UX	356.2	622.8	0.0	12.7	2300.0	337.9	1682.8		
60	1940.6	2001.9	0.0	0.0	0.0	-100.0	38.6	-100.0	
MK	769.8	752.3	-30.8	0.0	397.1	13.2	430.9		
65	1408.2	0.0	0.0	0.0	0.0	1400.0	8.2	1400.0	
UA	-182.6	0.0	0.0	0.0	652.4	342.2	127.5		
70	13257.4	12110.2	0.0	90.2	0.0	800.1	256.8	800.0	
RO	3102.5	4455.6	783.6	286.0	5605.0	-6.6	3189.0		
75	3949.9	2990.0	0.0	8.9	0.0	890.0	61.1	890.0	
SI	1235.6	964.6	0.0	53.8	868.0	338.5	746.9		
80	77661.6	77342.9	0.0	0.0	0.0	-800.0	1118.7	-800.0	
TR	9836.9	11034.0	996.9	0.0	22660.7	-169.4	20636.1		
90	7769.6	8298.8	0.0	17.2	0.0	-750.0	203.6	-750.0	
RS	2949.8	2986.6	0.0	73.2	1727.5	-639.2	2256.7		
91	662.3	938.0	0.5	2.1	0.0	-300.0	21.7	-300.0	
ME	247.2	346.6	-34.3	11.2	234.2	-14.3	172.3		
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0	
SK	-327.6	0.0	0.0	0.0	40.0	-302.5	14.8		
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTALS	192946.1	189732.9	0.6	139.9	0.0	0.0	3072.6	0.0	
	37844.1	47188.4	1893.6	745.9	62140.8	0.0	50142.3		

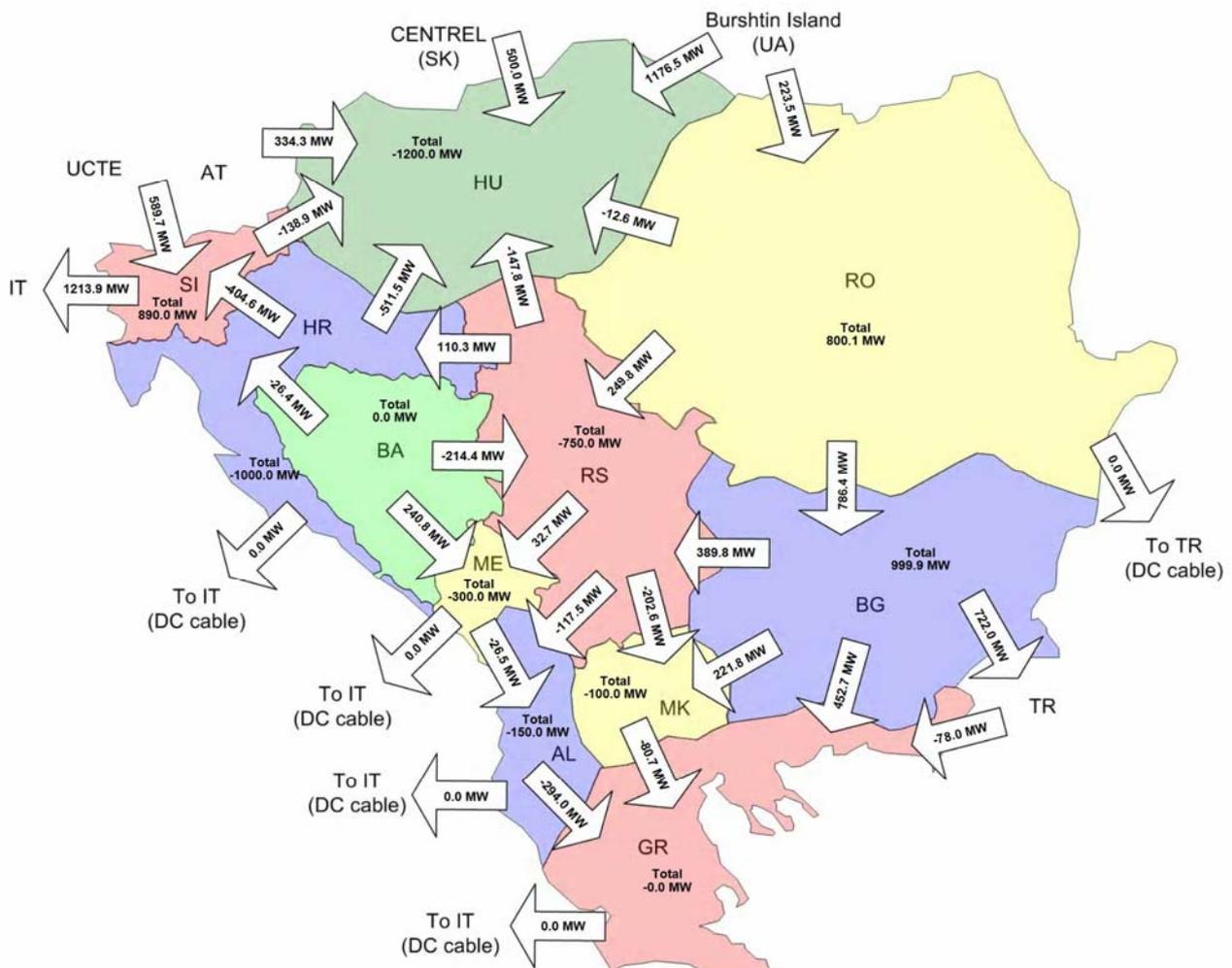


Figure 13.14.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of Montenegro imports 300 MW

Table 13.14.6: Changes in power flow in area of SEE in winter maximum 2020, scenario when power system of Montenegro imports 300 MW

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
78	[XSA_MU11 400.00]	24157	[MSAJ0 4 400.00]	1	58.9	42.7	-26.0	50.6	-84.9	144.2	
78	[XSA_MU11 400.00]	65001	[UMUKACH 400.00]	1	-58.9	-42.7	26.0	-50.6	84.9	144.2	
84	[XRO_MU11 400.00]	28039	[RROSIO1 400.00]	1	223.5	18.3	108.4	32.2	-115.1	51.5	
84	[XRO_MU11 400.00]	65001	[UMUKACH 400.00]	1	-223.5	-18.3	-108.4	-32.2	115.1	51.5	
24058	[MGOD 4 400.00]	24200	[MDETK 4 400.00]	A	167.3	-24.9	218.4	-27.5	51.1	30.5	
24157	[MSAJ0 4 400.00]	24200	[MDETK 4 400.00]	A	73.8	25.0	21.1	28.7	-52.7	71.4	
28037	[RGADAL1 400.00]	28039	[RROSIO1 400.00]	1	123.5	-1.1	176.4	-7.5	52.9	42.8	
36001	[ORIBAR11 400.00]	36010	[OPLJE211 400.00]	1	-242.8	-23.2	-315.8	-50.4	-73.0	30.1	
36023	[OTPLJE21 220.00]	36512	[OTPLJEG2 15.750]	1	16.2	12.7	-203.3	-72.9	-219.5	999.9	

Table 13.14.7: Changes in power flow greater than 50 MW through tie-lines in area of interest winter maximum 2020, scenario when power system of Montenegro imports 300 MW

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%
36001	[ORIBAR11 400.00]	184	[XRI_PE11 400.00]	1	121.7	36.4	161.4	51.1	39.7	32.6	14.8	40.6	
36005	[OPODG211 400.00]	13	[XTR_PG11 400.00]	1	-172.3	-117.3	-152.0	-112.0	20.3	11.8	5.3	4.5	
36005	[OPODG211 400.00]	220	[XKA_PG11 400.00]	1	-2.4	-37.2	9.5	-32.6	11.9	499.0	4.6	12.4	
36015	[OPODG121 220.00]	88	[XVD_PO21 220.00]	1	-24.0	2.7	-18.4	5.5	5.6	23.4	2.7	100.5	
36023	[OTPLJE21 220.00]	182	[XPL_BB21 220.00]	1	-134.0	37.5	-90.8	48.9	43.2	32.2	11.4	30.5	
36023	[OTPLJE21 220.00]	183	[XPL_BI21 220.00]	1	-21.5	43.9	14.3	55.6	35.8	166.6	11.7	26.6	
36025	[OHPIVA21 220.00]	115	[XSA_PI21 220.00]	1	67.7	-13.8	97.4	-2.2	29.8	44.0	11.7	84.4	
36027	[OHPERU21 220.00]	116	[XTR_PE21 220.00]	1	-48.1	-22.8	-41.5	-22.1	6.6	13.8	0.6	2.7	



36040 [OPLJEV51 110.00]	326 [XPL_ZA51 110.00]	1	1.8	9.5	5.3	11.3	3.5	192.1	1.8	19.4
36050 [OHNOVI51 110.00]	316 [XTR_HN51 110.00]	1	-83.2	-16.9	-81.6	-16.9	1.7	2.0	0.0	0.3
36144 [OVIILUSK 110.00]	315 [XBI_NI51 110.00]	1	-2.3	-4.0	-0.6	-3.9	1.7	73.4	0.1	2.9

Table 13.14.8: Results of contingency (n-1) analysis winter maximum 2020, scenario when power system of Montenegro imports 300 MW

<----- MONITORED BRANCH ----->				CONTINGENCY	RATING	FLOW	%
10010*AELBS22	220.00	10125 ACEKIN2	220.00	1 SINGLE 19	370.0	386.6	103.1
10009*AELBS12	220.00	10125 ACEKIN2	220.00	1 SINGLE 22	370.0	384.6	102.8
316 XTR_HN51	110.00	36050*OHNOVI51	110.00	1 SINGLE 207	89.6	99.1	112.4
24034*MDUME 2	220.00	24096 MMART 21	220.00	1 SINGLE 367	426.8	523.5	116.9
24094*MMART 4	400.00	24096 MMART 21	220.00	1 SINGLE 367	500.0	532.8	106.6
24034*MDUME 2	220.00	24095 MMART 22	220.00	1 SINGLE 368	426.8	527.3	117.8
24094*MMART 4	400.00	24095 MMART 22	220.00	1 SINGLE 368	500.0	536.6	107.3
24034*MDUME 2	220.00	24096 MMART 21	220.00	1 SINGLE 379	426.8	523.7	117.0
24094*MMART 4	400.00	24096 MMART 21	220.00	1 SINGLE 379	500.0	533.0	106.6
24034*MDUME 2	220.00	24095 MMART 22	220.00	1 SINGLE 380	426.8	527.5	117.8
24094*MMART 4	400.00	24095 MMART 22	220.00	1 SINGLE 380	500.0	536.9	107.4
28040*RLOTRU2	220.00	28366 RSIBIU2	220.00	1 SINGLE 621	333.4	393.1	112.2
28040*RLOTRU2	220.00	28100 RSIBIU21	220.00	1 SINGLE 622	333.4	393.1	112.2
28040*RLOTRU2	220.00	28366 RSIBIU2	220.00	1 SINGLE 719	333.4	392.8	111.6
28040*RLOTRU2	220.00	28100 RSIBIU21	220.00	1 SINGLE 720	333.4	392.8	111.6
34100*JBGD172	220.00	34111 JBGD8 22	220.00	2 SINGLE 819	445.8	466.9	105.6
34100*JBGD172	220.00	34111 JBGD8 22	220.00	1 SINGLE 820	445.8	466.9	105.6

MONITORED VOLTAGE REPORT:									
SYSTEM		CONTINGENCY	<----- B U S ----->		V-CONT	V-INIT	V-MAX	V-MIN	
'HU220	'	RANGE BASE CASE	24025	MDETK 2	220.00	1.05000	1.05000	1.05000	0.90000
'BG400	'	RANGE SINGLE 80	12473	VMI3 12	400.00	1.05011	1.03230	1.05000	0.90000
'BG220	'	RANGE SINGLE 134	12286	VUZUND2	220.00	0.88864	1.01023	1.10000	0.90000
'BG220	'	RANGE SINGLE 136	12282	VORFEJ2	220.00	1.10513	1.04381	1.10000	0.90000
'HU220	'	RANGE SINGLE 356	24005	MALBF 22	220.00	0.89275	1.04262	1.05000	0.90000
'HU220	'	RANGE SINGLE 357	24006	MALBF 21	220.00	0.89461	1.04267	1.05000	0.90000
'HU220	'	RANGE SINGLE 367	24095	MMART 22	220.00	1.06757	1.04946	1.05000	0.90000
'HU220	'	RANGE SINGLE 368	24096	MMART 21	220.00	1.06752	1.04944	1.05000	0.90000
'RO220	'	RANGE SINGLE 691	28855	RMOSTI2	220.00	0.82167	1.01469	1.10000	0.90000
'RS400	'	RANGE SINGLE 796	34085	JSOMB31	400.00	0.86315	0.99047	1.05000	0.90000
'RS220	'	RANGE SINGLE 844	34200	JSABA32	220.00	0.88275	1.01884	1.10000	0.90000

CONTINGENCY LEGEND:										
LABEL	EVENTS									
SINGLE 19	:	OPEN LINE FROM BUS 10009 [AELBS12	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1				
SINGLE 22	:	OPEN LINE FROM BUS 10010 [AELBS22	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1				
SINGLE 207	:	OPEN LINE FROM BUS 13 [XTR_PG11	400.00]	TO BUS 36005 [OPDGD211	400.00]	CKT 1				
SINGLE 367	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1				
SINGLE 368	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1				
SINGLE 379	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1				
SINGLE 380	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1				
SINGLE 621	:	OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1				
SINGLE 622	:	OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1				
SINGLE 719	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1				
SINGLE 720	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1				
SINGLE 819	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 1				
SINGLE 820	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 2				

### 13.14.2. Montenegrin Power System Exports 300 MW

Table 13.14.9: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of Montenegro exports 300 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1621.9	1723.7	0.0	0.0	0.0	-150.0	48.2	-150.0
AL	668.5	779.7	-204.7	0.0	475.4	101.7	467.2	
20	9658.2	8411.0	0.0	15.5	0.0	1000.0	231.7	1000.0
BG	3503.7	3357.9	0.0	181.3	3281.5	202.0	3044.0	
30	2952.0	2897.8	0.0	0.0	0.0	0.0	54.2	0.0

BA	1011.6	1017.2	0.0	0.0	912.9	225.8	681.5		
35	44667.1	54409.8	0.0	1.1	0.0	-10140.0	396.2	-10140.0	
IT	9682.0	11942.3	0.0	147.7	12390.1	-796.7	10778.7		
40	3432.1	4359.0	0.0	0.0	0.0	-999.9	73.1	-1000.0	
HR	541.9	1075.9	0.0	0.0	1528.8	199.4	795.3		
45	6094.9	7180.0	0.1	0.0	0.0	-1200.0	114.8	-1200.0	
HU	1380.2	2128.1	178.5	-29.1	2402.9	7.4	1498.2		
50	11749.7	11426.0	0.0	0.0	0.0	0.0	323.7	0.0	
GR	3118.5	5724.7	203.7	9.4	6664.2	122.8	3708.4		
55	5227.7	-4356.2	0.0	4.8	0.0	9448.5	130.6	9450.0	
UX	422.7	622.8	0.0	12.6	2294.7	364.1	1717.8		
60	1939.7	2001.9	0.0	0.0	0.0	-100.0	37.7	-100.0	
MK	759.1	752.3	-30.9	0.0	398.0	12.2	422.3		
65	1207.5	0.0	0.0	0.0	0.0	1200.0	7.5	1200.0	
UA	-163.6	0.0	0.0	0.0	652.3	367.9	120.8		
70	13264.5	12110.2	0.0	90.1	0.0	800.0	264.1	800.0	
RO	3134.3	4455.6	782.9	285.6	5598.5	-45.9	3254.6		
75	3953.6	2990.0	0.0	8.8	0.0	890.0	64.7	890.0	
SI	1281.0	964.6	0.0	53.5	863.0	340.7	785.3		
80	77661.5	77342.9	0.0	0.0	0.0	-800.0	1118.6	-800.0	
TR	9832.1	11034.0	996.9	0.0	22660.8	-172.7	20634.8		
90	7768.8	8298.8	0.0	17.3	0.0	-750.0	202.8	-750.0	
RS	2899.2	2986.6	0.0	73.4	1732.1	-655.7	2227.0		
91	1106.5	938.0	0.5	2.5	0.0	301.5	33.1	300.0	
ME	436.6	346.6	-34.6	14.5	237.6	21.4	366.7		
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0	
SK	-319.6	0.0	0.0	0.0	40.0	-294.3	14.7		
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTALS	192807.1	189732.9	0.6	140.2	0.0	0.0	3102.4	0.0	
	38188.0	47188.4	1891.9	748.9	62132.8	0.0	50517.3		

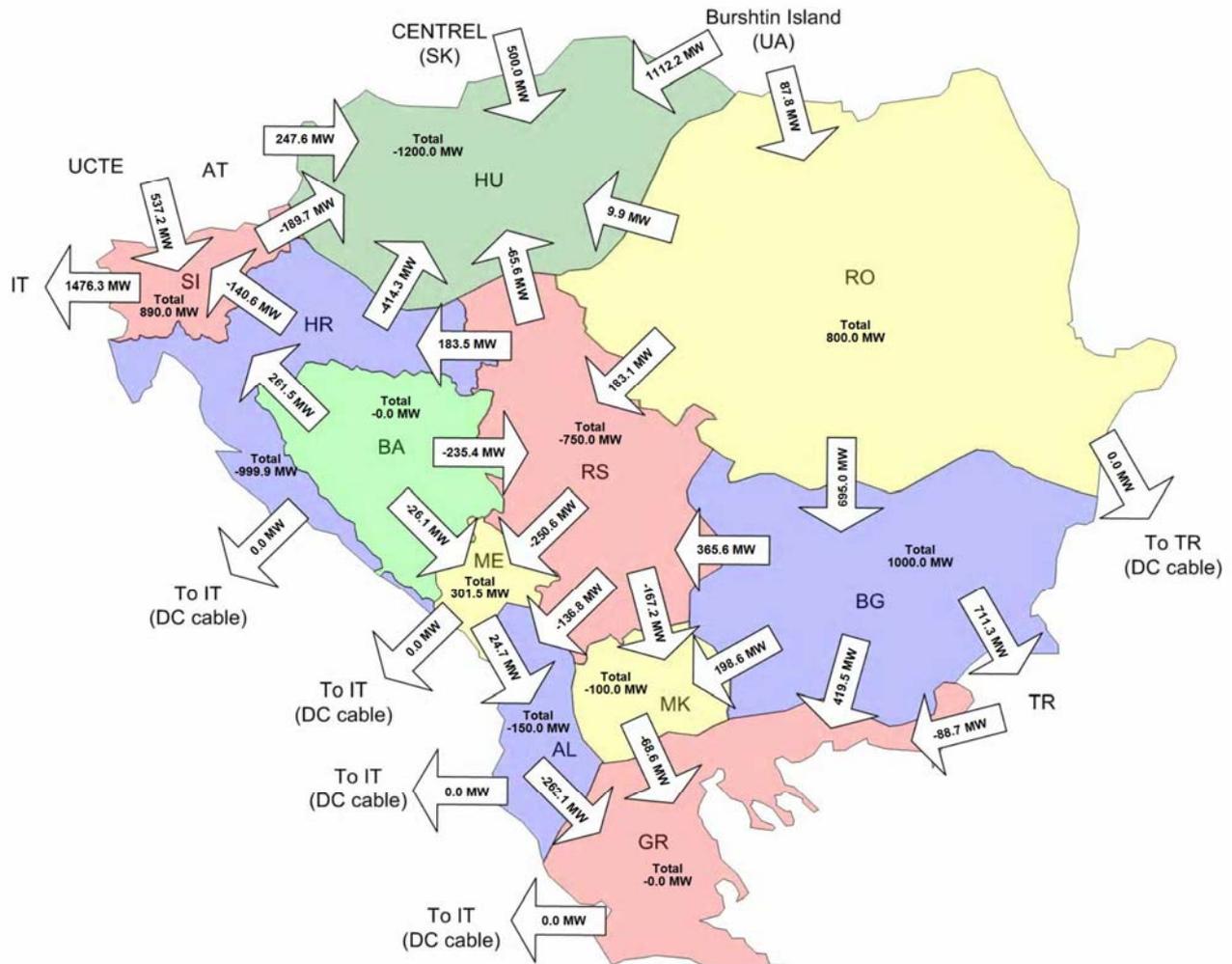


Figure 13.14.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of Montenegro exports 300 MW

Table 13.14.10: Changes in power flow in area of SEE in winter maximum 2020, scenario when power system of Montenegro exports 300 MW

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	
80	[XRE_DI11	400.00]	31410	[LDIVAC1	400.00]	1	-627.9	-228.0	-511.6	-235.9	116.3	18.5
80	[XRE_DI11	400.00]	53357	[IRDPV11	400.00]	1	627.9	228.0	511.6	235.9	-116.3	18.5
36025	[OHPIVA21	220.00]	36503	[OHPIVAG3	15.750]	3	-168.2	-10.0	OUT OF SERVICE	168.2	100.0	
36030	[OHPERU51	110.00]	36526	[OHPERUG6	10.500]	6	151.3	30.6	-30.4	-10.9	-181.7	120.1
52049	[ICRDV111	400.00]	52271	[IVEZV111	400.00]	1	713.0	-96.3	590.2	-74.9	-122.9	17.2
52049	[ICRDV111	400.00]	53122	[II12V111	400.00]	1	1221.4	116.8	1107.6	113.1	-113.8	9.3
52049	[ICRDV111	400.00]	53531	[IUDOV11	400.00]	1	-157.8	-165.0	-44.4	-162.0	113.5	71.9
52059	[IDOLV111	400.00]	52271	[IVEZV111	400.00]	1	-244.9	96.0	-126.0	67.0	118.9	48.5
52059	[IDOLV111	400.00]	52271	[IVEZV111	400.00]	2	-240.7	102.7	-123.3	70.3	117.4	48.8
52060	[IDUGV111	400.00]	52165	[IOSTM111	400.00]	1	-703.6	-327.3	-840.2	-290.8	-136.6	19.4
52060	[IDUGV111	400.00]	53160	[II49V111	400.00]	1	56.5	222.8	168.9	188.3	112.4	198.8
52137	[ILATR111	400.00]	52276	[IVLMR111	400.00]	1	160.6	-97.8	292.0	-92.1	131.4	81.8
52137	[ILATR111	400.00]	53121	[II11R111	400.00]	1	384.0	-10.8	-10.4	-7.7	-394.4	102.7
52165	[IOSTM111	400.00]	53431	[ISMDM111	400.00]	1	366.1	-222.2	258.5	-216.1	-107.6	29.4
52179	[IPLNV111	400.00]	52226	[ISLGV111	400.00]	1	654.4	10.4	526.6	11.3	-127.9	19.5
52226	[ISLGV111	400.00]	52271	[IVEZV111	400.00]	1	126.6	-67.6	12.3	-50.3	-114.3	90.3
52231	[ISNGV111	400.00]	53122	[II12V111	400.00]	1	-886.1	103.1	-773.7	70.4	112.4	12.7
52231	[ISNGV111	400.00]	53160	[II49V111	400.00]	1	190.9	-196.0	78.5	-163.3	-112.4	58.9
53120	[II10C111	400.00]	53121	[II11R111	400.00]	1	-383.9	10.0	10.4	6.4	394.3	102.7

Table 13.14.11: Changes in power flow greater than 50 MW through tie-lines in area of interest in winter maximum 2020, scenario when power system of Montenegro exports 300 MW

X-----	FROM BUS	X-----	TO BUS	X-----	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%
36001	[ORIBAR11 400.00]	184	[XRI_PE11 400.00]	1		209.6	48.8	161.4	51.1	-48.3	23.0	2.3	4.8
36001	[ORIBAR11 400.00]	36045	[OBPOLJ51 110.00]	A		-3.8	-11.6	3.8	-12.6	7.6	200.8	-1.0	8.5
36005	[OPODG211 400.00]	13	[XTR_PG11 400.00]	1		-93.0	-117.4	-152.0	-112.0	-58.9	63.3	5.4	4.6
36005	[OPODG211 400.00]	220	[XKA_PG11 400.00]	1		22.6	-34.0	9.5	-32.6	-13.0	57.8	1.5	4.4
36005	[OPODG211 400.00]	36120	[OPODG251 110.00]	1		125.9	100.7	146.4	98.9	20.4	16.2	-1.9	1.9
36005	[OPODG211 400.00]	36120	[OPODG251 110.00]	2		125.9	100.8	146.3	98.9	20.4	16.2	-1.9	1.9
36015	[OPODG121 220.00]	88	[XVD_PO21 220.00]	1		2.1	1.5	-18.4	5.5	-20.6	958.4	4.0	268.8
36015	[OPODG121 220.00]	36095	[OPODG151 110.00]	1		69.9	11.5	66.9	10.6	-3.0	4.3	-0.9	8.1
36015	[OPODG121 220.00]	36095	[OPODG151 110.00]	2		78.8	12.6	75.4	11.5	-3.4	4.3	-1.0	8.3
36020	[OMOJKO21 220.00]	36090	[OMOJKO51 110.00]	1		60.0	35.8	49.1	35.9	-10.9	18.1	0.1	0.3
36023	[OTPLJE21 220.00]	182	[XPL_BB21 220.00]	1		-32.9	40.3	-90.8	48.9	-57.9	175.9	8.6	21.4
36023	[OTPLJE21 220.00]	183	[XPL_BI21 220.00]	1		58.5	52.3	14.3	55.6	-44.2	75.6	3.3	6.3
36023	[OTPLJE21 220.00]	36125	[OPLJE251 110.00]	1		72.9	29.4	74.3	28.8	1.4	1.9	-0.6	2.0
36025	[OHPIVA21 220.00]	115	[XSA_PI21 220.00]	1		187.6	12.8	97.4	-2.2	-90.1	48.1	-15.0	116.7
36025	[OHPIVA21 220.00]	36502	[OHPIVAG2 15.750]	2		-99.6	-22.5	OUT OF SERVICE		99.6	100.0	22.5	100.0
36025	[OHPIVA21 220.00]	36503	[OHPIVAG3 15.750]	3		-168.2	-10.0	OUT OF SERVICE		168.2	100.0	10.0	100.0
36027	[OHPERU21 220.00]	116	[XTR_PE21 220.00]	1		-3.5	-28.0	-41.5	-22.1	-38.0	999.9	5.9	21.0
36027	[OHPERU21 220.00]	36030	[OHPERU51 110.00]	1		12.6	31.0	33.9	30.8	21.2	167.7	-0.2	0.7
36029	[OHANDR21 220.00]	36571	[OHANDRG1 13.800]	1		-62.7	-21.8	-36.8	-25.0	25.9	41.3	-3.2	14.7
36029	[OHANDR21 220.00]	36572	[OHANDRG2 13.800]	2		-62.7	-21.8	-36.8	-25.0	25.9	41.3	-3.2	14.7

Table 13.14.12: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of Montenegro exports 300 MW

<-----	MONITORED BRANCH	>-----	CONTINGENCY	RATING	FLOW	%
10010*	AELBS22 220.00	10125 ACEKIN2	220.00 1 SINGLE 19	370.0	386.3	102.9
10009*	AELBS12 220.00	10125 ACEKIN2	220.00 1 SINGLE 22	370.0	384.2	102.6
24034*	MDUME 2 220.00	24096 MMART 21	220.00 1 SINGLE 367	426.8	523.1	116.8
24094*	MMART 4 400.00	24096 MMART 21	220.00 1 SINGLE 367	500.0	532.2	106.4
24034*	MDUME 2 220.00	24095 MMART 22	220.00 1 SINGLE 368	426.8	526.9	117.7
24094*	MMART 4 400.00	24095 MMART 22	220.00 1 SINGLE 368	500.0	536.0	107.2
24034*	MDUME 2 220.00	24096 MMART 21	220.00 1 SINGLE 379	426.8	523.4	116.9
24094*	MMART 4 400.00	24096 MMART 21	220.00 1 SINGLE 379	500.0	532.5	106.5
24034*	MDUME 2 220.00	24095 MMART 22	220.00 1 SINGLE 380	426.8	527.2	117.8
24094*	MMART 4 400.00	24095 MMART 22	220.00 1 SINGLE 380	500.0	536.3	107.3
28040*	RLOTRU2 220.00	28366 RSIBIU2	220.00 1 SINGLE 621	333.4	393.1	112.3
28040*	RLOTRU2 220.00	28100 RSIBIU21	220.00 1 SINGLE 622	333.4	393.1	112.3
28040*	RLOTRU2 220.00	28366 RSIBIU2	220.00 1 SINGLE 719	333.4	392.9	111.7
28040*	RLOTRU2 220.00	28100 RSIBIU21	220.00 1 SINGLE 720	333.4	392.9	111.7
34100*	JBGD172 220.00	34111 JBGD8 22	220.00 2 SINGLE 819	445.8	466.9	105.6
34100*	JBGD172 220.00	34111 JBGD8 22	220.00 1 SINGLE 820	445.8	466.9	105.6

MONITORED VOLTAGE REPORT:	SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
'HU220	'	RANGE BASE CASE	24025 MDETK 2	220.00	1.05000	1.05000	0.90000
'BG400	'	RANGE SINGLE 80	12473 VMT3 12	400.00	1.05037	1.03265	0.90000
'BG220	'	RANGE SINGLE 134	12286 VUZUND2	220.00	0.88925	1.01064	1.10000
'BG220	'	RANGE SINGLE 136	12282 VORFEJ2	220.00	1.10522	1.04457	1.10000
'HR400	'	RANGE SINGLE 291	20260 HTEPLO	400.00	1.05099	1.03781	1.05000
'HU220	'	RANGE SINGLE 356	24005 MALBF 22	220.00	0.89275	1.04262	1.05000
'HU220	'	RANGE SINGLE 357	24006 MALBF 21	220.00	0.89461	1.04267	1.05000
'HU220	'	RANGE SINGLE 367	24095 MMART 22	220.00	1.06705	1.04937	1.05000
'HU220	'	RANGE SINGLE 368	24096 MMART 21	220.00	1.06700	1.04935	1.05000
'GR400	'	RANGE SINGLE 499	23126 GKPATC12	400.00	1.05003	1.02513	1.05000
'GR400	'	RANGE SINGLE 499	23180 GAXELO12	400.00	1.05003	1.02549	1.05000
'RO220	'	RANGE SINGLE 691	28855 RMOSTI2	220.00	0.82119	1.01423	1.10000
'RS400	'	RANGE SINGLE 796	34085 JSOMB31	400.00	0.86219	0.98971	1.05000
'RS220	'	RANGE SINGLE 844	34200 JSABA32	220.00	0.88199	1.01876	1.10000

CONTINGENCY LEGEND:	LABEL	EVENTS
SINGLE 19	:	OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	:	OPEN LINE FROM BUS 10010 [AELBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 367	:	OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 368	:	OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 379	:	OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 380	:	OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 621	:	OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	:	OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 719	:	OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	:	OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 819	:	OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 820	:	OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2

## 13.15. Romanian Power Balance Uncertainty

### 13.15.1. Romanian Power System Is Self-Balanced

Table 13.15.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of Romania is self-balanced

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1339.1	1491.9	0.0	0.0	0.0	-200.0	47.2	-200.0
AL			484.1	689.7	-199.4	0.0	457.9	29.5	422.2	
20			8802.3	7603.7	0.0	14.4	0.0	1000.0	184.1	1000.0
BG			2915.9	3045.8	-44.8	120.9	2994.6	358.2	2430.4	
30			3149.1	2610.1	0.0	0.0	0.0	490.0	49.0	490.0
BA			706.2	724.5	0.0	0.0	910.8	328.4	564.1	
35			40267.5	49222.0	0.0	1.1	0.0	-9399.5	444.0	-9400.0
IT			7088.6	10816.5	0.0	-156.9	12565.7	-525.0	9519.8	
40			3097.5	3483.0	0.0	0.0	0.0	-435.1	49.7	-435.0
HR			351.4	1074.2	0.0	0.0	1409.3	28.3	658.3	
45			5393.6	6500.0	0.1	0.0	0.0	-1200.4	93.9	-1200.0
HU			970.9	1926.6	178.1	-29.5	2422.2	87.8	1230.2	
50			10298.2	10371.1	0.0	0.0	0.0	-350.0	277.1	-350.0
GR			2148.4	5312.0	170.2	9.3	6612.6	113.6	3142.1	
55			4970.6	-4593.5	0.0	4.8	0.0	9431.3	128.1	9431.0
UX			329.9	637.5	0.0	12.7	2306.4	265.2	1720.9	
60			1501.2	1577.0	0.0	0.0	0.0	-100.0	24.2	-100.0
MK			453.5	573.6	-31.4	0.0	403.6	53.2	261.6	
65			1207.6	0.0	0.0	0.0	0.0	1200.0	7.6	1200.0
UA			-180.5	0.0	0.0	0.0	653.6	356.8	116.4	
70			9718.1	9416.9	0.0	87.8	0.0	0.1	213.2	0.0
RO			2650.3	4075.6	508.1	272.4	4587.1	-227.1	2608.5	
75			2992.6	2514.0	0.0	8.8	0.0	423.6	46.1	424.0
SI			985.9	811.0	0.0	54.0	608.1	192.9	536.1	
80			54592.0	54622.1	0.0	0.0	0.0	-800.0	770.0	-800.0
TR			4571.3	7792.0	1175.4	0.0	17195.7	-129.7	12929.3	
90			7713.4	7871.1	0.0	17.8	0.0	-360.0	184.5	-360.0
RS			2632.7	2853.5	0.0	76.5	1728.7	-626.1	2057.6	
91			630.2	805.2	0.5	1.9	0.0	-200.0	22.6	-200.0
ME			304.6	299.2	-34.9	10.9	238.6	51.2	216.8	
95			501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK			-381.4	0.0	0.0	0.0	40.0	-357.2	15.8	
TOTALS			156174.4	153494.7	0.6	136.6	0.0	0.0	2542.6	0.0
			26032.0	40631.6	1721.3	370.2	55134.9	0.0	38430.1	



Figure 13.15.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of Romania is self-balanced

Table 13.15.2: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2015, scenario when power system of Romania is self-balanced

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,CKT,STS,	MW,	MVAR,	MVA,	%I
***** NONE *****							

Table 13.15.3: Changes in power flow greater than 100 MW in area of SEE in winter maximum 2015, scenario when power system of Romania is self-balanced

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 100.0 MW:											
IN WORKING CASE					IN BASE CASE						
X-----	FROM BUS	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
5	[XDU_SL11	400.00]	50026 [ODUERN1	400.00]	1	500.0	-221.5	320.0	-235.2	-180.0	36.0
8	[XWI_GY11	400.00]	24067 [MGYOR 4	400.00]	1	145.0	11.1	-14.2	34.8	-159.2	109.8
8	[XWI_GY11	400.00]	50010 [OWIEN 1	400.00]	1	-145.0	-11.1	14.2	-34.8	159.2	109.8
80	[XRE_DI11	400.00]	31410 [LDIVAC1	400.00]	1	-626.8	-231.3	-730.1	-211.1	-103.3	16.5
80	[XRE_DI11	400.00]	52189 [IRDPV11	400.00]	1	626.8	231.3	730.1	211.1	103.3	16.5
181	[XVA_IS11	400.00]	12460 [VVARNA1	400.00]	1	28.0	-30.6	148.1	-30.9	120.1	429.1
181	[XVA_IS11	400.00]	28974 [RMEDGI1	400.00]	1	-28.0	30.6	-148.1	30.9	-120.1	429.1
24067	[MGYOR 4	400.00]	24763 [MGONYU1	400.00]	1	-345.1	-258.3	-451.1	-244.4	-105.9	30.7
24122	[MPAKS 4	400.00]	24148 [MSAFA 4	400.00]	1	423.7	32.4	317.0	27.1	-106.7	25.2
24763	[MGONYU1	400.00]	24765 [MOROE 11	400.00]	1	390.6	266.7	284.4	272.9	-106.2	27.2
28017	[RCONST1	400.00]	28069 [RTARIV1	400.00]	1	99.1	-12.1	-32.3	-56.7	-131.4	132.5
28017	[RCONST1	400.00]	28973 [RCERNAL	400.00]	1	-229.1	-46.9	-80.6	-19.4	148.5	64.8
28019	[RTLULCE1A	400.00]	28020 [RISACC1A	400.00]	1	-139.9	-39.1	78.7	-2.3	218.6	156.3

28019	[RTULCE1A	400.00]	28069	[RTARIV1	400.00]	1	-97.8	-64.4	-266.3	-112.4	-168.5	172.3
28031	[RBRASO1	400.00]	28034	[RSIBIU1	400.00]	1	-357.4	-35.6	-240.7	-48.2	116.7	32.6
34040	[JRPMLA1	400.00]	34045	[JSMIT21	400.00]	1	369.9	-62.1	486.0	-62.6	116.1	31.4
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	1	-1014.8	87.4	-880.0	51.8	134.8	13.3
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	2	-1014.8	87.4	-880.0	51.8	134.8	13.3
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	1	-1129.7	109.3	-936.2	78.3	193.6	17.1
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	2	-1129.7	109.3	-936.2	78.3	193.6	17.1
50009	[OWESTT1	400.00]	50011	[OZELL 1	400.00]	1	761.7	77.6	638.8	38.6	-122.9	16.1
50009	[OWESTT1	400.00]	50011	[OZELL 1	400.00]	2	761.7	77.6	638.8	38.6	-122.9	16.1
50011	[OZELL 1	400.00]	50042	[OZELL 2	220.00]	1	-757.7	22.9	-609.5	64.7	148.2	19.6

Table 13.15.4: Changes in power flow through tie-lines connecting Romania to the rest of the system, in winter maximum 2015, scenario when power system of Romania is self-balanced

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:											
IN WORKING CASE						IN BASE CASE					
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW %
75	[XSA_AR11	400.00]	24148	[MSAFA 4	400.00]	1	-112.1	1.5	-44.4	-5.2	67.7 60.4
84	[XRO_MU11	400.00]	65001	[UMUKACH	400.00]	1	-221.9	-57.5	-160.8	-57.2	61.1 27.5
85	[XPF_DJ11	400.00]	34010	[JHDJE11	400.00]	1	58.8	-32.2	139.8	-32.3	81.0 137.8
86	[XRE_PA11	400.00]	34035	[JPANC21	400.00]	1	82.0	6.6	129.4	0.9	47.4 57.9
219	[XBE_OR11	400.00]	24013	[MBEKO 4	400.00]	1	-155.2	10.9	-64.9	-0.4	90.2 58.2
28001	[RTANTA1	400.00]	22	[XKO_TI11	400.00]	1	196.5	-120.4	195.3	-114.0	-1.3 0.6
28001	[RTANTA1	400.00]	23	[XKO_TI12	400.00]	2	196.5	-120.4	195.3	-114.0	-1.3 0.6
28020	[RISACCA	400.00]	21	[XDO_IS11	400.00]	1	-67.0	-98.2	12.7	-97.2	79.7 118.9
28974	[RMEDEG1	400.00]	181	[XVA_IS11	400.00]	1	28.6	-66.7	148.9	-65.3	120.3 420.6

Table 13.15.5: Results of contingency (n-1) analysis in winter maximum 2015, scenario when power system of Romania is self-balanced

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%
316*XTR_HN51	110.00	36050 OHNOVI51	110.00 1 SINGLE 196	89.6	102.8	116.9
31210*LDIVAC2	220.00	156 XPA_DI21	220.00 1 SINGLE 707	320.1	483.6	145.9
MONITORED VOLTAGE REPORT:						
SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
'BG220	RANGE SINGLE 100	12252 VOCHIF2	220.00	0.81694	0.95819	1.10000
'BG220	RANGE SINGLE 124	12286 VUZUND2	220.00	0.89614	1.00472	1.10000
'GR400	RANGE SINGLE 432	22759 GTH_AG11	400.00	1.05200	1.02526	1.05000
'GR400	RANGE SINGLE 432	23123 GKPATR11	400.00	1.05215	1.03819	1.05000
'GR400	RANGE SINGLE 432	23125 GKPATC11	400.00	1.05224	1.03817	1.05000
'GR400	RANGE SINGLE 432	23126 GKPATC12	400.00	1.05218	1.03828	1.05000
'GR400	RANGE SINGLE 432	23173 GDISTO11	400.00	1.05308	1.03792	1.05000
'GR400	RANGE SINGLE 432	23174 GDISTO12	400.00	1.05270	1.03805	1.05000
'GR400	RANGE SINGLE 432	23180 GAXELO12	400.00	1.05236	1.03873	1.05000
'GR400	RANGE SINGLE 432	23181 GAXELO11	400.00	1.05232	1.03894	1.05000
'GR400	RANGE SINGLE 433	23064 GK_MEG13	400.00	1.05385	1.04116	1.05000
'GR400	RANGE SINGLE 433	23066 GK_MEG11	400.00	1.05385	1.04116	1.05000
'GR400	RANGE SINGLE 433	23123 GKPATR11	400.00	1.05328	1.03819	1.05000
'GR400	RANGE SINGLE 433	23125 GKPATC11	400.00	1.05337	1.03817	1.05000
'GR400	RANGE SINGLE 433	23126 GKPATC12	400.00	1.05332	1.03828	1.05000
'GR400	RANGE SINGLE 433	23173 GDISTO11	400.00	1.05400	1.03792	1.05000
'GR400	RANGE SINGLE 433	23174 GDISTO12	400.00	1.05382	1.03805	1.05000
'GR400	RANGE SINGLE 433	23180 GAXELO12	400.00	1.05350	1.03873	1.05000
'GR400	RANGE SINGLE 433	23181 GAXELO11	400.00	1.05356	1.03894	1.05000
'GR400	RANGE SINGLE 462	23036 GK_KOR13	400.00	1.06325	1.01748	1.05000
'GR400	RANGE SINGLE 462	23068 GK_MEG14	400.00	1.06086	1.02950	1.05000
'GR400	RANGE SINGLE 463	23037 GK_KOR14	400.00	1.06325	1.01748	1.05000
'GR400	RANGE SINGLE 463	23067 GK_MEG12	400.00	1.06086	1.02950	1.05000
'GR400	RANGE SINGLE 473	23126 GKPATC12	400.00	1.06899	1.03828	1.05000
'GR400	RANGE SINGLE 473	23180 GAXELO12	400.00	1.06899	1.03873	1.05000
'GR400	RANGE SINGLE 473	23181 GAXELO11	400.00	1.06880	1.03894	1.05000
'GR400	RANGE SINGLE 475	23180 GAXELO12	400.00	1.06844	1.03873	1.05000
'GR400	RANGE SINGLE 475	23181 GAXELO11	400.00	1.06826	1.03894	1.05000
'RO220	RANGE SINGLE 567	28042 RRIURE2	220.00	0.89470	0.97583	1.10000
'RO220	RANGE SINGLE 567	28043 RSTUPA2	220.00	0.88616	0.97430	1.10000
'RO220	RANGE SINGLE 637	28855 RMOSTI2	220.00	0.87622	1.03725	1.10000
'RO220	RANGE SINGLE 642	28907 RSTILP2	220.00	0.60183	0.97395	1.10000
'RO220	RANGE SINGLE 643	28906 RTELEA2	220.00	0.89583	0.99604	1.10000
'RO220	RANGE SINGLE 643	28907 RSTILP2	220.00	0.87666	0.97395	1.10000
'RO220	RANGE SINGLE 670	28095 RVETIS2	220.00	0.89205	1.01997	1.10000
'RS400	RANGE SINGLE 739	34085 JSOMB31	400.00	0.87986	0.99463	1.05000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 100	: OPEN LINE FROM BUS 12250 [VGORIA2 220.00] TO BUS 12252 [VOCHIF2 220.00] CKT 1
SINGLE 124	: OPEN LINE FROM BUS 12275 [VMI3 2 220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 196	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [OPODG211 400.00] CKT 1
SINGLE 432	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23172 [GDISTO13 400.00] CKT 1
SINGLE 433	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23173 [GDISTO11 400.00] CKT 1
SINGLE 462	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23036 [GK_KOR13 400.00] CKT 1
SINGLE 463	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23037 [GK_KOR14 400.00] CKT 1
SINGLE 473	: OPEN LINE FROM BUS 23123 [GKPATR11 400.00] TO BUS 23126 [GKPATC12 400.00] CKT 1
SINGLE 475	: OPEN LINE FROM BUS 23126 [GKPATC12 400.00] TO BUS 23180 [GAXELO12 400.00] CKT 1
SINGLE 567	: OPEN LINE FROM BUS 28043 [RSTUPA2 220.00] TO BUS 28044 [RBRADU2 220.00] CKT 1
SINGLE 637	: OPEN LINE FROM BUS 28855 [RMOSTI2 220.00] TO BUS 28935 [RRAC.M2 220.00] CKT 1
SINGLE 642	: OPEN LINE FROM BUS 28906 [RTELEA2 220.00] TO BUS 28907 [RSTILP2 220.00] CKT 1
SINGLE 643	: OPEN LINE FROM BUS 28906 [RTELEA2 220.00] TO BUS 29050 [RBRAZI2B 220.00] CKT 1
SINGLE 670	: OPEN LINE FROM BUS 28039 [RROSIO1 400.00] TO BUS 28094 [RROSIO2 220.00] CKT 1
SINGLE 707	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1
SINGLE 739	: OPEN LINE FROM BUS 34050 [JSUBO31 400.00] TO BUS 34085 [JSOMB31 400.00] CKT 1

Table 13.15.6: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of Romania is self-balanced

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1621.7	1723.7	0.0	0.0	0.0	-150.0	48.0	-150.0
AL	670.3	779.7	-204.6	0.0	475.3	105.3	465.2	
20	9646.7	8411.0	0.0	15.6	0.0	1001.1	219.0	1000.0
BG	3346.4	3357.9	0.0	182.3	3298.3	183.8	2920.7	
30	2948.7	2897.8	0.0	0.0	0.0	0.0	50.9	0.0
BA	1004.0	1017.2	0.0	0.0	913.9	252.9	647.9	
35	45065.4	54409.8	0.0	1.1	0.0	-9741.2	395.7	-9740.0
IT	9723.9	11942.3	0.0	147.7	12383.9	-760.3	10778.2	
40	3426.5	4359.0	0.0	0.0	0.0	-1000.2	67.7	-1000.0
HR	510.1	1075.9	0.0	0.0	1533.4	215.8	751.9	
45	6096.6	7180.0	0.1	0.0	0.0	-1201.2	117.7	-1200.0
HU	1379.0	2128.1	178.6	-29.0	2401.9	-15.7	1518.9	
50	11748.6	11426.0	0.0	0.0	0.0	0.1	322.5	0.0
GR	3099.8	5724.7	203.6	9.4	6666.8	117.8	3697.4	
55	6080.7	-4356.2	0.0	4.7	0.0	10249.4	182.8	10250.0
UX	1046.7	622.8	0.0	12.5	2265.0	129.2	2547.1	
60	1938.8	2001.9	0.0	0.0	0.0	-99.8	36.6	-100.0
MK	753.1	752.3	-30.9	0.0	398.6	17.4	411.7	
65	1208.0	0.0	0.0	0.0	0.0	1199.9	8.1	1200.0
UA	-158.9	0.0	0.0	0.0	652.2	366.0	127.2	
70	12435.0	12110.2	0.0	91.2	0.0	2.0	231.6	0.0
RO	2924.8	4455.6	791.4	288.5	5667.4	116.4	2940.3	
75	3950.1	2990.0	0.0	8.9	0.0	889.8	61.5	890.0
SI	1265.0	964.6	0.0	53.6	864.9	363.1	748.6	
80	77661.3	77342.9	0.0	0.0	0.0	-800.0	1118.4	-800.0
TR	9816.2	11034.0	996.9	0.0	22661.1	-185.3	20631.7	

90	7765.2	8298.8	0.0	17.3	0.0	-749.8	198.9	-750.0
RS	2863.8	2986.6	0.0	73.4	1734.3	-658.1	2196.2	
91	865.4	938.0	0.5	2.1	0.0	-100.2	25.0	-100.0
ME	351.7	346.6	-34.5	11.4	236.7	39.5	225.4	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-313.2	0.0	0.0	0.0	39.9	-287.8	14.6	
TOTALS	192960.1	189732.9	0.6	140.9	0.0	0.0	3085.6	0.0
	38282.6	47188.4	1900.3	749.8	62193.6	0.0	50622.8	

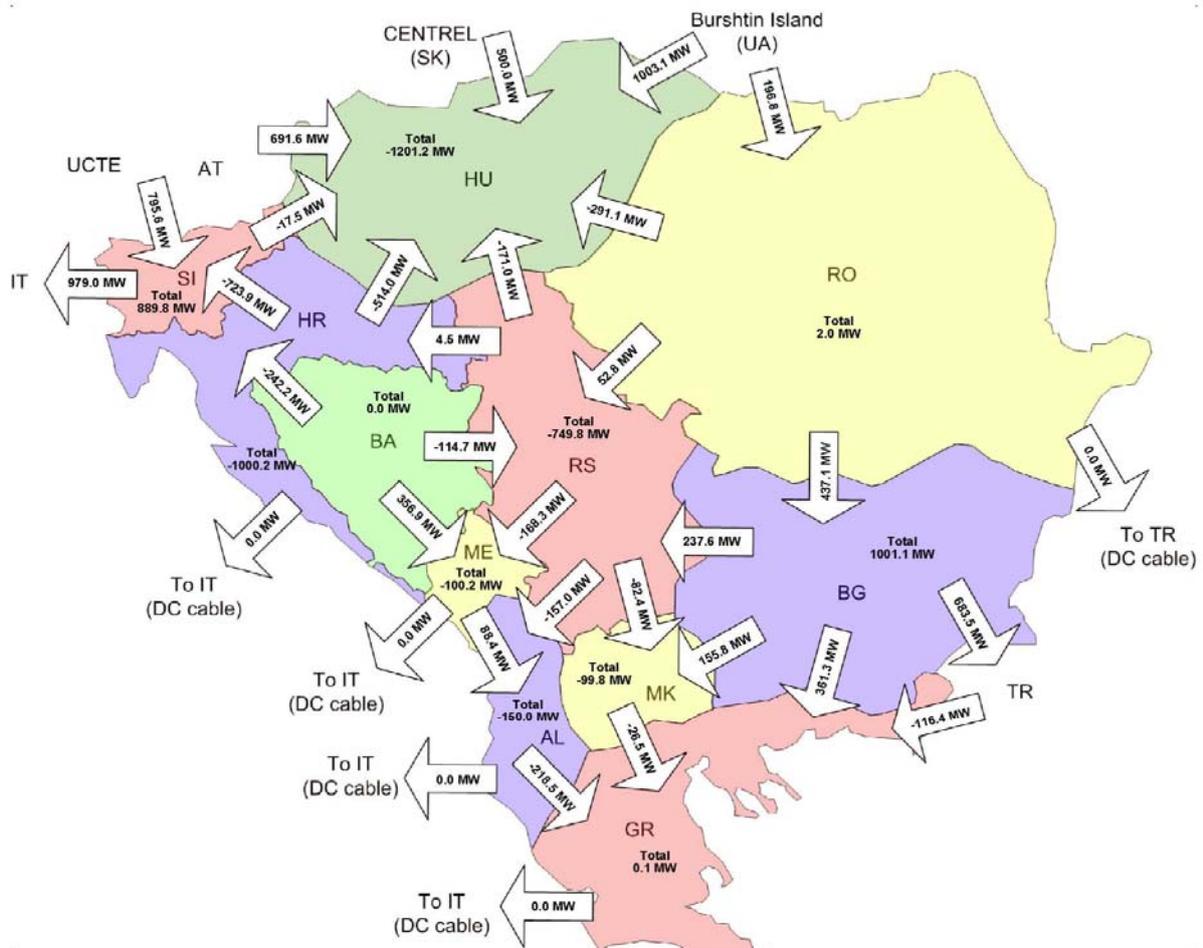


Figure 13.15.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of Romania is self-balanced

Table 13.15.7: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2020, scenario when power system of Romania is self-balanced

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I		
12274,VMI	2	220.00,	12474,VMI	1	400.00,	1,	1,	-537.14,	-108.86,	548.07,	82.50

*Table 13.15.8: Changes in power flow greater then 150 MW in area of SEE in winter maximum 2020, scenario when power system of Romania is self-balanced*

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 150.0 MW:												
IN WORKING CASE					IN BASE CASE							
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
8	[XWI_GY11	400.00]	24067	[MGYOR 4	400.00]	1	301.1	-27.5	84.1	12.2	-217.0	72.1
8	[XWI_GY11	400.00]	50010	[OWIEN 1	400.00]	1	-301.1	27.5	-84.1	-12.2	217.0	72.1
181	[XVA_IS11	400.00]	12994	[VSVOBO14	400.00]	1	226.8	105.5	441.0	64.2	214.2	94.4
181	[XVA_IS11	400.00]	28974	[RMEDGI1	400.00]	1	-226.8	-105.5	-441.0	-64.2	-214.2	94.4
24067	[MGYOR 4	400.00]	24763	[MGONYU1	400.00]	1	-313.8	-295.1	-465.3	-276.8	-151.5	48.3
24122	[MPAKS 4	400.00]	24148	[MSAFA 4	400.00]	1	495.1	41.6	334.7	36.1	-160.4	32.4
24763	[MGONYU1	400.00]	24765	[MOROE 11	400.00]	1	472.7	294.4	320.8	308.4	-151.9	32.1
28017	[RCONST1	400.00]	28069	[RTARIV1	400.00]	1	79.0	-26.3	-135.7	55.9	-214.7	271.8
28020	[RISACCL1A	400.00]	28028	[RVANT 1	400.00]	1	-296.8	17.6	-616.6	138.3	-319.8	107.7
28028	[RVANT 1	400.00]	28069	[RTARIV1	400.00]	1	34.2	-14.6	-211.8	63.7	-246.0	719.0
28028	[RVANT 1	400.00]	28069	[RTARIV1	400.00]	2	34.2	-14.6	-211.8	63.7	-246.0	719.0
28028	[RVANT 1	400.00]	28974	[RMEDGI1	400.00]	1	-65.8	-33.4	105.1	-88.0	171.0	259.7
28031	[RBRASO1	400.00]	28034	[RSIBIU1	400.00]	1	-135.1	-95.3	32.6	-122.5	167.7	124.1
34040	[JRPMLA1	400.00]	34045	[JSMIT21	400.00]	1	370.4	-23.0	533.3	-23.6	162.9	44.0
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	1	-1200.8	152.7	-969.3	69.8	231.6	19.3
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	2	-1200.8	152.7	-969.3	69.8	231.6	19.3
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	1	-1373.8	139.8	-1023.0	92.2	350.8	25.5
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	2	-1373.8	139.8	-1023.0	92.2	350.8	25.5
50011	[OZELL 1	400.00]	50042	[OZELL 2	220.00]	1	-848.0	-82.7	-398.8	4.3	449.2	53.0
52049	[ICRDV11	400.00]	53531	[IUDOV11	400.00]	1	122.3	-233.2	-44.4	-162.0	-166.6	136.3

*Table 13.15.9: Changes in power flow through tie-lines connecting Romania to the rest of the system in winter maximum 2020, scenario when power system of Romania is self-balanced*

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:												
IN WORKING CASE					IN BASE CASE							
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
75	[XSA_AR11	400.00]	24148	[MSAFA 4	400.00]	1	-118.1	30.0	-7.4	11.4	110.7	93.8
84	[XRO_MU11	400.00]	65001	[UMUKACH	400.00]	1	-196.8	-17.9	-108.4	-32.2	88.4	44.9
85	[XPF_DJ11	400.00]	34010	[JHDJE11	400.00]	1	-6.0	-9.5	100.9	-19.2	106.9	999.9
86	[XRE_PA11	400.00]	34035	[JPANC21	400.00]	1	58.7	17.7	107.9	7.8	49.1	83.7
219	[XBE_OR11	400.00]	24013	[MBEKO 4	400.00]	1	-173.0	49.6	-33.8	24.0	139.2	80.5
28001	[RTANTA1	400.00]	22	[XKO_TI11	400.00]	1	51.9	-112.2	36.0	-109.2	-16.0	30.7
28001	[RTANTA1	400.00]	23	[XKO_TI12	400.00]	2	51.6	-112.2	35.6	-109.2	-16.0	30.9
28020	[RISACCL1A	400.00]	21	[XDO_IS11	400.00]	1	109.5	-60.6	231.9	-77.0	122.4	111.7
28974	[RMEDGI1	400.00]	181	[XVA_IS11	400.00]	1	227.2	74.2	442.3	46.7	215.1	94.7

*Table 13.15.10: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of Romania is self-balanced*

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%
10010*AEBS22	220.00	10125 ACEKIN2	220.00 1 SINGLE 19	370.0	386.3	102.9
10009*AEBS12	220.00	10125 ACEKIN2	220.00 1 SINGLE 22	370.0	384.3	102.6
316 XTR_HN51	110.00	36050*OHNOVI51	110.00 1 SINGLE 207	89.6	108.1	122.6
24034*MDUME 2	220.00	24096 MMART 21	220.00 1 SINGLE 367	426.8	501.5	112.0
24094*MMART 4	400.00	24096 MMART 21	220.00 1 SINGLE 367	500.0	510.3	102.1
24034*MDUME 2	220.00	24095 MMART 22	220.00 1 SINGLE 368	426.8	505.1	112.8
24094*MMART 4	400.00	24095 MMART 22	220.00 1 SINGLE 368	500.0	513.9	102.8
24034*MDUME 2	220.00	24096 MMART 21	220.00 1 SINGLE 379	426.8	501.7	112.1
24094*MMART 4	400.00	24096 MMART 21	220.00 1 SINGLE 379	500.0	510.6	102.1
24034*MDUME 2	220.00	24095 MMART 22	220.00 1 SINGLE 380	426.8	505.4	112.9
24094*MMART 4	400.00	24095 MMART 22	220.00 1 SINGLE 380	500.0	514.2	102.8
28040*RLOTRU2	220.00	28366 RSIBIU2	220.00 1 SINGLE 621	333.4	393.1	112.0
28040*RLOTRU2	220.00	28100 RSIBIU21	220.00 1 SINGLE 622	333.4	393.1	112.0
28040*RLOTRU2	220.00	28366 RSIBIU2	220.00 1 SINGLE 719	333.4	392.8	111.5
28040*RLOTRU2	220.00	28100 RSIBIU21	220.00 1 SINGLE 720	333.4	392.8	111.5
34100*JBGD172	220.00	34111 JBGD8 22	220.00 2 SINGLE 819	445.8	466.8	105.5
34100*JBGD172	220.00	34111 JBGD8 22	220.00 1 SINGLE 820	445.8	466.8	105.5

MONITORED VOLTAGE REPORT:									
SYSTEM		CONTINGENCY	<-----	B U S	----->	V-CONT	V-INIT	V-MAX	V-MIN
'BG400	'	RANGE SINGLE 80	12473	VMI3 12	400.00	1.05151	1.03423	1.05000	0.90000
'BG220	'	RANGE SINGLE 134	12286	VUZUND2	220.00	0.89209	1.01250	1.10000	0.90000

'BG220	'	RANGE SINGLE	136	12282	VORFEJ2	220.00	1.10562	1.04688	1.10000	0.90000
'HR400	'	RANGE SINGLE	291	20260	HTEPLO	400.00	1.05323	1.04052	1.05000	0.90000
'HU220	'	RANGE SINGLE	356	24005	MALBF 22	220.00	0.89275	1.04262	1.10000	0.90000
'HU220	'	RANGE SINGLE	357	24006	MALBF 21	220.00	0.89462	1.04267	1.10000	0.90000
'GR400	'	RANGE SINGLE	499	23126	GKPATC12	400.00	1.05012	1.02519	1.05000	0.90000
'GR400	'	RANGE SINGLE	499	23180	GAXELO12	400.00	1.05012	1.02555	1.05000	0.90000
'RO220	'	RANGE SINGLE	691	28855	RMOSTI2	220.00	0.83991	1.02354	1.10000	0.90000
'RS400	'	RANGE SINGLE	796	34085	JSOMB31	400.00	0.86382	0.99019	1.05000	0.90000
'RS220	'	RANGE SINGLE	844	34200	JSABA32	220.00	0.88558	1.02025	1.10000	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS									
SINGLE 19	: OPEN LINE FROM BUS 10009 [AELBS12	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1					
SINGLE 22	: OPEN LINE FROM BUS 10010 [AELBS22	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1					
SINGLE 80	: OPEN LINE FROM BUS 12471 [VMI3 11	400.00]	TO BUS 12473 [VMI3 12	400.00]	CKT 1					
SINGLE 134	: OPEN LINE FROM BUS 12275 [VMI3 2	220.00]	TO BUS 12286 [VUZUND2	220.00]	CKT 1					
SINGLE 136	: OPEN LINE FROM BUS 12280 [VALEKO2	220.00]	TO BUS 12282 [VORFEJ2	220.00]	CKT 1					
SINGLE 207	: OPEN LINE FROM BUS 13 [XTR_PG11	400.00]	TO BUS 36005 [OPDGD211	400.00]	CKT 1					
SINGLE 356	: OPEN LINE FROM BUS 24005 [MALBF 22	220.00]	TO BUS 24034 [MDUME 2	220.00]	CKT 1					
SINGLE 357	: OPEN LINE FROM BUS 24006 [MALBF 21	220.00]	TO BUS 24034 [MDUME 2	220.00]	CKT 1					
SINGLE 367	: OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1					
SINGLE 368	: OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1					
SINGLE 379	: OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1					
SINGLE 380	: OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1					
SINGLE 621	: OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1					
SINGLE 622	: OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1					
SINGLE 719	: OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1					
SINGLE 720	: OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1					
SINGLE 796	: OPEN LINE FROM BUS 34050 [JSUBO31	400.00]	TO BUS 34085 [JSOMB31	400.00]	CKT 1					
SINGLE 819	: OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 1					
SINGLE 820	: OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 2					
SINGLE 844	: OPEN LINE FROM BUS 34170 [JOBREN2	220.00]	TO BUS 34200 [JSABA32	220.00]	CKT 1					

### 13.15.2. Romanian Power System Exports 1000 MW

Table 13.15.11: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of Romania exports 1000 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1338.2	1491.9	0.0	0.0	0.0	-200.0	46.3	-200.0
AL	472.9	689.7	-199.9	0.0	459.3	26.0	416.5	
20	8808.2	7603.7	0.0	14.4	0.0	1000.0	190.1	1000.0
BG	2928.1	3045.8	-44.9	120.8	2993.2	314.6	2485.0	
30	3148.2	2610.1	0.0	0.0	0.0	490.0	48.0	490.0
BA	704.1	724.5	0.0	0.0	910.5	319.9	570.2	
35	40263.5	49222.0	0.0	1.1	0.0	-9400.0	440.5	-9400.0
IT	7008.3	10816.5	0.0	-157.0	12573.1	-551.0	9473.0	
40	3103.6	3483.0	0.0	0.0	0.0	-434.9	55.6	-435.0
HR	380.4	1074.2	0.0	0.0	1405.8	3.7	708.3	
45	5393.4	6500.0	0.1	0.0	0.0	-1199.9	93.3	-1200.0
HU	993.7	1926.6	178.1	-29.6	2422.7	108.6	1232.8	
50	10298.2	10371.1	0.0	0.0	0.0	-350.0	277.1	-350.0
GR	2148.2	5312.0	170.2	9.3	6612.3	113.7	3141.5	
55	3921.3	-4593.5	0.0	4.9	0.0	8430.6	79.4	8431.0

UX	-266.8	637.5	0.0	12.8	2330.5	466.8	946.6	
60	1501.9	1577.0	0.0	0.0	0.0	-100.0	24.9	-100.0
MK	455.8	573.6	-31.3	0.0	403.3	48.4	268.4	
65	1206.9	0.0	0.0	0.0	0.0	1200.0	6.9	1200.0
UA	-194.4	0.0	0.0	0.0	653.8	349.5	109.8	
70	10716.4	9416.9	0.0	88.2	0.0	1000.2	211.1	1000.0
RO	2587.5	4075.6	512.5	273.4	4610.7	-286.5	2623.2	
75	2996.6	2514.0	0.0	8.8	0.0	424.1	49.7	424.0
SI	993.5	811.0	0.0	54.0	607.8	167.2	569.2	
80	54593.2	54622.1	0.0	0.0	0.0	-800.0	771.2	-800.0
TR	4585.2	7792.0	1175.4	0.0	17195.4	-129.7	12942.9	
90	7718.0	7871.1	0.0	17.8	0.0	-360.0	189.1	-360.0
RS	2655.4	2853.5	0.0	76.5	1727.2	-659.8	2112.5	
91	627.8	805.2	0.5	1.9	0.0	-200.0	20.2	-200.0
ME	296.3	299.2	-35.1	10.9	239.9	66.4	194.8	
95	501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK	-382.0	0.0	0.0	0.0	40.0	-357.8	15.8	
TOTALS	156136.9	153494.7	0.6	137.1	0.0	0.0	2504.6	0.0
	25366.4	40631.6	1724.9	371.2	55185.7	0.0	37810.7	



Figure 13.15.3: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of Romania exports 1000 MW

Table 13.15.12: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2015, scenario when power system of Romania exports 1000 MW

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I
***** NONE *****									

Table 13.15.13: Changes in power flow greater than 100 MW in area of SEE in winter maximum 2015, scenario when power system of Romania exports 1000 MW

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 100.0 MW:												
IN WORKING CASE				IN BASE CASE								
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
	8 [XWI_GY11	400.00]	24067 [MGYOR	4	400.00]	1	-132.6	47.5	-14.2	34.8	118.4	89.3
	8 [XWI_GY11	400.00]	50010 [OWIEN	1	400.00]	1	132.6	-47.5	14.2	-34.8	-118.4	89.3
	80 [XRE_DI11	400.00]	31410 [LDIVAC1	400.00]	1	-831.1	-190.1	-730.1	-211.1	-101.0	101.0	12.2
	80 [XRE_DI11	400.00]	52189 [IRDPV11	400.00]	1	831.1	190.1	730.1	211.1	-101.0	101.0	12.2
	85 [XPF_DJ11	400.00]	28004 [RP.D.F1	400.00]	1	-245.3	36.3	-139.8	32.3	105.5	43.0	
	85 [XPF_DJ11	400.00]	34010 [JHDJE11	400.00]	1	245.3	-36.3	139.8	-32.3	-105.5	43.0	
	28904 [RBRAZ11	400.00]	29476 [ROMVBZG1	20.000]	1	-289.0	-108.8	-137.5	-122.7	151.6	52.4	
	34040 [JRPMLA1	400.00]	34045 [JSMIT21	400.00]	1	587.3	-59.8	486.0	-62.6	-101.4	17.3	
	50005 [OLIENZ1	400.00]	50008 [OTAUER1	400.00]	1	-733.8	16.7	-880.0	51.8	-146.2	19.9	
	50005 [OLIENZ1	400.00]	50008 [OTAUER1	400.00]	2	-733.8	16.7	-880.0	51.8	-146.2	19.9	



50008 [OTAUER1 400.00]	50011 [OZELL 1 400.00]	1	-703.2	45.0	-936.2	78.3	-233.0	33.1
50008 [OTAUER1 400.00]	50011 [OZELL 1 400.00]	2	-703.2	45.0	-936.2	78.3	-233.0	33.1
50009 [OWESTT1 400.00]	50011 [OZELL 1 400.00]	1	481.8	4.6	638.8	38.6	157.0	32.6
50009 [OWESTT1 400.00]	50011 [OZELL 1 400.00]	2	481.8	4.6	638.8	38.6	157.0	32.6
50011 [OZELL 1 400.00]	50042 [OZELL 2 220.00]	1	-451.1	102.9	-609.5	64.7	-158.4	35.1

Table 13.15.14: Changes in power flow through tie-lines connecting Romania to the rest of the system, in winter maximum 2015, scenario when power system of Romania exports 1000 MW

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW: IN WORKING CASE IN BASE CASE												
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
75 [XSA_AR11 400.00]	24148 [MSAFA 4 400.00]	1	15.9	-15.4	-44.4	-5.2	-60.3	379.6				
84 [XRO_MU11 400.00]	65001 [UMUKACH 400.00]	1	-109.5	-66.7	-160.8	-57.2	-51.3	46.8				
85 [XPF_DJ11 400.00]	34010 [JHDJE11 400.00]	1	245.3	-36.3	139.8	-32.3	-105.5	43.0				
86 [XRE_PA11 400.00]	34035 [JPANC21 400.00]	1	178.5	-7.3	129.4	0.9	-49.1	27.5				
219 [XBE_OR11 400.00]	24013 [MBEKO 4 400.00]	1	12.9	-13.8	-64.9	-0.4	-77.8	603.9				
28001 [RTANTA1 400.00]	22 [XKO_TI11 400.00]	1	218.7	-113.7	195.3	-114.0	-23.5	10.7				
28001 [RTANTA1 400.00]	23 [XKO_TI12 400.00]	2	218.7	-113.7	195.3	-114.0	-23.5	10.7				
28020 [RISACC1A 400.00]	21 [XDO_IS11 400.00]	1	38.9	-99.2	12.7	-97.2	-26.2	67.3				
28974 [RMEDG11 400.00]	181 [XVA_IS11 400.00]	1	187.2	-65.9	148.9	-65.3	-38.3	20.5				

Table 13.15.15: Results of contingency (n-1) analysis in winter maximum 2015, scenario when power system of Romania exports 1000 MW

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%
24034*MDUME 2	220.00 24096 MMART 21	220.00 1	SINGLE 344	426.8	459.5	102.6
24034*MDUME 2	220.00 24095 MMART 22	220.00 1	SINGLE 345	426.8	462.8	103.4
24034*MDUME 2	220.00 24096 MMART 21	220.00 1	SINGLE 356	426.8	459.6	102.7
24034*MDUME 2	220.00 24095 MMART 22	220.00 1	SINGLE 357	426.8	463.0	103.4
28034*RSIBIU1	400.00 28366 RSIBIU2	220.00 1	SINGLE 562	400.0	417.6	104.4
28040*RLOTRU2	220.00 28366 RSIBIU2	220.00 1	SINGLE 562	333.4	408.2	119.3
28034*RSIBIU1	400.00 28100 RSIBIU21	220.00 1	SINGLE 563	400.0	417.6	104.4
28040*RLOTRU2	220.00 28100 RSIBIU21	220.00 1	SINGLE 563	333.4	408.2	119.3
28034*RSIBIU1	400.00 28366 RSIBIU2	220.00 1	SINGLE 667	400.0	416.5	104.1
28040*RLOTRU2	220.00 28366 RSIBIU2	220.00 1	SINGLE 667	333.4	408.0	118.9
28034*RSIBIU1	400.00 28100 RSIBIU21	220.00 1	SINGLE 668	400.0	416.5	104.1
28040*RLOTRU2	220.00 28100 RSIBIU21	220.00 1	SINGLE 668	333.4	408.0	118.9
31210*LDIVAC2	220.00 156 XPA_DI21	220.00 1	SINGLE 707	320.1	616.4	187.0

MONITORED VOLTAGE REPORT:								
SYSTEM		CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN	
'BG220	'	RANGE SINGLE 100	12252 VOCHIF2	220.00	0.81860	0.95849	1.10000	0.90000
'BG220	'	RANGE SINGLE 124	12286 VUZUND2	220.00	0.89549	1.00431	1.10000	0.90000
'GR400	'	RANGE SINGLE 432	22759 GTH_AG11	400.00	1.05201	1.02527	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23123 GKPATR11	400.00	1.05215	1.03820	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23125 GKPATC11	400.00	1.05225	1.03817	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23126 GKPATC12	400.00	1.05219	1.03829	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23173 GDISTO11	400.00	1.05308	1.03793	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23174 GDISTO12	400.00	1.05271	1.03806	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23180 GAXELO12	400.00	1.05236	1.03874	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23181 GAXELO11	400.00	1.05232	1.03895	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23064 GK_MEG13	400.00	1.05386	1.04117	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23066 GK_MEG11	400.00	1.05386	1.04117	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23123 GKPATR11	400.00	1.05329	1.03820	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23125 GKPATC11	400.00	1.05338	1.03817	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23126 GKPATC12	400.00	1.05333	1.03829	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23173 GDISTO11	400.00	1.05401	1.03793	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23174 GDISTO12	400.00	1.05383	1.03806	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23180 GAXELO12	400.00	1.05351	1.03874	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23181 GAXELO11	400.00	1.05357	1.03895	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23036 GK_KOR13	400.00	1.06326	1.01749	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23068 GK_MEG14	400.00	1.06086	1.02951	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23037 GK_KOR14	400.00	1.06326	1.01749	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23067 GK_MEG12	400.00	1.06086	1.02951	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23126 GKPATC12	400.00	1.06900	1.03829	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23180 GAXELO12	400.00	1.06900	1.03874	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23181 GAXELO11	400.00	1.06881	1.03895	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23180 GAXELO12	400.00	1.06845	1.03874	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23181 GAXELO11	400.00	1.06826	1.03895	1.05000	0.90000

'RO220	'	RANGE SINGLE 567	28043 RSTUPA2	220.00	0.89347	0.98078	1.10000	0.90000
'RO220	'	RANGE SINGLE 637	28855 RMOSTI2	220.00	0.88222	1.04093	1.10000	0.90000
'RO220	'	RANGE SINGLE 642	28907 RSTILP2	220.00	0.84436	0.98257	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28095 RVETIS2	220.00	0.89677	1.02055	1.10000	0.90000
'RS400	'	RANGE SINGLE 739	34085 JSOMB31	400.00	0.87853	0.99427	1.05000	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 100	: OPEN LINE FROM BUS 12250 [VGORIA2 220.00] TO BUS 12252 [VOCHIF2 220.00] CKT 1
SINGLE 124	: OPEN LINE FROM BUS 12275 [VMI3 2 220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 344	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 345	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 356	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 357	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 432	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23172 [GDISTO13 400.00] CKT 1
SINGLE 433	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23173 [GDISTO11 400.00] CKT 1
SINGLE 462	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23036 [GK_KOR13 400.00] CKT 1
SINGLE 463	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23037 [GK_KOR14 400.00] CKT 1
SINGLE 473	: OPEN LINE FROM BUS 23123 [GKPATR11 400.00] TO BUS 23126 [GKPATC12 400.00] CKT 1
SINGLE 475	: OPEN LINE FROM BUS 23126 [GKPATC12 400.00] TO BUS 23180 [GAXELO12 400.00] CKT 1
SINGLE 562	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 563	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 567	: OPEN LINE FROM BUS 28043 [RSTUPA2 220.00] TO BUS 28044 [RBRADU2 220.00] CKT 1
SINGLE 637	: OPEN LINE FROM BUS 28855 [RMOSTI2 220.00] TO BUS 28935 [RRAC.M2 220.00] CKT 1
SINGLE 642	: OPEN LINE FROM BUS 28906 [RTELEA2 220.00] TO BUS 28907 [RSTILP2 220.00] CKT 1
SINGLE 667	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 668	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 670	: OPEN LINE FROM BUS 28039 [RROSIO1 400.00] TO BUS 28094 [RROSIO2 220.00] CKT 1
SINGLE 707	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1
SINGLE 739	: OPEN LINE FROM BUS 34050 [JSUBO31 400.00] TO BUS 34085 [JSOMB31 400.00] CKT 1

Table 13.15.16: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of Romania exports 1000 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10 AL	1622.2 668.9	1723.7 779.7	0.0 -204.6	0.0 0.0	0.0 475.1	-150.0 98.9	48.5 470.0	-150.0
20 BG	9661.5 3532.8	8411.0 3357.9	0.0 0.0	15.5 181.1	0.0 3278.1	1000.0 193.3	235.0 3078.6	1000.0
30 BA	2950.5 1006.7	2897.8 1017.2	0.0 0.0	0.0 0.0	0.0 913.3	0.0 239.6	52.7 663.3	0.0
35 IT	45060.7 9578.0	54409.8 11942.3	0.0 0.0	1.1 147.8	0.0 12394.9	-9740.0 -809.6	389.8 10692.6	-9740.0
40 HR	3429.2 509.9	4359.0 1075.9	0.0 0.0	0.0 0.0	0.0 1534.1	-999.9 197.4	70.1 770.7	-1000.0
45 HU	6093.7 1360.2	7180.0 2128.1	0.1 178.6	0.0 -29.1	0.0 2405.2	-1200.0 -0.2	113.6 1488.1	-1200.0
50 GR	11750.3 3130.7	11426.0 5724.7	0.0 203.8	0.0 9.4	0.0 6662.5	0.0 127.1	324.3 3714.6	0.0
55 UX	5014.6 210.4	-4356.2 622.8	0.0 0.0	4.8 12.7	0.0 2306.0	9249.6 382.2	116.4 1498.7	9250.0
60 MK	1940.4 764.6	2001.9 752.3	0.0 -30.9	0.0 0.0	0.0 397.5	-100.0 10.6	38.4 428.9	-100.0
65	1207.5	0.0	0.0	0.0	0.0	1200.0	7.5	1200.0

UA	-165.1	0.0	0.0	0.0	652.3	366.7	120.5	
70	13461.9	12110.2	0.0	90.2	0.0	1000.1	261.3	1000.0
RO	3121.1	4455.6	783.4	285.8	5601.6	-46.6	3244.4	
75	3949.8	2990.0	0.0	8.9	0.0	890.0	60.9	890.0
SI	1230.4	964.6	0.0	53.8	868.6	334.7	745.9	
80	77661.6	77342.9	0.0	0.0	0.0	-800.0	1118.7	-800.0
TR	9836.1	11034.0	996.9	0.0	22660.7	-170.0	20636.0	
90	7769.4	8298.8	0.0	17.3	0.0	-749.9	203.3	-750.0
RS	2902.8	2986.6	0.0	73.3	1731.2	-672.9	2247.0	
91	864.5	938.0	0.5	2.1	0.0	-100.0	23.8	-100.0
ME	349.9	346.6	-34.6	11.4	237.1	52.4	211.2	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-328.9	0.0	0.0	0.0	40.0	-303.8	14.9	
TOTALS	192939.1	189732.9	0.6	139.9	0.0	0.0	3065.6	0.0
	37708.8	47188.4	1892.6	746.2	62158.4	0.0	50025.2	

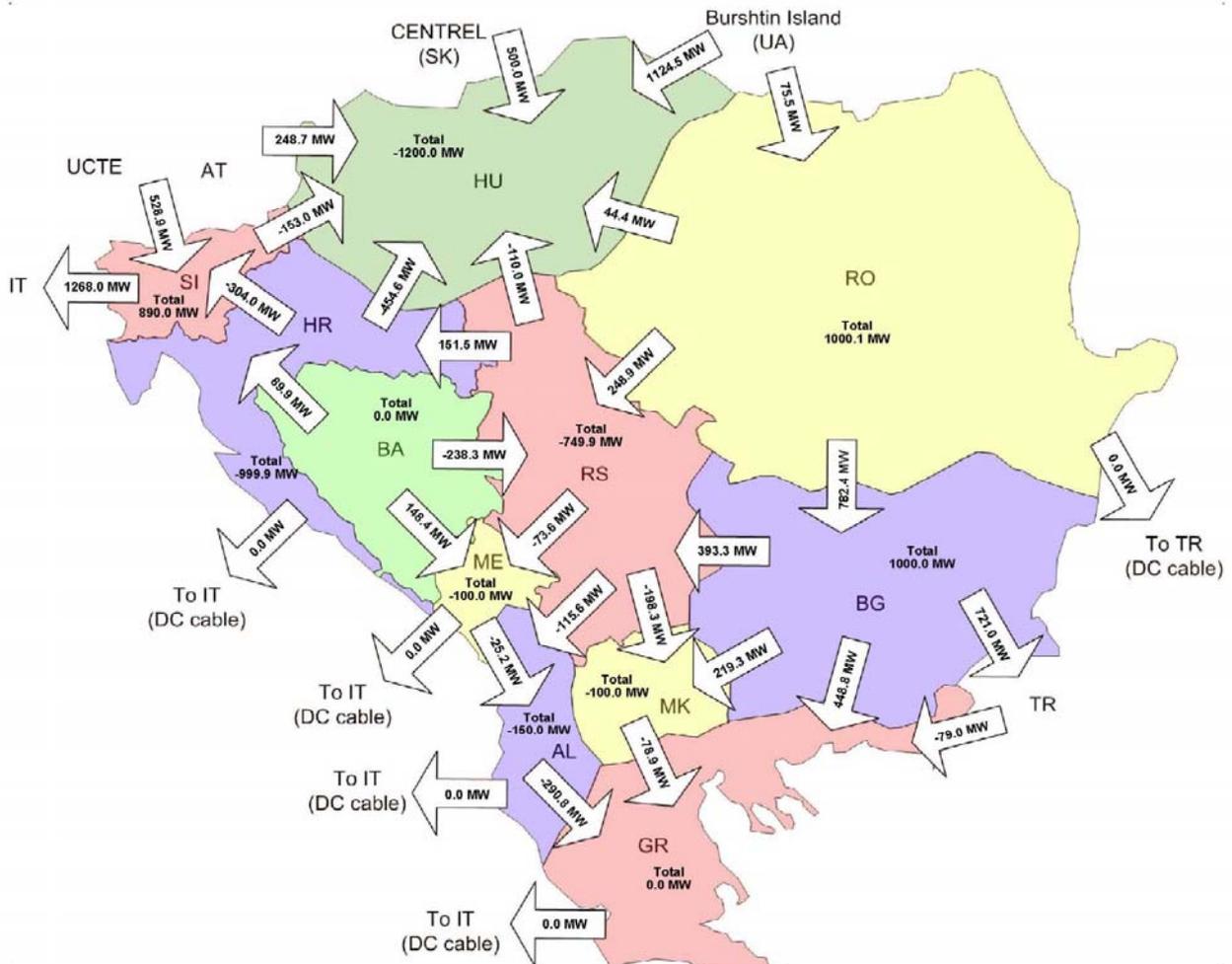


Figure 13.15.4: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of Romania exports 1000 MW

Table 13.15.17: Branches loaded more then 80% of their thermal limits in monitored grid in winter maximum 2020, scenario when power system of Romania exports 1000 MW

FRMBUS,	FROMBUSXNAME,	TOBUS,	TOBUSXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I		
12274,VMI	2	220.00,	12474,VMI	1	400.00,	1	1,	-528.07,	-109.94,	539.40,	81.37

Table 13.15.18: Changes in power flow greater then 50 MW in area of SEE in winter maximum 2020, scenario when power system of Romania exports 1000 MW

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 50.0 MW:												
IN WORKING CASE					IN BASE CASE							
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
	3 [XWE_PR11	400.00]	50009	[OWESTT1	400.00]	1	400.0	-16.0	450.0	-3.8	50.0	12.5
	4 [XWE_PR12	400.00]	50009	[OWESTT1	400.00]	1	400.0	-16.0	450.0	-3.8	50.0	12.5
	5 [XDU_SL11	400.00]	50026	[ODUERN1	400.00]	1	600.0	-215.0	700.0	-205.8	100.0	16.7
	8 [XWI_GY11	400.00]	24067	[MGYOR 4	400.00]	1	20.1	23.0	84.1	12.2	64.0	317.9
	8 [XWI_GY11	400.00]	50010	[OWIEN 1	400.00]	1	-20.1	-23.0	-84.1	-12.2	-64.0	317.9
	28003 [RMINT11A	400.00]	28008	[RARAD 1	400.00]	1	207.9	20.2	152.2	23.8	-55.8	26.8
	28026 [RTARN11A	400.00]	28037	[RGADAL1	400.00]	1	333.8	57.2	252.8	62.7	-81.0	24.3
	28026 [RTARN11A	400.00]	29471	[RTARNIG1	15.750]	1	-198.6	-11.1	-119.0	-18.0	79.6	40.1
	28026 [RTARN11A	400.00]	29472	[RTARNIG2	15.750]	1	-198.6	-11.1	-119.0	-18.0	79.6	40.1
	50008 [OTAUER1	400.00]	50011	[OZELL 1	400.00]	1	-969.3	81.9	-1023.0	92.2	-53.7	5.5
	50008 [OTAUER1	400.00]	50011	[OZELL 1	400.00]	2	-969.3	81.9	-1023.0	92.2	-53.7	5.5
	50009 [OWESTT1	400.00]	50011	[OZELL 1	400.00]	1	758.0	59.2	834.0	76.5	76.0	10.0
	50009 [OWESTT1	400.00]	50011	[OZELL 1	400.00]	2	758.0	59.2	834.0	76.5	76.0	10.0

Table 13.15.19: Changes in power flow through tie-lines connecting Romania to the rest of the system in winter maximum 2020, scenario when power system of Romania exports 1000 MW

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:												
IN WORKING CASE					IN BASE CASE							
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
	75 [XSA_AR11	400.00]	24148	[MSAFA 4	400.00]	1	31.5	5.9	-7.4	11.4	-38.9	123.4
	84 [XRO_MU11	400.00]	65001	[UMUKACH	400.00]	1	-75.5	-37.4	-108.4	-32.2	-32.8	43.5
	85 [XPF_DJ11	400.00]	34010	[JHDJE11	400.00]	1	125.4	-18.7	100.9	-19.2	-24.5	19.5
	86 [XRE_PA11	400.00]	34035	[JPANC21	400.00]	1	123.5	6.2	107.9	7.8	-15.6	12.7
	219 [XBE_OR11	400.00]	24013	[MBEKO 4	400.00]	1	12.9	17.0	-33.8	24.0	-46.7	361.4
	28001 [RTANTAL	400.00]	22	[XKO_TI11	400.00]	1	47.4	-109.2	36.0	-109.2	-11.4	24.1
	28001 [RTANTAL	400.00]	23	[XKO_TI12	400.00]	2	47.0	-109.2	35.6	-109.2	-11.4	24.3
	28020 [RTSACC1A	400.00]	21	[XDO_IS11	400.00]	1	238.2	-76.4	231.9	-77.0	-6.3	2.6
	28974 [RMEG11	400.00]	181	[XVA_IS11	400.00]	1	454.8	47.8	442.3	46.7	-12.6	2.8

Table 13.15.20: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of Romania exports 1000 MW

<-----	MONITORED BRANCH				CONTINGENCY			RATING	FLOW	%
10010*	AELBS22	220.00	10125	ACEKIN2	220.00	1	SINGLE 19	370.0	386.3	102.9
10009*	AELBS12	220.00	10125	ACEKIN2	220.00	1	SINGLE 22	370.0	384.3	102.6
316	XTR_HN51	110.00	36050*	OHNOVI51	110.00	1	SINGLE 207	89.6	93.8	105.8
24034*	MDUME 2	220.00	24096	MMART 21	220.00	1	SINGLE 367	426.8	523.0	116.8
24094*	MMART 4	400.00	24096	MMART 21	220.00	1	SINGLE 367	500.0	532.3	106.5
24034*	MDUME 2	220.00	24095	MMART 22	220.00	1	SINGLE 368	426.8	526.8	117.7
24094*	MMART 4	400.00	24095	MMART 22	220.00	1	SINGLE 368	500.0	536.1	107.2
24034*	MDUME 2	220.00	24096	MMART 21	220.00	1	SINGLE 379	426.8	523.2	116.9
24094*	MMART 4	400.00	24096	MMART 21	220.00	1	SINGLE 379	500.0	532.5	106.5
24034*	MDUME 2	220.00	24095	MMART 22	220.00	1	SINGLE 380	426.8	527.0	117.7
24094*	MMART 4	400.00	24095	MMART 22	220.00	1	SINGLE 380	500.0	536.3	107.3
28040*	RLOTRU2	220.00	28366	RSIBIU2	220.00	1	SINGLE 621	333.4	393.1	112.2
28040*	RLOTRU2	220.00	28100	RSIBIU21	220.00	1	SINGLE 622	333.4	393.1	112.2
28040*	RLOTRU2	220.00	28366	RSIBIU2	220.00	1	SINGLE 719	333.4	392.8	111.6
28040*	RLOTRU2	220.00	28100	RSIBIU21	220.00	1	SINGLE 720	333.4	392.8	111.6
34100*	JBGD172	220.00	34111	JBGD8 22	220.00	2	SINGLE 819	445.8	466.9	105.6
34100*	JBGD172	220.00	34111	JBGD8 22	220.00	1	SINGLE 820	445.8	466.9	105.6

MONITORED VOLTAGE REPORT:										
SYSTEM		CONTINGENCY	<----- B U S ----->			V-CONT	V-INIT	V-MAX	V-MIN	
'BG400	'	RANGE SINGLE 80	12473	VMI3	12	400.00	1.05015	1.03235	1.05000	0.90000
'BG220	'	RANGE SINGLE 134	12286	VUZUND2		220.00	0.88873	1.01029	1.10000	0.90000



'BG220	'	RANGE SINGLE 136	12282 VORFEJ2	220.00	1.10515	1.04396	1.10000	0.90000
'HU220	'	RANGE SINGLE 356	24005 MALBF 22	220.00	0.89275	1.04262	1.10000	0.90000
'HU220	'	RANGE SINGLE 357	24006 MALBF 21	220.00	0.89462	1.04267	1.10000	0.90000
'RO220	'	RANGE SINGLE 691	28855 RMOSTI2	220.00	0.82164	1.01460	1.10000	0.90000
'RS400	'	RANGE SINGLE 796	34085 JSOMB31	400.00	0.86300	0.99027	1.05000	0.90000
'RS220	'	RANGE SINGLE 844	34200 JSABA32	220.00	0.88304	1.01922	1.10000	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 19	: OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	: OPEN LINE FROM BUS 10010 [AELBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 80	: OPEN LINE FROM BUS 12471 [VMI3 11 400.00] TO BUS 12473 [VMI3 12 400.00] CKT 1
SINGLE 134	: OPEN LINE FROM BUS 12275 [VMI3 2 220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 136	: OPEN LINE FROM BUS 12280 [VALEKO2 220.00] TO BUS 12282 [VORFEJ2 220.00] CKT 1
SINGLE 207	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [PODGD211 400.00] CKT 1
SINGLE 356	: OPEN LINE FROM BUS 24005 [MALBF 22 220.00] TO BUS 24034 [MDUME 2 220.00] CKT 1
SINGLE 357	: OPEN LINE FROM BUS 24006 [MALBF 21 220.00] TO BUS 24034 [MDUME 2 220.00] CKT 1
SINGLE 367	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 368	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 379	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 380	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 621	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 691	: OPEN LINE FROM BUS 28855 [RMOSTI2 220.00] TO BUS 28935 [RRAC.M2 220.00] CKT 1
SINGLE 719	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 796	: OPEN LINE FROM BUS 34050 [JSUBO31 400.00] TO BUS 34085 [JSOMB31 400.00] CKT 1
SINGLE 819	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 820	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2
SINGLE 844	: OPEN LINE FROM BUS 34170 [JOBREN2 220.00] TO BUS 34200 [JSABA32 220.00] CKT 1

## 13.16. Serbian Power Balance Uncertainty

### 13.16.1. Serbian Power System Is Self-Balanced

Table 13.16.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of Serbia is self-balanced

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1338.2	1491.9	0.0	0.0	0.0	-200.0	46.3	-200.0
AL			474.4	689.7	-199.9	0.0	459.1	26.9	416.8	
20			8806.6	7603.7	0.0	14.4	0.0	1000.0	188.5	1000.0
BG			2930.4	3045.8	-44.9	120.8	2993.2	331.3	2470.5	
30			3148.1	2610.1	0.0	0.0	0.0	490.0	48.0	490.0
BA			704.3	724.5	0.0	0.0	910.5	321.2	569.2	
35			40263.8	49222.0	0.0	1.1	0.0	-9400.0	440.7	-9400.0
IT			7014.8	10816.5	0.0	-157.0	12572.5	-548.5	9476.3	
40			3102.7	3483.0	0.0	0.0	0.0	-434.9	54.7	-435.0
HR			376.2	1074.2	0.0	0.0	1406.3	7.3	701.0	
45			5392.9	6500.0	0.1	0.0	0.0	-1200.0	92.7	-1200.0
HU			987.3	1926.6	178.1	-29.6	2422.9	108.6	1226.6	
50			10298.2	10371.1	0.0	0.0	0.0	-350.0	277.1	-350.0
GR			2149.5	5312.0	170.2	9.3	6612.1	114.9	3141.4	
55			4023.4	-4593.5	0.0	4.9	0.0	8525.7	86.4	8526.0
UX			-180.2	637.5	0.0	12.8	2328.1	448.4	1049.2	
60			1501.8	1577.0	0.0	0.0	0.0	-100.0	24.8	-100.0
MK			456.7	573.6	-31.3	0.0	403.2	50.5	267.1	
65			1207.0	0.0	0.0	0.0	0.0	1200.0	7.0	1200.0
UA			-195.4	0.0	0.0	0.0	653.8	347.9	110.5	
70			10262.6	9416.9	0.0	88.1	0.0	545.1	212.4	545.0
RO			2610.1	4075.6	512.1	273.1	4605.5	-223.2	2578.0	
75			2996.0	2514.0	0.0	8.8	0.0	424.1	49.1	424.0
SI			990.7	811.0	0.0	54.0	608.0	169.6	564.1	
80			54592.9	54622.1	0.0	0.0	0.0	-800.0	770.9	-800.0
TR			4582.3	7792.0	1175.4	0.0	17195.5	-129.8	12940.2	
90			8087.0	7871.1	0.0	17.7	0.0	0.0	198.1	0.0
RS			2736.6	2853.5	0.0	76.4	1724.5	-732.3	2263.5	
91			628.1	805.2	0.5	1.9	0.0	-200.0	20.4	-200.0
ME			298.1	299.2	-35.1	10.9	239.7	65.6	197.1	
95			501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK			-382.8	0.0	0.0	0.0	40.0	-358.6	15.8	
TOTALS			156150.7	153494.7	0.6	137.0	0.0	0.0	2518.5	0.0
			25553.1	40631.6	1724.6	370.8	55174.9	0.0	37987.4	



Figure 13.16.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of Serbia is self-balanced

Table 13.16.2: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2015, scenario when power system of Serbia is self-balanced

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I
***** NONE *****									

Table 13.16.3: Changes in power flow greater than 100 MW in area of SEE in winter maximum 2015, scenario when power system of Serbia is self-balanced

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 100.0 MW:													
IN WORKING CASE				IN BASE CASE									
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	
	85	[XPF_DJ11	400.00]	28004	[RP.D.F1	400.00]	1	70.0	-24.8	-139.8	32.3	-209.8	299.7
	85	[XPF_DJ11	400.00]	34010	[JHDJE11	400.00]	1	-70.0	24.8	139.8	-32.3	209.8	299.7
	34010	[JHDJE11	400.00]	35005	[JHDJERG5	15.750]	3	-296.8	-6.8	-129.1	-31.8	167.7	56.5
	50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	1	-764.1	24.8	-880.0	51.8	-115.9	15.2
	50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	2	-764.1	24.8	-880.0	51.8	-115.9	15.2
	50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	1	-751.9	55.0	-936.2	78.3	-184.3	24.5
	50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	2	-751.9	55.0	-936.2	78.3	-184.3	24.5
	50011	[OZELL 1	400.00]	50042	[OZELL 2	220.00]	1	-307.6	78.4	-609.5	64.7	-301.9	98.2



Table 13.16.4: Changes in power flow through tie-lines connecting Serbia to the rest of the system, in winter maximum 2015, scenario when power system of Serbia is self-balanced

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:												
IN WORKING CASE		IN BASE CASE										
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
182	[XPL_BB21	220.00]	36023	[OTPLJE21	220.00]	1	112.7	-52.3	108.1	-50.5	-4.7	4.2
183	[XPL_BI21	220.00]	36023	[OTPLJE21	220.00]	1	4.9	-54.2	1.8	-53.1	-3.1	63.3
184	[XRI_PEL1	400.00]	36001	[ORIBAR11	400.00]	1	-158.5	-63.4	-189.8	-58.1	-31.4	19.8
326	[XPL_ZA51	110.00]	36040	[OPLJEV51	110.00]	1	1.1	-12.7	0.0	-12.0	-1.1	95.9
34010	[JHDJE11	400.00]	85	[XPF_DJ11	400.00]	1	70.0	-25.5	-139.8	31.6	-209.8	299.7
34020	[JNIS2_1	400.00]	24	[XSO_NI11	400.00]	1	-191.2	-120.4	-179.9	-116.5	11.3	5.9
34035	[JPANC21	400.00]	86	[XRE_PA11	400.00]	1	-180.1	-23.6	-129.2	-39.0	51.0	28.3
34045	[JSMIT21	400.00]	74	[XER_SM11	400.00]	1	231.6	-90.3	165.1	-86.7	-66.4	28.7
34045	[JSMIT21	400.00]	211	[XUG_SM11	400.00]	1	209.3	-84.1	168.2	-76.4	-41.1	19.6
34050	[JSUBO31	400.00]	79	[XSA_SU11	400.00]	1	2.7	-109.3	-44.4	-100.2	-47.1	999.9
34071	[JTKOSC1	400.00]	82	[XKA_KC11	400.00]	1	65.8	-69.4	55.1	-67.5	-10.6	16.2
34072	[JKURO21	400.00]	81	[XSK_KB11	400.00]	1	-5.8	-44.9	10.6	-46.2	16.4	282.5
34087	[JVVRAN31	400.00]	208	[XST_NI11	400.00]	1	48.8	-61.7	45.4	-58.6	-3.5	7.1
34180	[JPOZEG2	220.00]	117	[XVI_VA21	220.00]	1	-49.5	-69.1	-64.5	-66.4	-15.0	30.2
34190	[JKPRZ22	220.00]	87	[XFI_PR21	220.00]	1	-157.2	-37.4	-161.8	-35.8	-4.6	2.9

Table 13.16.5: Results of contingency (n-1) analysis in winter maximum 2015, scenario when power system of Serbia is self-balanced

<----- MONITORED BRANCH ----->				CONTINGENCY		RATING	FLOW	%		
24034*MDUME	2	220.00	24096 MMART	21	220.00	1	SINGLE 344	426.8	456.4	101.9
24034*MDUME	2	220.00	24095 MMART	22	220.00	1	SINGLE 345	426.8	459.7	102.7
24034*MDUME	2	220.00	24096 MMART	21	220.00	1	SINGLE 356	426.8	456.5	102.0
24034*MDUME	2	220.00	24095 MMART	22	220.00	1	SINGLE 357	426.8	459.9	102.7
31210*LDIVAC2		220.00	156 XPA_DI21		220.00	1	SINGLE 707	320.1	603.0	182.8

MONITORED VOLTAGE REPORT:									
SYSTEM		CONTINGENCY	<-----	B U S	----->	V-CONT	V-INIT	V-MAX	V-MIN
'BG220	'	RANGE SINGLE 100	12252	VOCHIF2	220.00	0.81838	0.95846	1.10000	0.90000
'BG220	'	RANGE SINGLE 124	12286	VUZUND2	220.00	0.89564	1.00442	1.10000	0.90000
'GR400	'	RANGE SINGLE 432	22759	GTH_AG11	400.00	1.05200	1.02525	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23123	GKPATR11	400.00	1.05214	1.03819	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23125	GKPATC11	400.00	1.05224	1.03816	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23126	GKPATC12	400.00	1.05218	1.03828	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23173	GDISTO11	400.00	1.05308	1.03791	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23174	GDISTO12	400.00	1.05270	1.03805	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23180	GAXELO12	400.00	1.05235	1.03873	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23181	GAXELO11	400.00	1.05232	1.03894	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23064	GK_MEG13	400.00	1.05385	1.04116	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23066	GK_MEG11	400.00	1.05385	1.04116	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23123	GKPATR11	400.00	1.05328	1.03819	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23125	GKPATC11	400.00	1.05337	1.03816	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23126	GKPATC12	400.00	1.05332	1.03828	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23173	GDISTO11	400.00	1.05400	1.03791	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23174	GDISTO12	400.00	1.05382	1.03805	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23180	GAXELO12	400.00	1.05350	1.03873	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23181	GAXELO11	400.00	1.05356	1.03894	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23036	GK_KOR13	400.00	1.06325	1.01748	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23068	GK_MEG14	400.00	1.06085	1.02950	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23037	GK_KOR14	400.00	1.06325	1.01748	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23067	GK_MEG12	400.00	1.06085	1.02950	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23126	GKPATC12	400.00	1.06899	1.03828	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23180	GAXELO12	400.00	1.06898	1.03873	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23181	GAXELO11	400.00	1.06879	1.03894	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23180	GAXELO12	400.00	1.06843	1.03873	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23181	GAXELO11	400.00	1.06825	1.03894	1.05000	0.90000
'RO220	'	RANGE SINGLE 567	28042	RRIURE2	220.00	0.89937	0.98023	1.10000	0.90000
'RO220	'	RANGE SINGLE 567	28043	RSTUPA2	220.00	0.89085	0.97870	1.10000	0.90000
'RO220	'	RANGE SINGLE 637	28855	RMOSTI2	220.00	0.88147	1.03967	1.10000	0.90000
'RO220	'	RANGE SINGLE 642	28907	RSTILP2	220.00	0.84242	0.98137	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28095	RVETIS2	220.00	0.89728	1.02111	1.10000	0.90000
'RS400	'	RANGE SINGLE 739	34085	JSOMB31	400.00	0.87814	0.99398	1.05000	0.90000

CONTINGENCY LEGEND:									
LABEL	EVENTS								
SINGLE 100	: OPEN LINE	FROM BUS	12250 [VGORIA2	220.00]	TO BUS	12252 [VOCHIF2	220.00]	CKT	1
SINGLE 124	: OPEN LINE	FROM BUS	12275 [VMI3 2	220.00]	TO BUS	12286 [VUZUND2	220.00]	CKT	1
SINGLE 344	: OPEN LINE	FROM BUS	24034 [MDUME 2	220.00]	TO BUS	24095 [MMART 22	220.00]	CKT	1
SINGLE 345	: OPEN LINE	FROM BUS	24034 [MDUME 2	220.00]	TO BUS	24096 [MMART 21	220.00]	CKT	1

SINGLE 356	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 357	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 432	:	OPEN LINE FROM BUS 22759 [GTH_AG11	400.00]	TO BUS 23172 [GDISTO13	400.00]	CKT 1
SINGLE 433	:	OPEN LINE FROM BUS 22759 [GTH_AG11	400.00]	TO BUS 23173 [GDISTO11	400.00]	CKT 1
SINGLE 462	:	OPEN LINE FROM BUS 23033 [GKYT_K11	400.00]	TO BUS 23036 [GK_KOR13	400.00]	CKT 1
SINGLE 463	:	OPEN LINE FROM BUS 23033 [GKYT_K11	400.00]	TO BUS 23037 [GK_KOR14	400.00]	CKT 1
SINGLE 473	:	OPEN LINE FROM BUS 23123 [GKPATR11	400.00]	TO BUS 23126 [GKPATC12	400.00]	CKT 1
SINGLE 475	:	OPEN LINE FROM BUS 23126 [GKPATC12	400.00]	TO BUS 23180 [GAXELO12	400.00]	CKT 1
SINGLE 567	:	OPEN LINE FROM BUS 28043 [RSTUPA2	220.00]	TO BUS 28044 [RBRADU2	220.00]	CKT 1
SINGLE 637	:	OPEN LINE FROM BUS 28855 [RMOSTI2	220.00]	TO BUS 28935 [RRAC.M2	220.00]	CKT 1
SINGLE 642	:	OPEN LINE FROM BUS 28906 [RTELEA2	220.00]	TO BUS 28907 [RSTILP2	220.00]	CKT 1
SINGLE 670	:	OPEN LINE FROM BUS 28039 [RROSI01	400.00]	TO BUS 28094 [RROSIO2	220.00]	CKT 1
SINGLE 707	:	OPEN LINE FROM BUS 31410 [LDIVAC1	400.00]	TO BUS 80 [XRE_DI11	400.00]	CKT 1
SINGLE 739	:	OPEN LINE FROM BUS 34050 [JSUBO31	400.00]	TO BUS 34085 [JSOMB31	400.00]	CKT 1

Table 13.16.6: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of Serbia is self-balanced

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1622.4	1723.7	0.0	0.0	0.0	-150.0	48.7	-150.0
AL	674.2	779.7	-204.4	0.0	474.3	101.4	471.8	
20	9660.0	8411.0	0.0	15.5	0.0	1000.0	233.4	1000.0
BG	3539.1	3357.9	0.0	181.1	3277.5	213.7	3063.9	
30	2954.2	2897.8	0.0	0.0	0.0	0.1	56.3	0.0
BA	1037.4	1017.2	0.0	0.0	910.0	235.1	695.1	
35	45058.6	54409.8	0.0	1.1	0.0	-9740.0	387.7	-9740.0
IT	9535.3	11942.3	0.0	147.8	12398.5	-818.9	10662.7	
40	3435.5	4359.0	0.0	0.0	0.0	-999.9	76.4	-1000.0
HR	544.3	1075.9	0.0	0.0	1529.7	176.6	821.5	
45	6097.9	7180.0	0.1	0.0	0.0	-1199.9	117.6	-1200.0
HU	1405.5	2128.1	178.3	-29.1	2402.7	2.6	1528.3	
50	11750.3	11426.0	0.0	0.0	0.0	0.0	324.3	0.0
GR	3136.1	5724.7	203.8	9.4	6661.8	131.5	3714.9	
55	4436.1	-4356.2	0.0	4.8	0.0	8699.3	88.1	8700.0
UX	-119.6	622.8	0.0	12.8	2319.5	499.1	1065.2	
60	1940.4	2001.9	0.0	0.0	0.0	-100.0	38.3	-100.0
MK	768.0	752.3	-30.8	0.0	397.2	14.3	428.2	
65	1207.4	0.0	0.0	0.0	0.0	1200.0	7.4	1200.0
UA	-158.4	0.0	0.0	0.0	652.2	373.5	120.2	
70	13272.0	12110.2	0.0	89.9	0.0	800.2	271.7	800.0
RO	3218.8	4455.6	781.3	284.9	5586.0	-45.4	3328.4	
75	3951.0	2990.0	0.0	8.9	0.0	890.0	62.1	890.0
SI	1235.7	964.6	0.0	53.8	868.1	326.0	759.5	
80	77661.6	77342.9	0.0	0.0	0.0	-800.0	1118.7	-800.0
TR	9835.9	11034.0	996.9	0.0	22660.7	-170.0	20635.7	
90	8545.1	8298.8	0.0	17.2	0.0	0.1	229.0	0.0
RS	3073.7	2986.6	0.0	73.1	1724.3	-779.7	2518.0	
91	867.2	938.0	0.5	2.1	0.0	-100.0	26.6	-100.0
ME	354.8	346.6	-34.5	11.4	236.0	36.1	231.2	

95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-321.0	0.0	0.0	0.0	39.9	-295.8	14.7	
TOTALS	192960.9	189732.9	0.6	139.6	0.0	0.0	3087.7	0.0
	37759.6	47188.4	1890.6	745.0	62138.5	0.0	50059.4	



Figure 13.16.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of Serbia is self-balanced

Table 13.16.7: Branches loaded more then 80% of their thermal limits in monitored grid in winter maximum 2020, scenario when power system of Serbia is self-balanced

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I		
12274,VMI	2	220.00,	12474,VMI	1	400.00,	1,	1,	-528.50,	-109.90,	539.81,	81.43

Table 13.16.8: Changes in power flow greater then 150 MW in area of SEE in winter maximum 2020, scenario when power system of Serbia is self-balanced

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 150.0 MW:											
IN WORKING CASE						IN BASE CASE					
X-----	FROM BUS	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
	5 [XDU_SL11	400.00]	50026 [ODUERN1	400.00]	1	550.0	-226.6	700.0	-205.8	150.0	27.3
	8 [XWI_GY11	400.00]	24067 [MGYOR 4	400.00]	1	-119.5	43.4	84.1	12.2	203.7	170.4
	8 [XWI_GY11	400.00]	50010 [OWIEN 1	400.00]	1	119.5	-43.4	-84.1	-12.2	-203.7	170.4
	85 [XPF_DJ11	400.00]	28004 [RP.D.F1	400.00]	1	87.7	-22.4	-100.9	19.2	-188.6	215.1
	85 [XPF_DJ11	400.00]	34010 [JHDJE11	400.00]	1	-87.7	22.4	100.9	-19.2	188.6	215.1



34040	[JRPLA1	400.00]	34045	[JSMIT21	400.00]	1	704.8	-12.8	533.3	-23.6	-171.6	24.3
34090	[JBBAST2	220.00]	34196	[JRHBA22	220.00]	2	-303.2	-6.9	0.2	0.2	303.4	100.1
34196	[JRHBA22	220.00]	35072	[JRHBA22	11.000]	3	-152.0	-5.5	0.1	0.7	152.1	100.1
34196	[JRHBA22	220.00]	35072	[JRHBA22	11.000]	4	-152.0	-5.5	0.1	0.7	152.1	100.1
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	1	-762.7	20.0	-969.3	69.8	-206.6	27.1
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	2	-762.7	20.0	-969.3	69.8	-206.6	27.1
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	1	-735.0	48.4	-1023.0	92.2	-288.0	39.2
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	2	-735.0	48.4	-1023.0	92.2	-288.0	39.2
50009	[OWESTT1	400.00]	50011	[OZELL 1	400.00]	1	581.4	16.8	834.0	76.5	252.7	43.5
50009	[OWESTT1	400.00]	50011	[OZELL 1	400.00]	2	581.4	16.8	834.0	76.5	252.7	43.5
52049	[ICRDV111	400.00]	53531	[IUDOV11	400.00]	1	-197.9	-105.4	-44.4	-162.0	153.5	77.6

Table 13.16.9: Changes in power flow through tie-lines connecting Serbia to the rest of the system in winter maximum 2020, scenario when power system of Serbia is self-balanced

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:												
IN WORKING CASE				IN BASE CASE								
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
182	[XPL_BB21	220.00]	36023	[OTPLJE21	220.00]	1	158.0	-55.2	91.0	-49.8	-67.0	42.4
183	[XPL_BT21	220.00]	36023	[OTPLJE21	220.00]	1	16.8	-59.1	-14.2	-57.2	-31.0	184.6
184	[XRI_PE11	400.00]	36001	[ORIBAR11	400.00]	1	-143.3	-73.0	-161.1	-76.0	-17.8	12.4
326	[XPL_ZA51	110.00]	36040	[OPLJEV51	110.00]	1	1.9	-13.9	-5.3	-11.6	-7.2	384.1
34010	[JHDJE11	400.00]	85	[XPF_DJ11	400.00]	1	87.7	-23.1	-100.9	18.5	-188.6	215.1
34020	[JNIS2 1	400.00]	24	[XSO_NI11	400.00]	1	-361.9	-95.3	-373.3	-85.2	-11.5	3.2
34035	[JPANC21	400.00]	86	[XRE_PA11	400.00]	1	-93.7	-37.7	-107.7	-46.0	-14.0	14.9
34045	[JSMIT21	400.00]	74	[XER_SM11	400.00]	1	270.6	-102.1	126.5	-89.6	-144.1	53.3
34045	[JSMIT21	400.00]	211	[XUG_SM11	400.00]	1	334.1	-45.9	254.2	-39.5	-79.9	23.9
34050	[JSUBO31	400.00]	79	[XSA_SU11	400.00]	1	6.3	-133.2	-111.7	-113.1	-117.9	999.9
34072	[JUROS21	400.00]	81	[XSK_KB11	400.00]	1	-157.6	-30.7	-149.3	-28.6	8.3	5.2
34073	[JGJAK31	400.00]	82	[XKA_KC11	400.00]	1	22.4	-59.0	6.5	-57.3	-16.0	71.2
34087	[JVLAN31	400.00]	208	[XST_NI11	400.00]	1	-26.7	-53.7	-35.3	-49.2	-8.6	32.1
34180	[JPOZEG2	220.00]	117	[XVI_VA21	220.00]	1	12.0	-75.2	-37.5	-68.4	-49.5	411.2
34190	[JPRIZ22	220.00]	87	[XFI_PR21	220.00]	1	-121.4	-61.8	-127.2	-60.1	-5.8	4.8

Table 13.16.10: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of Serbia is self-balanced

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%
10010	*AELBS22	220.00	10125 ACEKIN2	220.00	1 SINGLE 19	370.0 386.5 103.0
10009	*AELBS12	220.00	10125 ACEKIN2	220.00	1 SINGLE 22	370.0 384.4 102.7
24034	*MDUME 2	220.00	24096 MMART 21	220.00	1 SINGLE 367	426.8 533.3 119.1
24094	*MMART 4	400.00	24096 MMART 21	220.00	1 SINGLE 367	500.0 542.3 108.5
24034	*MDUME 2	220.00	24095 MMART 22	220.00	1 SINGLE 368	426.8 537.2 120.0
24094	*MMART 4	400.00	24095 MMART 22	220.00	1 SINGLE 368	500.0 546.2 109.2
24034	*MDUME 2	220.00	24096 MMART 21	220.00	1 SINGLE 379	426.8 533.6 119.2
24094	*MMART 4	400.00	24096 MMART 21	220.00	1 SINGLE 379	500.0 542.6 108.5
24034	*MDUME 2	220.00	24095 MMART 22	220.00	1 SINGLE 380	426.8 537.5 120.1
24094	*MMART 4	400.00	24095 MMART 22	220.00	1 SINGLE 380	500.0 546.6 109.3
28040	*RLOTU2	220.00	28366 RSIBIU2	220.00	1 SINGLE 621	333.4 393.1 112.4
28040	*RLOTU2	220.00	28100 RSIBIU21	220.00	1 SINGLE 622	333.4 393.1 112.4
28040	*RLOTU2	220.00	28366 RSIBIU2	220.00	1 SINGLE 719	333.4 392.9 111.7
28040	*RLOTU2	220.00	28100 RSIBIU21	220.00	1 SINGLE 720	333.4 392.9 111.7
34100	*JBGD172	220.00	34111 JBGD8 22	220.00	2 SINGLE 819	445.8 467.0 105.8
34100	*JBGD172	220.00	34111 JBGD8 22	220.00	1 SINGLE 820	445.8 467.0 105.8

MONITORED VOLTAGE REPORT:									
SYSTEM	CONTINGENCY	<-----	B U S	----->	V-CONT	V-INIT	V-MAX	V-MIN	
'BG400	'	RANGE SINGLE 80	12473	VMI3 12	400.00	1.05015	1.03236	1.05000	0.90000
'BG220	'	RANGE SINGLE 134	12286	VUZUND2	220.00	0.88875	1.01031	1.10000	0.90000
'BG220	'	RANGE SINGLE 136	12282	VORFEJ2	220.00	1.10515	1.04387	1.10000	0.90000
'HU220	'	RANGE SINGLE 356	24005	MALBF 22	220.00	0.89275	1.04262	1.10000	0.90000
'HU220	'	RANGE SINGLE 357	24006	MALBF 21	220.00	0.89462	1.04267	1.10000	0.90000
'RO220	'	RANGE SINGLE 691	28855	RMOSTI2	220.00	0.82076	1.01359	1.10000	0.90000
'RS400	'	RANGE SINGLE 796	34085	JSOMB31	400.00	0.85908	0.98777	1.05000	0.90000
'RS220	'	RANGE SINGLE 844	34200	JSABA32	220.00	0.87801	1.01741	1.10000	0.90000

CONTINGENCY LEGEND:							
LABEL	EVENTS						
SINGLE 19	: OPEN LINE FROM BUS 10009 [AELBS12	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1		
SINGLE 22	: OPEN LINE FROM BUS 10010 [AELBS22	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1		
SINGLE 80	: OPEN LINE FROM BUS 12471 [VMI3 11	400.00]	TO BUS 12473 [VMI3 12	400.00]	CKT 1		
SINGLE 134	: OPEN LINE FROM BUS 12275 [VMI3 2	220.00]	TO BUS 12286 [VUZUND2	220.00]	CKT 1		
SINGLE 136	: OPEN LINE FROM BUS 12280 [VALEKO2	220.00]	TO BUS 12282 [VORFEJ2	220.00]	CKT 1		

SINGLE 356	:	OPEN LINE FROM BUS 24005 [MALBF 22	220.00]	TO BUS 24034 [MDUME 2	220.00]	CKT 1
SINGLE 357	:	OPEN LINE FROM BUS 24006 [MALBF 21	220.00]	TO BUS 24034 [MDUME 2	220.00]	CKT 1
SINGLE 367	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 368	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 379	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 380	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 621	:	OPEN LINE FROM BUS 28040 [RLOTU2	220.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 622	:	OPEN LINE FROM BUS 28040 [RLOTU2	220.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 691	:	OPEN LINE FROM BUS 28855 [RMOSTI2	220.00]	TO BUS 28935 [RRAC.M2	220.00]	CKT 1
SINGLE 719	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 720	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 796	:	OPEN LINE FROM BUS 34050 [JSUBO31	400.00]	TO BUS 34085 [JSOMB31	400.00]	CKT 1
SINGLE 819	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 1
SINGLE 820	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 2
SINGLE 844	:	OPEN LINE FROM BUS 34170 [JOBREN2	220.00]	TO BUS 34200 [JSABA32	220.00]	CKT 1

### 13.16.2. Serbian Power System Imports 500 MW

Table 13.16.11: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of Serbia imports 500 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1338.5	1491.9	0.0	0.0	0.0	-200.0	46.6	-200.0
AL	477.3	689.7	-199.8	0.0	458.8	27.8	418.3	
20	8804.9	7603.7	0.0	14.4	0.0	1000.0	186.8	1000.0
BG	2897.6	3045.8	-44.9	120.9	2996.7	321.6	2450.9	
30	3147.8	2610.1	0.0	0.0	0.0	490.0	47.6	490.0
BA	698.1	724.5	0.0	0.0	911.3	323.8	561.1	
35	40265.5	49222.0	0.0	1.1	0.0	-9400.0	442.5	-9400.0
IT	7053.9	10816.5	0.0	-156.9	12568.8	-536.5	9499.7	
40	3098.8	3483.0	0.0	0.0	0.0	-434.9	50.7	-435.0
HR	354.9	1074.2	0.0	0.0	1409.0	22.1	667.6	
45	5391.7	6500.0	0.1	0.0	0.0	-1200.0	91.6	-1200.0
HU	956.4	1926.6	178.2	-29.6	2423.8	92.4	1212.6	
50	10298.1	10371.1	0.0	0.0	0.0	-350.0	277.0	-350.0
GR	2144.3	5312.0	170.2	9.3	6613.1	111.9	3140.2	
55	4543.9	-4593.5	0.0	4.8	0.0	9025.4	107.2	9026.0
UX	88.3	637.5	0.0	12.8	2316.9	350.0	1404.9	
60	1501.6	1577.0	0.0	0.0	0.0	-100.0	24.6	-100.0
MK	452.8	573.6	-31.4	0.0	403.6	49.7	264.6	
65	1207.2	0.0	0.0	0.0	0.0	1200.0	7.2	1200.0
UA	-195.2	0.0	0.0	0.0	653.8	346.0	112.5	
70	10251.8	9416.9	0.0	88.4	0.0	545.1	201.4	545.0
RO	2518.0	4075.6	512.9	273.9	4617.0	-206.5	2479.2	
75	2993.7	2514.0	0.0	8.8	0.0	424.1	46.8	424.0
SI	981.5	811.0	0.0	54.0	608.4	182.4	542.6	
80	54592.7	54622.1	0.0	0.0	0.0	-800.0	770.7	-800.0
TR	4577.5	7792.0	1175.4	0.0	17195.6	-131.8	12937.5	

90	7571.0	7871.1	0.0	17.8	0.0	-499.7	181.8	-500.0
RS	2577.7	2853.5	0.0	76.6	1729.7	-650.5	2027.9	
91	628.8	805.2	0.5	1.9	0.0	-200.0	21.2	-200.0
ME	298.4	299.2	-35.0	10.9	239.4	58.7	204.0	
95	501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK	-385.0	0.0	0.0	0.0	40.0	-360.8	15.9	
TOTALS	156137.3	153494.7	0.6	137.2	0.0	0.0	2504.9	0.0
	25496.5	40631.6	1725.6	371.9	55186.0	0.0	37939.7	

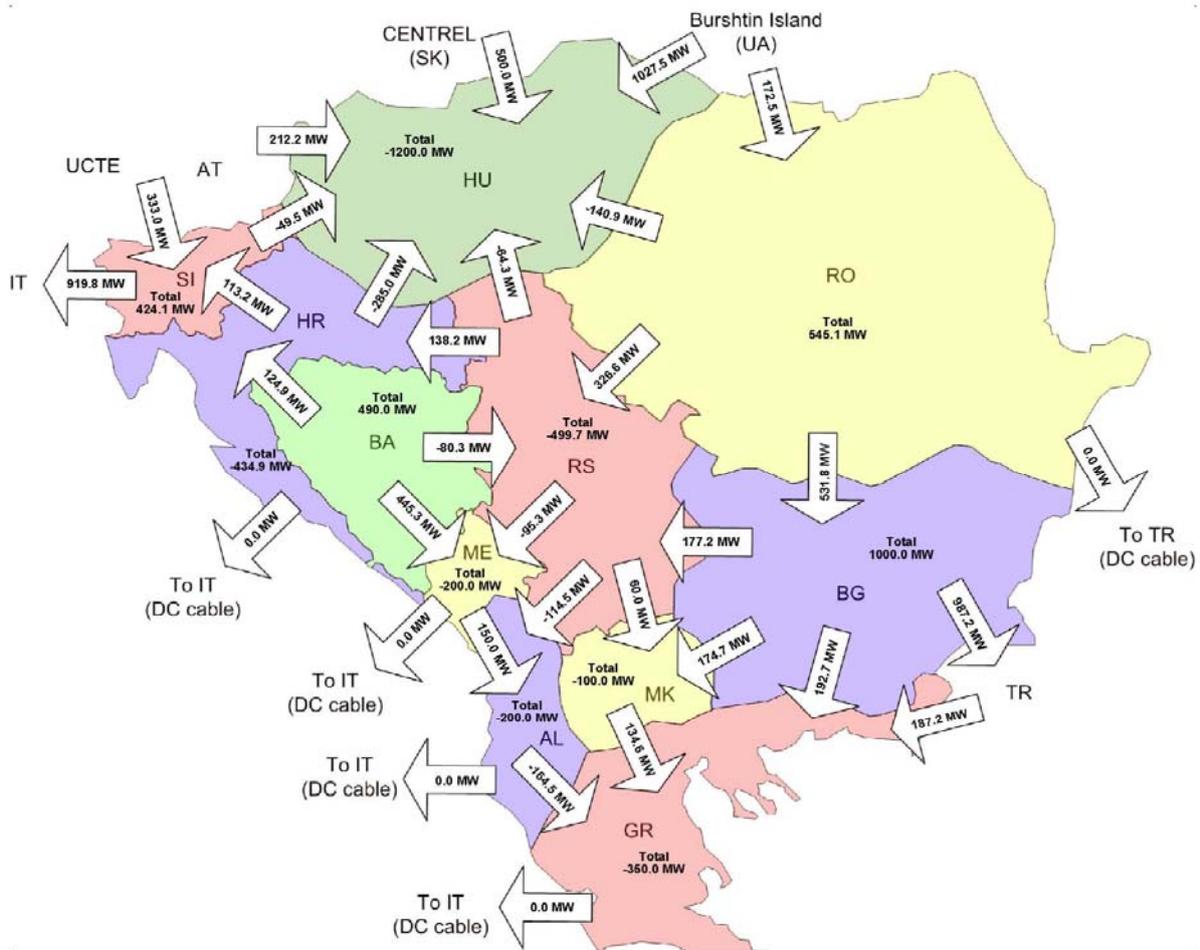


Figure 13.16.3: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of Serbia imports 500 MW

Table 13.16.12: Branches loaded more then 80% of their thermal limits in monitored grid in winter maximum 2015, scenario when power system of Serbia imports 500 MW

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,CKT,STS,	MW,	MVAR,	MVA,	%I
***** NONE *****							

Table 13.16.13: Changes in power flow greater than 50 MW in area of SEE in winter maximum 2015, scenario when power system of Serbia imports 500 MW

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 50.0 MW:												
IN WORKING CASE						IN BASE CASE						
X	FROM BUS	END	MW	TO BUS	X	CTK	MW	MVAR	MW	MVAR	DELTA MW	%
85	[XPF_DJ11	400.00]	28004	[RP.D.F1	400.00]	1	-214.6	13.0	-139.8	32.3	74.8	34.9
85	[XPF_DJ11	400.00]	34010	[JHDJE11	400.00]	1	214.6	-13.0	139.8	-32.3	-74.8	34.9
34010	[JHDJE11	400.00]	35005	[JHDJERG5	15.750]	3	0.3	0.6	-129.1	-31.8	-129.4	999.9
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	1	-1009.7	89.0	-936.2	78.3	73.5	7.3
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	2	-1009.7	89.0	-936.2	78.3	73.5	7.3
50011	[OZELL 1	400.00]	50042	[OZELL 2	220.00]	1	-729.9	59.3	-609.5	64.7	120.4	16.5

Table 13.16.14: Changes in power flow through tie-lines connecting Serbia to the rest of the system, in winter maximum 2015, scenario when power system of Serbia imports 500 MW

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:												
IN WORKING CASE						IN BASE CASE						
X	FROM BUS	END	MW	TO BUS	X	CTK	MW	MVAR	MW	MVAR	DELTA MW	%
182	[XPL_BB21	220.00]	36023	[OTPLJE21	220.00]	1	106.0	-49.8	108.1	-50.5	2.1	2.0
183	[XPL_BI21	220.00]	36023	[OTPLJE21	220.00]	1	0.4	-52.8	1.8	-53.1	1.4	306.2
184	[XRI_PE11	400.00]	36001	[ORIBAR11	400.00]	1	-201.4	-56.3	-189.8	-58.1	11.5	5.7
326	[XPL_ZA51	110.00]	36040	[OPLJEV51	110.00]	1	-0.4	-11.8	0.0	-12.0	0.5	111.2
34010	[JHDJE11	400.00]	85	[XPF_DJ11	400.00]	1	-214.6	12.4	-139.8	31.6	74.8	34.9
34020	[JNIS2 1	400.00]	24	[XSO_NI11	400.00]	1	-176.8	-117.1	-179.9	-116.5	-3.2	1.8
34035	[JPANC21	400.00]	86	[XRE_PA11	400.00]	1	-111.8	-40.4	-129.2	-39.0	-17.4	15.5
34045	[JSMIT21	400.00]	74	[XER_SM11	400.00]	1	138.4	-85.4	165.1	-86.7	26.7	19.3
34045	[JSMIT21	400.00]	211	[XUG_SM11	400.00]	1	151.4	-73.6	168.2	-76.4	16.8	11.1
34050	[JSUBO31	400.00]	79	[XSA_SU11	400.00]	1	-64.3	-96.4	-44.4	-100.2	19.9	30.9
34071	[JTKOSC1	400.00]	82	[XKA_KC11	400.00]	1	51.1	-66.9	55.1	-67.5	4.0	7.8
34072	[JKURO21	400.00]	81	[XSK_KB11	400.00]	1	16.3	-47.0	10.6	-46.2	-5.7	35.1
34087	[JVRAN31	400.00]	208	[XST_NI11	400.00]	1	43.7	-58.5	45.4	-58.6	1.6	3.7
34180	[JPOZEG2	220.00]	117	[XVI_VA21	220.00]	1	-70.2	-65.5	-64.5	-66.4	5.7	8.1
34190	[JKPRZ22	220.00]	87	[XFI_PR21	220.00]	1	-163.5	-35.3	-161.8	-35.8	1.7	1.0

Table 13.16.15: Results of contingency (n-1) analysis in winter maximum 2015, scenario when power system of Serbia imports 500 MW

<-----	MONITORED BRANCH	>-----	CONTINGENCY	RATING	FLOW	%
316	*XTR_HN51	110.00	36050 OHNOVI51	110.00	1 SINGLE 196	89.6 95.8 108.6
24034	*MDUME 2	220.00	24095 MMART 22	220.00	1 SINGLE 345	426.8 449.5 100.4
24034	*MDUME 2	220.00	24095 MMART 22	220.00	1 SINGLE 357	426.8 449.6 100.4
31210	*LDIVAC2	220.00	156 XPA_DI21	220.00	1 SINGLE 707	320.1 529.2 159.9

MONITORED VOLTAGE REPORT:									
SYSTEM		CONTINGENCY	<-----	B U S	>-----	V-CONT	V-INIT	V-MAX	V-MIN
'BG220	'	RANGE SINGLE 100	12252	VOCHIF2	220.00	0.81893	0.95881	1.10000	0.90000
'BG220	'	RANGE SINGLE 124	12286	VUZUND2	220.00	0.89602	1.00468	1.10000	0.90000
'GR400	'	RANGE SINGLE 432	22759	GTH_AG11	400.00	1.05203	1.02529	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23123	GKPTR11	400.00	1.05217	1.03822	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23125	GKPATC11	400.00	1.05227	1.03820	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23126	GKPATC12	400.00	1.05221	1.03831	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23173	GDISTO11	400.00	1.05311	1.03795	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23174	GDISTO12	400.00	1.05273	1.03809	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23180	GAXELO12	400.00	1.05238	1.03877	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23181	GAXELO11	400.00	1.05235	1.03898	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23064	GK_MEG13	400.00	1.05388	1.04119	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23066	GK_MEG11	400.00	1.05388	1.04119	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23123	GKPTR11	400.00	1.05332	1.03822	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23125	GKPATC11	400.00	1.05341	1.03820	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23126	GKPATC12	400.00	1.05336	1.03831	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23173	GDISTO11	400.00	1.05404	1.03795	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23174	GDISTO12	400.00	1.05386	1.03809	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23180	GAXELO12	400.00	1.05353	1.03877	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23181	GAXELO11	400.00	1.05359	1.03898	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23036	GK_KOR13	400.00	1.06329	1.01751	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23068	GK_MEG14	400.00	1.06089	1.02954	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23037	GK_KOR14	400.00	1.06329	1.01751	1.05000	0.90000

'GR400	'	RANGE SINGLE 463	23067	GK_MEG12	400.00	1.06089	1.02954	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23126	GKPATC12	400.00	1.06904	1.03831	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23180	GAXELO12	400.00	1.06904	1.03877	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23181	GAXELO11	400.00	1.06885	1.03898	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23180	GAXELO12	400.00	1.06849	1.03877	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23181	GAXELO11	400.00	1.06830	1.03898	1.05000	0.90000
'RO220	'	RANGE SINGLE 567	28043	RSTUPA2	220.00	0.89320	0.98053	1.10000	0.90000
'RO220	'	RANGE SINGLE 637	28855	RMOSTI2	220.00	0.88232	1.04055	1.10000	0.90000
'RO220	'	RANGE SINGLE 642	28907	RSTILP2	220.00	0.84382	0.98224	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28095	RVETIS2	220.00	0.89842	1.02201	1.10000	0.90000
'RS400	'	RANGE SINGLE 739	34085	JSOMB31	400.00	0.88005	0.99523	1.05000	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 100	: OPEN LINE FROM BUS 12250 [VGORIA2 220.00] TO BUS 12252 [VOCHIF2 220.00] CKT 1
SINGLE 124	: OPEN LINE FROM BUS 12275 [VMI3 2 220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 196	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [0PODG211 400.00] CKT 1
SINGLE 345	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 357	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 432	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23172 [GDISTO13 400.00] CKT 1
SINGLE 433	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23173 [GDISTO11 400.00] CKT 1
SINGLE 462	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23036 [GK_KOR13 400.00] CKT 1
SINGLE 463	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23037 [GK_KOR14 400.00] CKT 1
SINGLE 473	: OPEN LINE FROM BUS 23123 [GKPATR11 400.00] TO BUS 23126 [GKPATC12 400.00] CKT 1
SINGLE 475	: OPEN LINE FROM BUS 23126 [GKPATC12 400.00] TO BUS 23180 [GAXELO12 400.00] CKT 1
SINGLE 567	: OPEN LINE FROM BUS 28043 [RSTUPA2 220.00] TO BUS 28044 [RBRADU2 220.00] CKT 1
SINGLE 637	: OPEN LINE FROM BUS 28855 [RMOSTI2 220.00] TO BUS 28935 [RRAC.M2 220.00] CKT 1
SINGLE 642	: OPEN LINE FROM BUS 28906 [RTELEA2 220.00] TO BUS 28907 [RSTILP2 220.00] CKT 1
SINGLE 670	: OPEN LINE FROM BUS 28039 [RROSIO1 400.00] TO BUS 28094 [RROSIO2 220.00] CKT 1
SINGLE 707	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1
SINGLE 739	: OPEN LINE FROM BUS 34050 [JSUBO31 400.00] TO BUS 34085 [JSOMB31 400.00] CKT 1

Table 13.16.16: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of Serbia imports 500 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1622.2	1723.7	0.0	0.0	0.0	-150.0	48.5	-150.0
AL	669.8	779.7	-204.6	0.0	474.9	99.2	470.4	
20	9660.8	8411.0	0.0	15.5	0.0	1000.0	234.2	1000.0
BG	3537.7	3357.9	0.0	181.1	3277.6	204.5	3071.9	
30	2951.0	2897.8	0.0	0.0	0.0	0.0	53.1	0.0
BA	1011.1	1017.2	0.0	0.0	912.8	239.5	667.3	
35	45060.2	54409.8	0.0	1.1	0.0	-9740.0	389.3	-9740.0
IT	9567.9	11942.3	0.0	147.8	12395.8	-811.6	10685.4	
40	3429.9	4359.0	0.0	0.0	0.0	-999.9	70.8	-1000.0
HR	514.6	1075.9	0.0	0.0	1533.4	195.8	776.4	
45	6094.1	7180.0	0.1	0.0	0.0	-1199.9	114.0	-1200.0
HU	1369.4	2128.1	178.5	-29.1	2404.5	5.1	1491.3	
50	11750.3	11426.0	0.0	0.0	0.0	0.0	324.3	0.0
GR	3132.8	5724.7	203.8	9.4	6662.2	128.9	3714.6	
55	4964.6	-4356.2	0.0	4.8	0.0	9199.6	116.4	9200.0
UX	211.5	622.8	0.0	12.7	2307.5	394.5	1488.8	
60	1940.4	2001.9	0.0	0.0	0.0	-100.0	38.4	-100.0
MK	766.1	752.3	-30.9	0.0	397.4	11.9	428.8	
65	1207.5	0.0	0.0	0.0	0.0	1200.0	7.5	1200.0

UA	-163.0	0.0	0.0	0.0	652.3	368.6	120.8	
70	13266.2	12110.2	0.0	90.0	0.0	800.1	265.8	800.0
RO	3177.2	4455.6	782.1	285.3	5593.3	-25.2	3272.6	
75	3950.2	2990.0	0.0	8.9	0.0	890.0	61.3	890.0
SI	1231.7	964.6	0.0	53.8	868.5	332.1	749.8	
80	77661.6	77342.9	0.0	0.0	0.0	-800.0	1118.7	-800.0
TR	9836.1	11034.0	996.9	0.0	22660.7	-170.0	20635.8	
90	8027.4	8298.8	0.0	17.3	0.0	-499.9	211.3	-500.0
RS	2981.4	2986.6	0.0	73.2	1727.9	-723.8	2373.3	
91	864.6	938.0	0.5	2.1	0.0	-100.0	24.0	-100.0
ME	350.4	346.6	-34.6	11.4	237.0	52.2	211.8	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-326.7	0.0	0.0	0.0	40.0	-301.6	14.8	
TOTALS	192952.3	189732.9	0.6	139.7	0.0	0.0	3079.0	0.0
	37868.0	47188.4	1891.3	745.6	62145.8	0.0	50173.8	

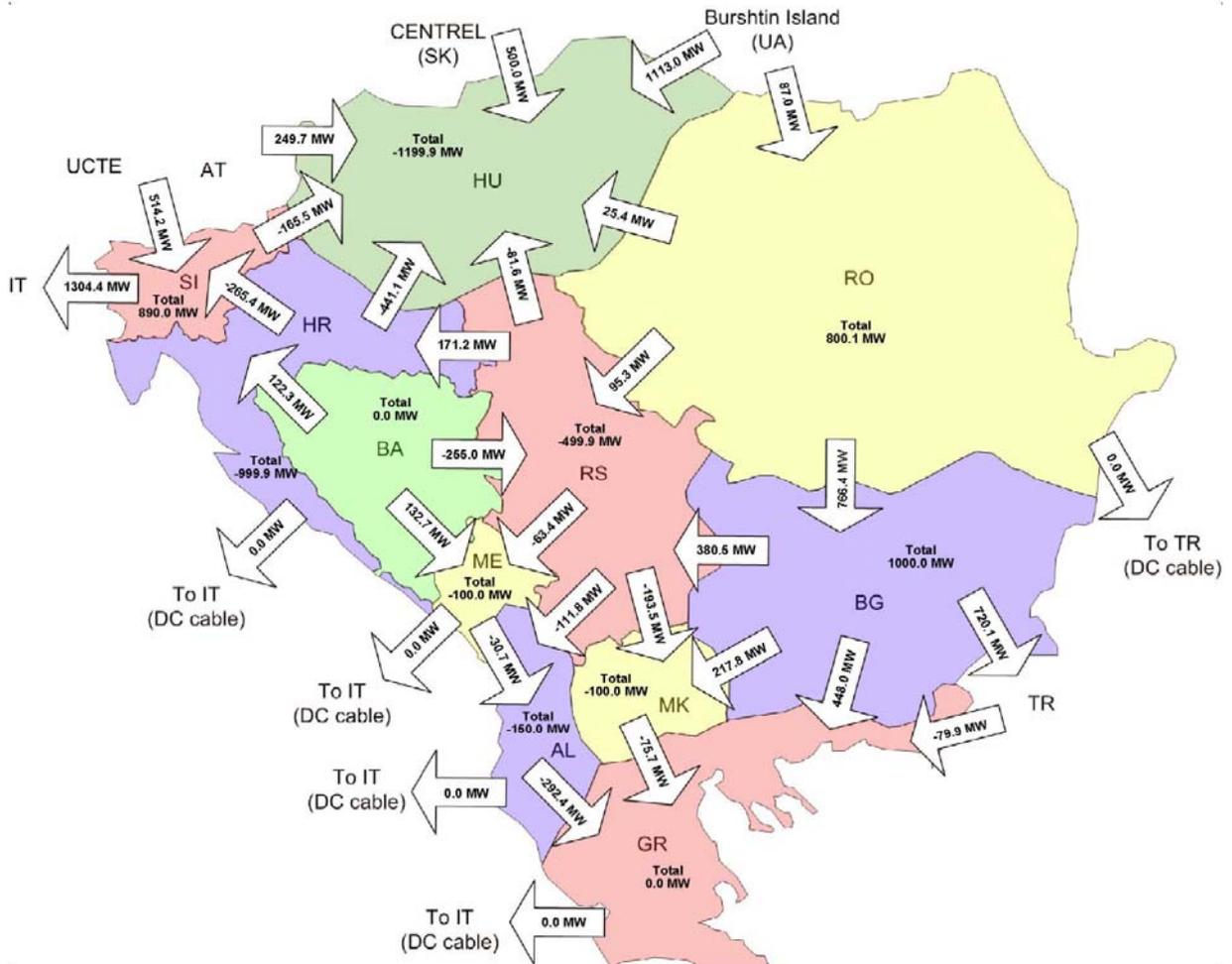


Figure 13.16.4: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of Serbia imports 500 MW

Table 13.16.17: Branches loaded more then 80% of their thermal limits in monitored grid in winter maximum 2020, scenario when power system of Serbia imports 500 MW

FRMBUS,	FROMBUSNAME,	TOBUS,	TOBUSNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I		
12274,VMI	2	220.00,	12474,VMI	1	400.00,	1,	1,	-528.26,	-109.93,	539.58,	81.39

Table 13.16.18: Changes in power flow greater then 50 MW in area of SEE in winter maximum 2020, scenario when power system of Serbia imports 500 MW

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 50.0 MW:												
IN WORKING CASE						IN BASE CASE						
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
	8 [XWI_GY11	400.00]	24067	[MGYOR 4	400.00]	1	20.5	21.9	84.1	12.2	63.7	311.2
	8 [XWI_GY11	400.00]	50010	[OWIEN 1	400.00]	1	-20.5	-21.9	-84.1	-12.2	-63.7	311.2
	85 [XPF_DJ11	400.00]	28004	[RP.D.F1	400.00]	1	26.1	-15.9	-100.9	19.2	-127.0	486.7
	85 [XPF_DJ11	400.00]	34010	[JHDJE11	400.00]	1	-26.1	15.9	100.9	-19.2	127.0	486.7
	24122 [MPAKS 4	400.00]	24148	[MSAFA 4	400.00]	1	284.4	39.2	334.7	36.1	50.2	17.7
	34010 [JHDJE11	400.00]	35001	[JHDJERG1	15.750]	1	-326.2	-5.3	-257.5	-17.7	68.7	21.1
	34010 [JHDJE11	400.00]	35003	[JHDJERG3	15.750]	2	-326.2	-5.3	-257.5	-17.7	68.7	21.1
	34010 [JHDJE11	400.00]	35005	[JHDJERG5	15.750]	3	-326.2	-5.3	-257.5	-17.7	68.7	21.1
	34040 [JRPLM1A1	400.00]	34045	[JSMIT21	400.00]	1	598.1	-22.1	533.3	-23.6	-64.8	10.8
	50005 [OLIENZ1	400.00]	50008	[OTAUER1	400.00]	1	-886.6	49.6	-969.3	69.8	-82.6	9.3
	50005 [OLIENZ1	400.00]	50008	[OTAUER1	400.00]	2	-886.6	49.6	-969.3	69.8	-82.6	9.3
	50008 [OTAUER1	400.00]	50011	[OZELL 1	400.00]	1	-893.2	75.5	-1023.0	92.2	-129.8	14.5
	50008 [OTAUER1	400.00]	50011	[OZELL 1	400.00]	2	-893.2	75.5	-1023.0	92.2	-129.8	14.5
	50011 [OZELL 1	400.00]	50042	[OZELL 2	220.00]	1	-185.4	21.5	-398.8	4.3	-213.4	115.1
	52049 [ICRDV111	400.00]	53531	[IUDOV11	400.00]	1	-102.3	-140.3	-44.4	-162.0	57.9	56.6

Table 13.16.19: Changes in power flow through tie-lines connecting Serbia to the rest of the system in winter maximum 2020, scenario when power system of Serbia imports 500 MW

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:												
IN WORKING CASE						IN BASE CASE						
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
	182 [XPL_BB21	220.00]	36023	[OTPLJE21	220.00]	1	95.1	-50.7	91.0	-49.8	-4.0	4.3
	183 [XPL_BI21	220.00]	36023	[OTPLJE21	220.00]	1	-11.8	-57.7	-14.2	-57.2	-2.5	21.0
	184 [XRI_PE11	400.00]	36001	[ORIBAR11	400.00]	1	-142.2	-78.2	-161.1	-76.0	-18.9	13.3
	326 [XPL_ZA51	110.00]	36040	[OPLJEV51	110.00]	1	-4.5	-12.0	-5.3	-11.6	-0.8	17.2
	34010 [JHDJE11	400.00]	85 [XPF_DJ11	400.00]	1	26.1	-16.6	-100.9	18.5	-127.0	486.7	
	34020 [JNIS2 1	400.00]	24 [XSO_NI11	400.00]	1	-378.7	-88.4	-373.3	-85.2	5.4	1.4	
	34035 [JPANC21	400.00]	86 [XRE_PA11	400.00]	1	-121.1	-38.9	-107.7	-46.0	13.5	11.1	
	34045 [JSMIT21	400.00]	74 [XER_SM11	400.00]	1	171.5	-94.5	126.5	-89.6	-45.0	26.3	
	34045 [JSMIT21	400.00]	211 [XUG_SM11	400.00]	1	283.7	-42.5	254.2	-39.5	-29.5	10.4	
	34050 [JSUBO31	400.00]	79 [XSA_SU11	400.00]	1	-81.5	-118.6	-111.7	-113.1	-30.1	37.0	
	34072 [JUROS21	400.00]	81 [XSK_KB11	400.00]	1	-160.4	-28.1	-149.3	-28.6	11.1	6.9	
	34073 [JGJAK31	400.00]	82 [XKA_KC11	400.00]	1	14.2	-58.5	6.5	-57.3	-7.7	54.4	
	34087 [JVVRAN31	400.00]	208 [XST_NI11	400.00]	1	-32.9	-51.5	-35.3	-49.2	-2.4	7.2	
	34180 [JPOZEG2	220.00]	117 [XVI_VA21	220.00]	1	-27.8	-70.0	-37.5	-68.4	-9.7	34.9	
	34190 [JPRIZ22	220.00]	87 [XFI_PR21	220.00]	1	-124.5	-61.0	-127.2	-60.1	-2.7	2.2	

Table 13.16.20: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of Serbia exports 500 MW

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%
10010*AELBS22	220.00	10125 ACEKIN2	220.00 1 SINGLE 19	370.0	386.3	102.9
10009*AELBS12	220.00	10125 ACEKIN2	220.00 1 SINGLE 22	370.0	384.3	102.6
316 XTR_HN51	110.00	36050*OHNOVI51	110.00 1 SINGLE 207	89.6	92.8	104.7
24034*MDUME 2	220.00	24096 MMART 21	220.00 1 SINGLE 367	426.8	522.7	116.7
24094*MMART 4	400.00	24096 MMART 21	220.00 1 SINGLE 367	500.0	531.8	106.4
24034*MDUME 2	220.00	24095 MMART 22	220.00 1 SINGLE 368	426.8	526.4	117.6
24094*MMART 4	400.00	24095 MMART 22	220.00 1 SINGLE 368	500.0	535.6	107.1
24034*MDUME 2	220.00	24096 MMART 21	220.00 1 SINGLE 379	426.8	522.9	116.8
24094*MMART 4	400.00	24096 MMART 21	220.00 1 SINGLE 379	500.0	532.1	106.4
24034*MDUME 2	220.00	24095 MMART 22	220.00 1 SINGLE 380	426.8	526.7	117.6
24094*MMART 4	400.00	24095 MMART 22	220.00 1 SINGLE 380	500.0	535.9	107.2



28040*RLOTRU2	220.00	28366	RSIBIU2	220.00	1	SINGLE	621	333.4	393.0	112.3
28040*RLOTRU2	220.00	28100	RSIBIU21	220.00	1	SINGLE	622	333.4	393.0	112.3
28040*RLOTRU2	220.00	28366	RSIBIU2	220.00	1	SINGLE	719	333.4	392.9	111.7
28040*RLOTRU2	220.00	28100	RSIBIU21	220.00	1	SINGLE	720	333.4	392.9	111.7
34100*JBGD172	220.00	34111	JBGD8 22	220.00	2	SINGLE	819	445.8	466.9	105.7
34100*JBGD172	220.00	34111	JBGD8 22	220.00	1	SINGLE	820	445.8	466.9	105.7
MONITORED VOLTAGE REPORT:										
SYSTEM		CONTINGENCY	<----- B U S ----->			V-CONT	V-INIT	V-MAX	V-MIN	
'BG400	'	RANGE SINGLE 80	12473	VMI3 12	400.00	1.05015	1.03235	1.05000	0.90000	
'BG220	'	RANGE SINGLE 134	12286	VUZUND2	220.00	0.88873	1.01029	1.10000	0.90000	
'BG220	'	RANGE SINGLE 136	12282	VORFEJ2	220.00	1.10515	1.04389	1.10000	0.90000	
'HU220	'	RANGE SINGLE 356	24005	MALBF 22	220.00	0.89275	1.04262	1.10000	0.90000	
'HU220	'	RANGE SINGLE 357	24006	MALBF 21	220.00	0.89462	1.04267	1.10000	0.90000	
'RO220	'	RANGE SINGLE 691	28855	RMOSTI2	220.00	0.82112	1.01400	1.10000	0.90000	
'RS400	'	RANGE SINGLE 796	34085	JSOMB31	400.00	0.86183	0.98943	1.05000	0.90000	
'RS220	'	RANGE SINGLE 844	34200	JSABA32	220.00	0.88212	1.01864	1.10000	0.90000	
CONTINGENCY LEGEND:										
LABEL	EVENTS									
SINGLE 19	:	OPEN LINE FROM BUS 10009	[AELBS12	220.00]	TO BUS 10125	[ACEKIN2	220.00]	CKT 1		
SINGLE 22	:	OPEN LINE FROM BUS 10010	[AELBS22	220.00]	TO BUS 10125	[ACEKIN2	220.00]	CKT 1		
SINGLE 80	:	OPEN LINE FROM BUS 12471	[VMI3 11	400.00]	TO BUS 12473	[VMI3 12	400.00]	CKT 1		
SINGLE 134	:	OPEN LINE FROM BUS 12275	[VMI3 2	220.00]	TO BUS 12286	[VUZUND2	220.00]	CKT 1		
SINGLE 136	:	OPEN LINE FROM BUS 12275	[VMI3 2	220.00]	TO BUS 12286	[VUZUND2	220.00]	CKT 1		
SINGLE 207	:	OPEN LINE FROM BUS 13	[XTR_PG11	400.00]	TO BUS 36005	[OPODG211	400.00]	CKT 1		
SINGLE 357	:	OPEN LINE FROM BUS 24006	[MALBF 21	220.00]	TO BUS 24034	[MDUME 2	220.00]	CKT 1		
SINGLE 367	:	OPEN LINE FROM BUS 24034	[MDUME 2	220.00]	TO BUS 24095	[MMART 22	220.00]	CKT 1		
SINGLE 368	:	OPEN LINE FROM BUS 24034	[MDUME 2	220.00]	TO BUS 24096	[MMART 21	220.00]	CKT 1		
SINGLE 379	:	OPEN LINE FROM BUS 24094	[MMART 4	400.00]	TO BUS 24095	[MMART 22	220.00]	CKT 1		
SINGLE 380	:	OPEN LINE FROM BUS 24094	[MMART 4	400.00]	TO BUS 24096	[MMART 21	220.00]	CKT 1		
SINGLE 621	:	OPEN LINE FROM BUS 28040	[RLOTRU2	220.00]	TO BUS 28100	[RSIBIU21	220.00]	CKT 1		
SINGLE 622	:	OPEN LINE FROM BUS 28040	[RLOTRU2	220.00]	TO BUS 28366	[RSIBIU2	220.00]	CKT 1		
SINGLE 691	:	OPEN LINE FROM BUS 28855	[RMOSTI2	220.00]	TO BUS 28935	[RRAC.M2	220.00]	CKT 1		
SINGLE 719	:	OPEN LINE FROM BUS 28034	[RSIBIU1	400.00]	TO BUS 28100	[RSIBIU21	220.00]	CKT 1		
SINGLE 720	:	OPEN LINE FROM BUS 28034	[RSIBIU1	400.00]	TO BUS 28366	[RSIBIU2	220.00]	CKT 1		
SINGLE 796	:	OPEN LINE FROM BUS 34050	[JSUBO31	400.00]	TO BUS 34085	[JSOMB31	400.00]	CKT 1		
SINGLE 819	:	OPEN LINE FROM BUS 34100	[JBGD172	220.00]	TO BUS 34111	[JBGD8 22	220.00]	CKT 1		
SINGLE 820	:	OPEN LINE FROM BUS 34100	[JBGD172	220.00]	TO BUS 34111	[JBGD8 22	220.00]	CKT 2		
SINGLE 844	:	OPEN LINE FROM BUS 34170	[JOBREN2	220.00]	TO BUS 34200	[JSABA32	220.00]	CKT 1		

## 13.17. Slovenian Power Balance Uncertainty

### 13.17.1. Slovenian Power System Is Self-Balanced

Table 13.17.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of Slovenia is self-balanced

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	AL		1338.3 474.7	1491.9 689.7	0.0 -199.9	0.0 0.0	0.0 459.1	-200.0 27.0	46.4 417.0	-200.0
20	BG		8806.4 2909.2	7603.7 3045.8	0.0 -44.9	14.4 120.9	0.0 2995.4	1000.0 315.8	188.3 2467.0	1000.0
30	BA		3148.2 708.9	2610.1 724.5	0.0 0.0	0.0 0.0	0.0 910.0	490.0 324.6	48.1 569.8	490.0
35	IT		40289.0 7070.1	49222.0 10816.5	0.0 0.0	1.1 -156.9	0.0 12568.1	-9376.0 -517.0	441.9 9495.6	-9376.0
40	HR		3103.2 414.2	3483.0 1074.2	0.0 0.0	0.0 0.0	0.0 1402.0	-435.0 38.0	55.2 704.1	-435.0
45	HU		5394.2 1018.1	6500.0 1926.6	0.1 178.2	0.0 -29.7	0.0 2421.1	-1200.0 120.6	94.1 1243.6	-1200.0
50	GR		10298.1 2145.8	10371.1 5312.0	0.0 170.2	0.0 9.3	0.0 6612.8	-350.0 112.5	277.0 3140.8	-350.0
55	UX		4398.1 46.4	-4593.5 637.5	0.0 0.0	4.8 12.8	0.0 2314.3	8886.0 410.9	100.9 1299.6	8886.0
60	MK		1501.7 454.1	1577.0 573.6	0.0 -31.3	0.0 0.0	0.0 403.5	-100.0 48.9	24.7 266.4	-100.0
65	UA		1609.1 -216.7	0.0 0.0	0.0 0.0	0.0 0.0	0.0 653.7	1600.0 305.7	9.1 131.3	1600.0
70	RO		10251.2 2494.5	9416.9 4075.6	0.0 513.1	88.4 274.1	0.0 4619.6	545.0 -225.1	200.8 2476.4	545.0
75	SI		2569.6 916.0	2514.0 811.0	0.0 0.0	8.7 53.1	0.0 599.6	0.0 107.3	47.0 544.3	0.0
80	TR		54592.9 4580.7	54622.1 7792.0	0.0 1175.4	0.0 0.0	0.0 17195.5	-800.0 -131.1	770.9 12939.9	-800.0
90	RS		7714.2 2625.2	7871.1 2853.5	0.0 0.0	17.8 76.6	0.0 1729.4	-360.0 -647.9	185.3 2072.5	-360.0
91	ME		628.3 298.0	805.2 299.2	0.5 -35.1	1.9 10.9	0.0 239.7	-200.0 63.3	20.7 199.3	-200.0
95	SK		501.4 -377.8	0.0 0.0	0.0 0.0	0.0 0.0	0.0 40.0	500.0 -353.4	1.4 15.7	500.0
101	XX (IT-GR)		0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0

102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	156144.0	153494.7	0.6	137.1	0.0	0.0	2511.7	0.0
	25561.6	40631.6	1725.7	371.0	55164.0	0.0	37983.4	



Figure 13.17.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of Slovenia is self-balanced

Table 13.17.2: Changes in power flow in area of SEE in winter maximum 2015, scenario when power system of Slovenia is self-balanced

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
78	[XSA_MU11 400.00]	24157	[MSAJ0 4 400.00]	1	169.7	19.5	-29.1	36.2	-198.9	117.2	
78	[XSA_MU11 400.00]	65001	[UMUKACH 400.00]	1	-169.7	-19.5	29.1	-36.2	198.9	117.2	
84	[XRO_MU11 400.00]	28039	[RROSIO1 400.00]	1	362.0	36.6	160.8	57.2	-201.2	55.6	
84	[XRO_MU11 400.00]	65001	[UMUKACH 400.00]	1	-362.0	-36.6	-160.8	-57.2	201.2	55.6	
501	[XCI_P111 400.00]	24076	[MHEVI 4 400.00]	1	-171.7	-8.9	-68.7	-5.7	103.0	60.0	
501	[XCI_P111 400.00]	31435	[LCIRK011 400.00]	A	171.7	8.9	68.7	5.7	-103.0	60.0	
24058	[MGOD 4 400.00]	24200	[MDETK 4 400.00]	A	125.3	-22.6	247.8	-28.2	122.5	97.7	
24157	[MSAJ0 4 400.00]	24200	[MDETK 4 400.00]	A	95.1	24.8	-31.3	36.0	-126.4	132.9	
28009	[RNADAB1 400.00]	28096	[RORADELA 400.00]	1	59.3	-16.5	166.0	-28.2	106.7	180.1	
28039	[RROSIO1 400.00]	28096	[RORADELA 400.00]	1	56.6	-28.6	-44.0	-14.1	-100.6	177.7	
30006	[LTES G5 21.000]	31401	[LTESOS1 400.00]	5	-14.4	-45.0	140.1	-45.0	154.5	999.9	
31401	[LTESOS1 400.00]	31425	[LPODLO1 400.00]	1P	406.4	-55.6	560.7	-91.1	154.3	38.0	
31425	[LPODLO1 400.00]	31435	[LCIRK011 400.00]	1	-112.5	-30.6	3.7	-47.5	116.2	103.3	

Table 13.17.3: Changes in power flow greater then 50 MW through tie-lines in area of interest in winter maximum 2015, scenario when power system of Slovenia is self-balanced

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%
31049	[LHFORM5 110.00]	329	[XNE_F051 110.00]	1	16.5	-10.4	40.0	2.1	23.5	142.1	12.4	120.0	
31050	[LILBIS5 110.00]	328	[XMA_IB51 110.00]	1	-34.9	1.2	-30.9	0.7	4.0	11.5	-0.5	42.0	
31067	[LKOPER5 110.00]	327	[XBU_K051 110.00]	1	-7.1	22.6	-5.1	21.8	2.1	28.8	-0.8	3.6	
31201	[LPODLO2 220.00]	109	[XOB_PO21 220.00]	1	-175.7	-44.2	-152.9	-40.4	22.8	13.0	3.8	8.6	
31210	[LDIVAC2 220.00]	153	[XPE_DI21 220.00]	1	-155.8	9.6	-147.3	8.9	8.6	5.5	-0.7	7.6	
31210	[LDIVAC2 220.00]	156	[XPA_DI21 220.00]	1	220.9	-43.9	230.8	-39.1	9.9	4.5	4.7	10.8	
31220	[LCIRK02 220.00]	152	[XZE_C121 220.00]	1	-27.3	-21.8	-9.0	-18.9	18.3	67.0	2.9	13.2	
31410	[LDIVAC1 400.00]	71	[XME_DI11 400.00]	1	-482.5	-18.0	-446.1	-24.1	36.4	7.6	-6.1	33.8	
31410	[LDIVAC1 400.00]	80	[XRE_DI11 400.00]	1	704.1	210.3	732.5	225.8	28.5	4.0	15.5	7.4	
31415	[LKRSKO1 400.00]	72	[XTU_KR11 400.00]	1	171.4	-27.3	198.7	-25.2	27.3	15.9	2.1	7.7	
31415	[LKRSKO1 400.00]	73	[XTU_KR12 400.00]	2	171.4	-27.3	198.7	-25.2	27.3	15.9	2.1	7.7	
31420	[LMARIB1 400.00]	9	[XKA_M111 400.00]	1	-130.1	16.3	-82.9	29.6	47.2	36.3	13.3	81.3	
31435	[LCIRK011 400.00]	501	[XCI_P111 400.00]	A	-171.5	-28.6	-68.7	-27.6	102.9	60.0	1.0	3.5	
31435	[LCIRK011 400.00]	502	[XCI_P112 400.00]	B	-11.5	-27.0	27.5	-23.6	39.0	339.1	3.4	12.7	
31450	[LKOZJK1 400.00]	10	[XKA_K011 400.00]	1	-77.9	10.2	-49.7	18.4	28.3	36.3	8.2	80.0	

Table 13.17.4: Results of contingency (n-1) analysis in winter maximum 2015, scenario when power system of Slovenia is self-balanced

<----- MONITORED BRANCH ----->	CONTINGENCY	RATING	FLOW	%
316*XTR_HN51 110.00 36050 OHNOVI51 110.00 1	SINGLE 196	89.6	90.0	102.0
24034*MDUME 2 220.00 24096 MMART 21 220.00 1	SINGLE 344	426.8	467.4	104.4
24034*MDUME 2 220.00 24095 MMART 22 220.00 1	SINGLE 345	426.8	470.9	105.2
24034*MDUME 2 220.00 24096 MMART 21 220.00 1	SINGLE 356	426.8	467.7	104.5
24034*MDUME 2 220.00 24095 MMART 22 220.00 1	SINGLE 357	426.8	471.1	105.2
31210*LDIVAC2 220.00 156 XPA_DI21 220.00 1	SINGLE 707	320.1	529.1	160.3

MONITORED VOLTAGE REPORT:	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
'HU220	RANGE BASE CASE	24025 MDETK 2 220.00	1.05000	1.05000	1.05000	0.90000
'HU220	RANGE BASE CASE	24068 MGYOR 2 220.00	1.05723	1.05723	1.05000	0.90000
'HU220	RANGE BASE CASE	24095 MMART 22 220.00	1.05048	1.05048	1.05000	0.90000
'HU220	RANGE BASE CASE	24096 MMART 21 220.00	1.05044	1.05044	1.05000	0.90000
'BG220	RANGE SINGLE 100	12252 VOCHIF2 220.00	0.81880	0.95869	1.10000	0.90000
'BG220	RANGE SINGLE 124	12286 VUZUND2 220.00	0.89583	1.00455	1.10000	0.90000
'GR400	RANGE SINGLE 432	22759 GTH_AG11 400.00	1.05202	1.02528	1.05000	0.90000
'GR400	RANGE SINGLE 432	23123 GKPATR11 400.00	1.05217	1.03821	1.05000	0.90000
'GR400	RANGE SINGLE 432	23125 GKPATC11 400.00	1.05226	1.03819	1.05000	0.90000
'GR400	RANGE SINGLE 432	23126 GKPATC12 400.00	1.05220	1.03830	1.05000	0.90000
'GR400	RANGE SINGLE 432	23173 GDISTO11 400.00	1.05310	1.03794	1.05000	0.90000
'GR400	RANGE SINGLE 432	23174 GDISTO12 400.00	1.05272	1.03808	1.05000	0.90000
'GR400	RANGE SINGLE 432	23180 GAXELO12 400.00	1.05238	1.03876	1.05000	0.90000
'GR400	RANGE SINGLE 432	23181 GAXELO11 400.00	1.05234	1.03897	1.05000	0.90000
'GR400	RANGE SINGLE 433	23064 GK_MEG13 400.00	1.05387	1.04118	1.05000	0.90000
'GR400	RANGE SINGLE 433	23066 GK_MEG11 400.00	1.05387	1.04118	1.05000	0.90000
'GR400	RANGE SINGLE 433	23123 GKPATR11 400.00	1.05331	1.03821	1.05000	0.90000
'GR400	RANGE SINGLE 433	23125 GKPATC11 400.00	1.05340	1.03819	1.05000	0.90000
'GR400	RANGE SINGLE 433	23126 GKPATC12 400.00	1.05335	1.03830	1.05000	0.90000
'GR400	RANGE SINGLE 433	23173 GDISTO11 400.00	1.05403	1.03794	1.05000	0.90000
'GR400	RANGE SINGLE 433	23174 GDISTO12 400.00	1.05385	1.03808	1.05000	0.90000
'GR400	RANGE SINGLE 433	23180 GAXELO12 400.00	1.05352	1.03876	1.05000	0.90000
'GR400	RANGE SINGLE 433	23181 GAXELO11 400.00	1.05358	1.03897	1.05000	0.90000
'GR400	RANGE SINGLE 462	23036 GK_KOR13 400.00	1.06328	1.01751	1.05000	0.90000
'GR400	RANGE SINGLE 462	23068 GK_MEG14 400.00	1.06088	1.02953	1.05000	0.90000
'GR400	RANGE SINGLE 463	23037 GK_KOR14 400.00	1.06328	1.01751	1.05000	0.90000
'GR400	RANGE SINGLE 463	23067 GK_MEG12 400.00	1.06088	1.02953	1.05000	0.90000
'GR400	RANGE SINGLE 473	23126 GKPATC12 400.00	1.06903	1.03830	1.05000	0.90000

'GR400	'	RANGE SINGLE	473	23180	GAXELO12	400.00	1.06902	1.03876	1.05000	0.90000
'GR400	'	RANGE SINGLE	473	23181	GAXELO11	400.00	1.06883	1.03897	1.05000	0.90000
'GR400	'	RANGE SINGLE	475	23180	GAXELO12	400.00	1.06847	1.03876	1.05000	0.90000
'GR400	'	RANGE SINGLE	475	23181	GAXELO11	400.00	1.06829	1.03897	1.05000	0.90000
'RO220	'	RANGE SINGLE	567	28043	RSTUPA2	220.00	0.89406	0.98102	1.10000	0.90000
'RO220	'	RANGE SINGLE	637	28855	RMOSTI2	220.00	0.88243	1.04080	1.10000	0.90000
'RO220	'	RANGE SINGLE	642	28907	RSTILP2	220.00	0.84418	0.98248	1.10000	0.90000
'RO220	'	RANGE SINGLE	670	28095	RVETIS2	220.00	0.89842	1.02189	1.10000	0.90000
'RS400	'	RANGE SINGLE	739	34085	JSOMB31	400.00	0.88003	0.99560	1.05000	0.90000

CONTINGENCY LEGEND:  
 LABEL                      EVENTS

SINGLE 196 : OPEN LINE FROM BUS 13 [XTR\_PG11                      400.00] TO BUS 36005 [0PODG211                      400.00] CKT 1  
 SINGLE 344 : OPEN LINE FROM BUS 24034 [MDUME 2                      220.00] TO BUS 24095 [MMART 22                      220.00] CKT 1  
 SINGLE 345 : OPEN LINE FROM BUS 24034 [MDUME 2                      220.00] TO BUS 24096 [MMART 21                      220.00] CKT 1  
 SINGLE 356 : OPEN LINE FROM BUS 24094 [MMART 4                      400.00] TO BUS 24095 [MMART 21                      220.00] CKT 1  
 SINGLE 357 : OPEN LINE FROM BUS 24094 [MMART 4                      400.00] TO BUS 24096 [MMART 22                      220.00] CKT 1  
 SINGLE 707 : OPEN LINE FROM BUS 31410 [LDIVAC1                      400.00] TO BUS 80 [XRE\_DI11                      400.00] CKT 1

Table 13.17.5: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of Slovenia is self-balanced

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	AL		1622.5	1723.7	0.0	0.0	0.0	-150.0	48.8	-150.0
			671.5	779.7	-204.5	0.0	474.6	97.7	473.2	
20	BG		9663.8	8411.0	0.0	15.5	0.0	1000.0	237.3	1000.0
			3552.8	3357.9	0.0	181.0	3275.8	186.8	3102.8	
30	BA		2953.5	2897.8	0.0	0.0	0.0	-0.1	55.7	0.0
			1032.3	1017.2	0.0	0.0	910.4	235.9	689.6	
35	IT		45062.8	54409.8	0.0	1.1	0.0	-9739.9	391.8	-9740.0
			9638.6	11942.3	0.0	147.7	12390.7	-781.2	10720.5	
40	HR		3437.1	4359.0	0.0	0.0	0.0	-1000.3	78.4	-1000.0
			561.7	1075.9	0.0	0.0	1525.6	173.3	838.1	
45	HU		6109.3	7180.0	0.1	0.0	0.0	-1200.7	129.9	-1200.0
			1482.5	2128.1	178.1	-29.2	2395.5	-53.5	1654.6	
50	GR		11750.7	11426.0	0.0	0.0	0.0	0.0	324.7	0.0
			3140.3	5724.7	203.8	9.4	6661.2	130.7	3719.3	
55	UX		5230.8	-4356.2	0.0	4.8	0.0	9451.2	131.0	9450.0
			423.7	622.8	0.0	12.6	2292.5	351.9	1729.0	
60	MK		1940.9	2001.9	0.0	0.0	0.0	-100.0	38.9	-100.0
			768.6	752.3	-30.8	0.0	397.2	9.8	433.2	
65	UA		2104.4	0.0	0.0	0.0	0.0	2089.9	14.4	2090.0
			-158.8	0.0	0.0	0.0	651.7	302.5	190.3	
70	RO		13257.2	12110.2	0.0	90.2	0.0	799.9	256.9	800.0
			3104.5	4455.6	783.9	285.9	5603.4	-12.2	3194.6	
75	SI		3058.0	2990.0	0.0	8.8	0.0	-0.1	59.3	0.0
			1234.5	964.6	0.0	53.4	862.3	420.3	658.6	
80	TR		77661.7	77342.9	0.0	0.0	0.0	-800.0	1118.8	-800.0
			9838.9	11034.0	996.9	0.0	22660.6	-168.0	20636.7	
90	RS		7772.4	8298.8	0.0	17.3	0.0	-750.1	206.5	-750.0
			2929.8	2986.6	0.0	73.2	1729.0	-681.1	2280.0	

91	864.9	938.0	0.5	2.1	0.0	-100.0	24.2	-100.0
ME	351.4	346.6	-34.6	11.4	236.8	51.8	212.8	
95	501.2	0.0	0.0	0.0	0.0	500.0	1.2	500.0
SK	-290.5	0.0	0.0	0.0	39.9	-264.7	14.2	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTALS	192991.3	189732.9	0.6	139.8	0.0	0.0	3117.8	0.0
	38281.7	47188.4	1892.8	745.6	62107.1	0.0	50547.5	

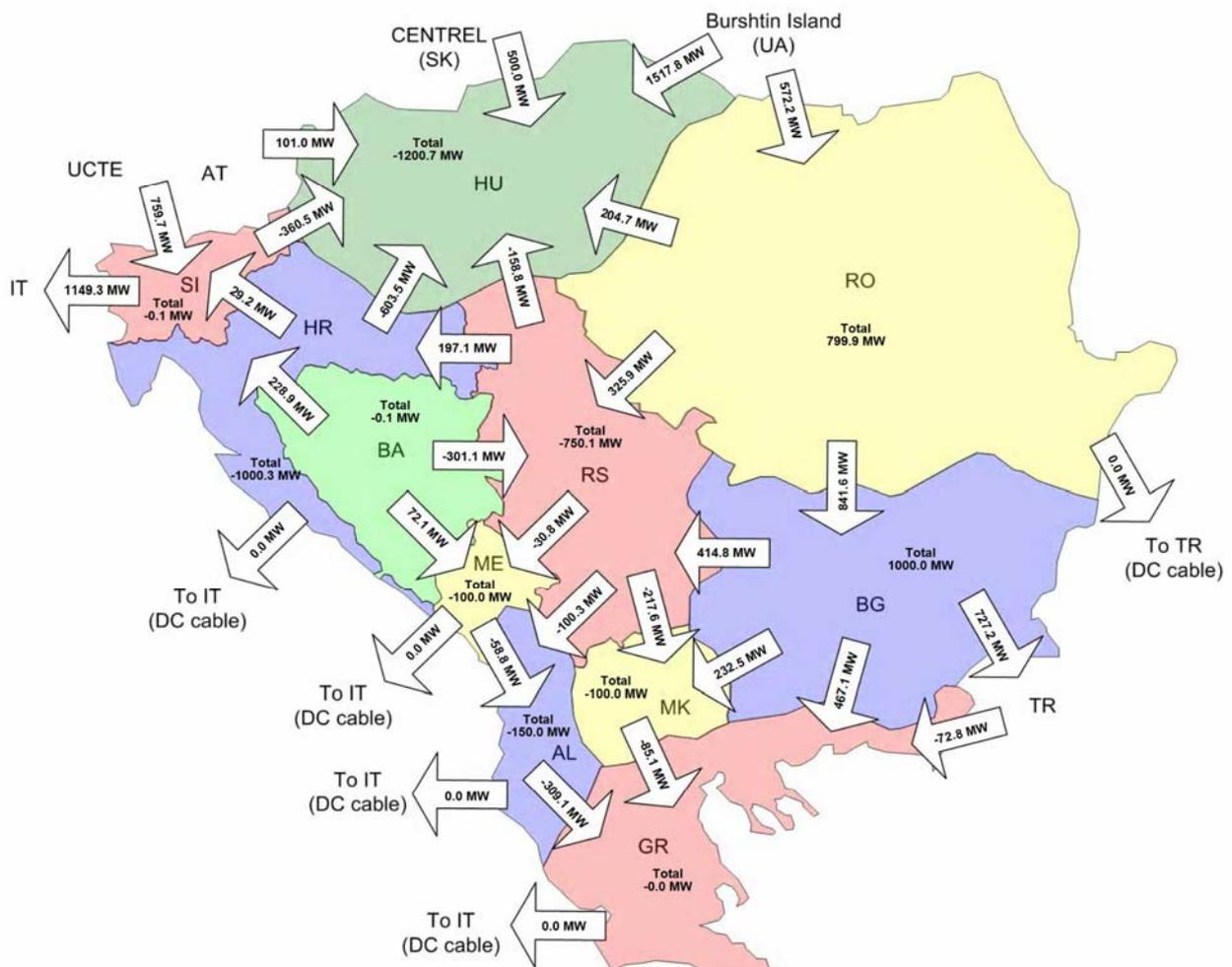


Figure 13.17.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of Slovenia is self-balanced

Table 13.17.6: Changes in power flow in area of SEE in winter maximum 2020, scenario when power system of Slovenia is self-balanced

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
8	[XWI_GY11	400.00]	24067	[MGYOR 4	400.00]	1	-92.0	27.0	84.1	12.2	176.1	191.5
8	[XWI_GY11	400.00]	50010	[OWIEN 1	400.00]	1	92.0	-27.0	-84.1	-12.2	-176.1	191.5
78	[XSA_MU11	400.00]	24157	[MSAJO 4	400.00]	1	400.1	28.3	-26.0	50.6	-426.1	106.5
78	[XSA_MU11	400.00]	65001	[UMUKACH	400.00]	1	-400.1	-28.3	26.0	-50.6	426.1	106.5
84	[XRO_MU11	400.00]	28039	[RROSIO1	400.00]	1	572.2	-10.8	108.4	32.2	-463.8	81.1
84	[XRO_MU11	400.00]	65001	[UMUKACH	400.00]	1	-572.2	10.8	-108.4	-32.2	463.8	81.1
501	[XCI_P111	400.00]	24076	[MHEVI 4	400.00]	1	-360.5	26.4	-128.0	-4.6	232.5	64.5
501	[XCI_P111	400.00]	31435	[LCIRKO11	400.00]	A	360.5	-26.4	128.0	4.6	-232.5	64.5
24002	[MAISA 4	400.00]	24094	[MMART 4	400.00]	A	219.4	-27.2	63.5	-24.4	-155.9	71.1
24002	[MAISA 4	400.00]	24094	[MMART 4	400.00]	B	219.4	-27.2	63.5	-24.4	-155.9	71.1
24058	[MGOD 4	400.00]	24200	[MDETK 4	400.00]	A	-42.3	-4.7	218.4	-27.5	260.7	616.3
24067	[MGYOR 4	400.00]	24763	[MGONYU1	400.00]	1	-652.3	-257.6	-465.3	-276.8	187.0	28.7
24076	[MHEVI 4	400.00]	24087	[MLITR 4	400.00]	1	-417.9	83.6	-266.7	69.9	151.2	36.2
24087	[MLITR 4	400.00]	24769	[MSZEKEL	400.00]	1	-350.5	64.5	-195.0	54.8	155.5	44.4
24094	[MMART 4	400.00]	24769	[MSZEKEL	400.00]	1	619.3	22.7	458.3	12.4	-161.1	26.0
24157	[MSAJO 4	400.00]	24200	[MDETK 4	400.00]	A	291.8	5.7	21.1	28.7	-270.7	92.8
24763	[MGONYU1	400.00]	24765	[MOROE 11	400.00]	1	133.1	319.4	320.8	308.4	187.7	141.0
24765	[MOROE 11	400.00]	24766	[METYEK1	400.00]	1	-209.0	158.8	-49.5	146.0	159.6	76.3
28009	[RNADABIB	400.00]	28096	[RORADEIA	400.00]	1	-76.6	-15.0	136.0	-45.1	212.6	277.6
28037	[RGADAL1	400.00]	28039	[RROSIO1	400.00]	1	-16.5	25.6	176.4	-7.5	192.9	999.9
28039	[RROSIO1	400.00]	28096	[RORADEIA	400.00]	1	219.8	-31.0	18.6	-11.0	-201.1	91.5
30006	[LTES G5	21.000]	31401	[LTESOS1	400.00]	5	-15.0	-45.9	276.7	-45.9	291.7	999.9
30066	[LTES G6	22.000]	31401	[LTESOS1	400.00]	6	0.0	0.0	600.0	41.5	600.0	999.9
31401	[LTESOS1	400.00]	31425	[LPDLO1	400.00]	1P	-7.8	-24.9	437.2	-47.3	445.0	999.9
31401	[LTESOS1	400.00]	31425	[LPDLO1	400.00]	2	-7.8	-24.9	437.2	-47.3	445.0	999.9
31425	[LPDLO1	400.00]	31430	[LBERIC1	400.00]	1	278.6	11.2	448.6	16.3	169.9	61.0
31425	[LPDLO1	400.00]	31430	[LBERIC1	400.00]	2	278.6	11.2	448.6	16.3	169.9	61.0
31425	[LPDLO1	400.00]	31435	[LCIRKO11	400.00]	1	-228.8	-12.2	20.5	-41.6	249.2	108.9
31425	[LPDLO1	400.00]	31435	[LCIRKO11	400.00]	2	-228.8	-12.2	20.5	-41.6	249.2	108.9

Table 13.17.7: Changes in power flow greater than 50 MW through tie-lines in area of interest in winter maximum 2020, scenario when power system of Slovenia is self-balanced

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%
31049	[LHFORM5	110.00]	329	[XNE_F051	110.00]	1	66.0	1.7	73.1	0.7	7.1	10.8	-1.0	57.5
31050	[LILBIS5	110.00]	328	[XMA_IB51	110.00]	1	-0.6	-3.4	4.7	-5.8	5.3	845.7	-2.4	70.1
31067	[LKOPER5	110.00]	327	[XBU_K051	110.00]	1	58.3	20.3	63.0	18.5	4.7	8.1	-1.8	8.9
31201	[LPDLO2	220.00]	109	[XOB_PO21	220.00]	1	-197.7	-34.0	-164.8	-40.5	32.9	16.7	-6.6	19.4
31210	[LDIVAC2	220.00]	153	[XPE_DI21	220.00]	1	-78.0	-9.6	-62.6	-13.5	15.4	19.7	-3.9	40.3
31210	[LDIVAC2	220.00]	156	[XPA_DI21	220.00]	1	150.2	-23.3	141.6	-20.0	-8.6	5.7	3.2	13.9
31220	[LCIRKO2	220.00]	152	[XZE_CI21	220.00]	1	-14.9	-3.2	-0.1	-6.4	14.8	99.1	-3.2	101.3
31405	[LOKROG1	400.00]	503	[XUD_OK11	400.00]	1	263.3	84.3	305.4	87.6	42.1	16.0	3.3	4.0
31410	[LDIVAC1	400.00]	71	[XME_DI11	400.00]	1	-314.1	-106.0	-210.3	-123.4	103.9	33.1	-17.4	16.4
31410	[LDIVAC1	400.00]	80	[XRE_DI11	400.00]	1	504.4	228.2	512.9	237.2	8.5	1.7	9.1	4.0
31415	[LKRSKO1	400.00]	72	[XTU_KR11	400.00]	1	127.4	-9.5	206.3	-18.8	78.9	62.0	-9.3	97.9
31415	[LKRSKO1	400.00]	73	[XTU_KR12	400.00]	2	127.4	-9.5	206.3	-18.8	78.9	62.0	-9.3	97.9
31420	[LMARIB1	400.00]	9	[XKA_M111	400.00]	1	-348.9	49.8	-258.3	42.0	90.6	26.0	-7.9	15.8
31435	[LCIRKO11	400.00]	501	[XCI_P111	400.00]	A	-359.5	15.1	-127.9	-25.2	231.6	64.4	-40.3	267.2
31435	[LCIRKO11	400.00]	502	[XCI_P112	400.00]	B	2.3	-38.6	100.8	-49.3	98.5	999.9	-10.7	27.8
31445	[LHAVCE1	400.00]	504	[XUD_AV11	400.00]	1	234.1	102.3	263.6	103.5	29.5	12.6	1.1	1.1
31450	[LKOZJK1	400.00]	10	[XKA_K011	400.00]	1	-209.2	27.8	-154.8	24.4	54.3	26.0	-3.4	12.2

Table 13.17.8: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of Slovenia is self-balanced

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%		
10010*	AELBS22	220.00	10125 ACEKIN2	220.00 1	SINGLE 19	370.0	386.4	103.0
10009*	AELBS12	220.00	10125 ACEKIN2	220.00 1	SINGLE 22	370.0	384.4	102.7
24034*	MDUME 2	220.00	24096 MMART 21	220.00 1	SINGLE 367	426.8	563.2	125.8
24094*	MMART 4	400.00	24096 MMART 21	220.00 1	SINGLE 367	500.0	571.7	114.3
24034*	MDUME 2	220.00	24095 MMART 22	220.00 1	SINGLE 368	426.8	567.3	126.7
24094*	MMART 4	400.00	24095 MMART 22	220.00 1	SINGLE 368	500.0	575.8	115.2
24034*	MDUME 2	220.00	24096 MMART 21	220.00 1	SINGLE 379	426.8	563.9	126.0
24094*	MMART 4	400.00	24096 MMART 21	220.00 1	SINGLE 379	500.0	572.4	114.5
24034*	MDUME 2	220.00	24095 MMART 22	220.00 1	SINGLE 380	426.8	568.0	126.9
24094*	MMART 4	400.00	24095 MMART 22	220.00 1	SINGLE 380	500.0	576.5	115.3
24157*	MSAJO 4	400.00	24200 MDETK 4	400.00 A	SINGLE 390	554.3	642.0	117.6
28040*	RLOTRU2	220.00	28366 RSIBIU2	220.00 1	SINGLE 621	333.4	393.0	112.2
28040*	RLOTRU2	220.00	28100 RSIBIU21	220.00 1	SINGLE 622	333.4	393.0	112.2
28040*	RLOTRU2	220.00	28366 RSIBIU2	220.00 1	SINGLE 719	333.4	392.8	111.6
28040*	RLOTRU2	220.00	28100 RSIBIU21	220.00 1	SINGLE 720	333.4	392.8	111.6
24157*	MSAJO 4	400.00	24200 MDETK 4	400.00 A	SINGLE 726	554.3	631.0	115.5
34100*	JBGD172	220.00	34111 JBGD8 22	220.00 2	SINGLE 819	445.8	466.9	105.6
34100*	JBGD172	220.00	34111 JBGD8 22	220.00 1	SINGLE 820	445.8	466.9	105.6

MONITORED VOLTAGE REPORT:

SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN
--------	-------------	---------------------	--------	--------	-------	-------

'HU220	'	RANGE BASE CASE	24025	MDETK 2	220.00	1.05000	1.05000	1.05000	0.90000
'BG220	'	RANGE SINGLE 134	12286	VUZUND2	220.00	0.88835	1.01005	1.10000	0.90000
'BG220	'	RANGE SINGLE 136	12282	VORFEJ2	220.00	1.10510	1.04353	1.10000	0.90000
'HU220	'	RANGE SINGLE 356	24005	MALBF 22	220.00	0.89275	1.04262	1.05000	0.90000
'HU220	'	RANGE SINGLE 357	24006	MALBF 21	220.00	0.89461	1.04267	1.05000	0.90000
'HU220	'	RANGE SINGLE 367	24095	MMART 22	220.00	1.06467	1.04873	1.05000	0.90000
'HU220	'	RANGE SINGLE 368	24096	MMART 21	220.00	1.06463	1.04872	1.05000	0.90000
'RO220	'	RANGE SINGLE 691	28855	RMOSTI2	220.00	0.82181	1.01484	1.10000	0.90000
'RS400	'	RANGE SINGLE 796	34085	JSOMB31	400.00	0.86247	0.99012	1.05000	0.90000
'RS220	'	RANGE SINGLE 844	34200	JSABA32	220.00	0.88115	1.01859	1.10000	0.90000

CONTINGENCY LEGEND:  
 LABEL           EVENTS

SINGLE 19	:	OPEN LINE FROM BUS 10009 [AELBS12	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1
SINGLE 22	:	OPEN LINE FROM BUS 10010 [AELBS22	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1
SINGLE 367	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 368	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 379	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1
SINGLE 380	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1
SINGLE 390	:	OPEN LINE FROM BUS 196 [XAL_ZA01	750.00]	TO BUS 65003 [UZUKRA01	750.00]	CKT 1
SINGLE 621	:	OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 622	:	OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 719	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1
SINGLE 720	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1
SINGLE 726	:	OPEN LINE FROM BUS 84 [XRO_MU11	400.00]	TO BUS 65001 [UMUKACH	400.00]	CKT 1
SINGLE 819	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 1
SINGLE 820	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 2

### 13.17.2. Slovenian Power System Exports 400 MW

Table 13.17.9: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of Slovenia exports 400 MW

X-- AREA	--X GENERATION	FROM TO	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1338.4	1491.9	0.0	0.0	0.0	-200.0	46.5	-200.0
AL	476.0	689.7	-199.8	0.0	458.9	27.4	417.7	
20	8805.3	7603.7	0.0	14.4	0.0	1000.0	187.2	1000.0
BG	2901.8	3045.8	-44.9	120.9	2996.2	320.9	2455.3	
30	3147.7	2610.1	0.0	0.0	0.0	490.0	47.6	490.0
BA	698.2	724.5	0.0	0.0	911.2	322.3	562.5	
35	40289.0	49222.0	0.0	1.1	0.0	-9375.5	441.4	-9376.0
IT	7036.6	10816.5	0.0	-157.0	12570.4	-542.0	9489.4	
40	3099.5	3483.0	0.0	0.0	0.0	-435.0	51.5	-435.0
HR	357.9	1074.2	0.0	0.0	1408.6	17.9	674.4	
45	5391.7	6500.0	0.1	0.0	0.0	-1200.0	91.6	-1200.0
HU	960.0	1926.6	178.2	-29.6	2423.8	95.2	1213.5	
50	10298.1	10371.1	0.0	0.0	0.0	-350.0	277.0	-350.0
GR	2144.6	5312.0	170.2	9.3	6613.0	111.9	3140.4	
55	4396.6	-4593.5	0.0	4.8	0.0	8885.1	100.3	8886.0
UX	-6.8	637.5	0.0	12.8	2320.9	378.8	1285.1	
60	1501.6	1577.0	0.0	0.0	0.0	-100.0	24.6	-100.0
MK	453.1	573.6	-31.4	0.0	403.6	49.4	265.2	
65	1207.1	0.0	0.0	0.0	0.0	1200.0	7.1	1200.0
UA	-196.3	0.0	0.0	0.0	653.8	345.6	111.9	

70	10254.1	9416.9	0.0	88.4	0.0	545.0	203.8	545.0
RO	2511.5	4075.6	512.8	273.9	4616.7	-234.0	2499.9	
75	2970.2	2514.0	0.0	8.8	0.0	400.4	47.0	400.0
SI	980.1	811.0	0.0	54.0	608.6	181.4	542.2	
80	54592.7	54622.1	0.0	0.0	0.0	-800.0	770.7	-800.0
TR	4578.4	7792.0	1175.4	0.0	17195.6	-131.6	12938.2	
90	7713.4	7871.1	0.0	17.8	0.0	-360.0	184.4	-360.0
RS	2620.1	2853.5	0.0	76.6	1729.8	-642.9	2062.8	
91	628.6	805.2	0.5	1.9	0.0	-200.0	20.9	-200.0
ME	297.9	299.2	-35.0	10.9	239.5	60.4	201.9	
95	501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK	-385.0	0.0	0.0	0.0	40.0	-360.8	15.9	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTALS	156135.5	153494.7	0.6	137.2	0.0	0.0	2503.0	0.0
	25428.2	40631.6	1725.5	371.9	55190.9	0.0	37876.2	



Figure 13.17.2: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of Slovenia exports 400 MW

Table 13.17.10: Changes in power flow in area of SEE in winter maximum 2015, scenario when power system of Slovenia exports 400 MW

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA	MW	%
--------	----------	--------	--------	--------	--------	-----	----	------	----	------	-------	----	---

Table 13.17.11: Changes in power flow greater than 50 MW through tie-lines in area of interest in winter maximum 2015, scenario when power system of Slovenia exports 400 MW

X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA	MW	%	MVAR	%
31049	[LHFORM5	110.00]	329	[XNE_F051	110.00]	1	39.9	2.1	40.0	2.1	0.1	0.3	0.0	1.6	
31067	[LKOPER5	110.00]	327	[XBU_KO51	110.00]	1	-5.0	21.7	-5.1	21.8	-0.1	2.4	0.0	0.1	
31201	[LPDLO2	220.00]	109	[XOB_PO21	220.00]	1	-155.0	-39.9	-152.9	-40.4	2.1	1.3	-0.5	1.3	
31210	[LDIVAC2	220.00]	153	[XPE_DI21	220.00]	1	-146.7	8.9	-147.3	8.9	-0.6	0.4	0.0	0.3	
31210	[LDIVAC2	220.00]	156	[XPA_DI21	220.00]	1	228.0	-39.0	230.8	-39.1	2.9	1.3	-0.2	0.5	
31220	[LCIRKO2	220.00]	152	[XZE_CI21	220.00]	1	-9.3	-18.8	-9.0	-18.9	0.3	3.5	-0.1	0.4	
31410	[LDIVAC1	400.00]	71	[XME_DI11	400.00]	1	-443.1	-23.7	-446.1	-24.1	-2.9	0.7	-0.4	1.8	
31410	[LDIVAC1	400.00]	80	[XRE_DI11	400.00]	1	720.5	226.0	732.5	225.8	12.0	1.7	-0.2	0.1	
31415	[LKRSKO1	400.00]	72	[XTU_KR11	400.00]	1	197.7	-25.2	198.7	-25.2	1.0	0.5	0.0	0.1	
31415	[LKRSKO1	400.00]	73	[XTU_KR12	400.00]	2	197.7	-25.2	198.7	-25.2	1.0	0.5	0.0	0.1	
31420	[LMARIB1	400.00]	9	[XKA_M11	400.00]	1	-87.9	30.0	-82.9	29.6	4.9	5.6	-0.4	1.4	
31435	[LCIRKO11	400.00]	501	[XCI_P111	400.00]	A	-70.4	-27.1	-68.7	-27.6	1.7	2.5	-0.4	1.6	
31435	[LCIRKO11	400.00]	502	[XCI_P112	400.00]	B	26.4	-23.4	27.5	-23.6	1.1	4.1	-0.2	0.8	
31450	[LKOZJK1	400.00]	10	[XKA_KO11	400.00]	1	-52.6	18.7	-49.7	18.4	3.0	5.6	-0.2	1.3	



Table 13.17.12: Results of contingency (n-1) analysis in winter maximum 2015, scenario when power system of Slovenia exports 400 MW

MONITORED BRANCH				CONTINGENCY		RATING	FLOW	%
316*XTR_HN51	110.00	36050 OHNOVI51	110.00	1	SINGLE 196	89.6	93.7	106.2
24034*MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE 344	426.8	448.9	100.3
24034*MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE 345	426.8	452.2	101.0
24034*MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE 356	426.8	449.0	100.3
24034*MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE 357	426.8	452.3	101.0
31210*LDIVAC2	220.00	156 XPA_DI21	220.00	1	SINGLE 707	320.1	542.6	164.0

MONITORED VOLTAGE REPORT:									
SYSTEM		CONTINGENCY	B U S		V-CONT	V-INIT	V-MAX	V-MIN	
'HU220	'	RANGE BASE CASE	24025	MDETK 2	220.00	1.05000	1.05000	1.05000	0.90000
'HU220	'	RANGE BASE CASE	24068	MGYOR 2	220.00	1.05777	1.05777	1.05000	0.90000
'HU220	'	RANGE BASE CASE	24095	MMART 22	220.00	1.05068	1.05068	1.05000	0.90000
'HU220	'	RANGE BASE CASE	24096	MMART 21	220.00	1.05064	1.05064	1.05000	0.90000
'BG220	'	RANGE SINGLE 100	12252	VOCHIF2	220.00	0.81885	0.95876	1.10000	0.90000
'BG220	'	RANGE SINGLE 124	12286	VUZUND2	220.00	0.89597	1.00464	1.10000	0.90000
'GR400	'	RANGE SINGLE 432	22759	GTH_AG11	400.00	1.05202	1.02529	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23123	GKPATR11	400.00	1.05217	1.03822	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23125	GKPATC11	400.00	1.05227	1.03820	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23126	GKPATC12	400.00	1.05221	1.03831	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23173	GDISTO11	400.00	1.05310	1.03795	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23174	GDISTO12	400.00	1.05273	1.03808	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23180	GAXELO12	400.00	1.05238	1.03876	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23181	GAXELO11	400.00	1.05235	1.03898	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23064	GK_MEG13	400.00	1.05388	1.04119	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23066	GK_MEG11	400.00	1.05388	1.04119	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23123	GKPATR11	400.00	1.05332	1.03822	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23125	GKPATC11	400.00	1.05341	1.03820	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23126	GKPATC12	400.00	1.05335	1.03831	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23173	GDISTO11	400.00	1.05404	1.03795	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23174	GDISTO12	400.00	1.05385	1.03808	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23180	GAXELO12	400.00	1.05353	1.03876	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23181	GAXELO11	400.00	1.05359	1.03898	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23036	GK_KOR13	400.00	1.06329	1.01751	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23068	GK_MEG14	400.00	1.06089	1.02954	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23037	GK_KOR14	400.00	1.06329	1.01751	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23067	GK_MEG12	400.00	1.06089	1.02954	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23126	GKPATC12	400.00	1.06904	1.03831	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23180	GAXELO12	400.00	1.06903	1.03876	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23181	GAXELO11	400.00	1.06884	1.03898	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23180	GAXELO12	400.00	1.06848	1.03876	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23181	GAXELO11	400.00	1.06830	1.03898	1.05000	0.90000
'RO220	'	RANGE SINGLE 567	28043	RSTUPA2	220.00	0.89294	0.98033	1.10000	0.90000
'RO220	'	RANGE SINGLE 637	28855	RMOSTI2	220.00	0.88208	1.04051	1.10000	0.90000
'RO220	'	RANGE SINGLE 642	28907	RSTILP2	220.00	0.84370	0.98216	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28095	RVETIS2	220.00	0.89844	1.02194	1.10000	0.90000
'RS400	'	RANGE SINGLE 739	34085	JSOMB31	400.00	0.87979	0.99509	1.05000	0.90000

CONTINGENCY LEGEND:	
LABEL	EVENTS
SINGLE 196	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [0PODG211 400.00] CKT 1
SINGLE 344	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 345	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 356	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 357	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 707	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1

Table 13.17.13: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of Slovenia exports 400 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1622.3	1723.7	0.0	0.0	0.0	-149.9	48.6	-150.0
AL	669.7	779.7	-204.6	0.0	475.0	98.6	470.9	
20	9662.4	8411.0	0.0	15.5	0.0	1000.4	235.5	1000.0

BG	3536.1	3357.9	0.0	181.1	3277.7	191.0	3083.8	
30	2952.0	2897.8	0.0	0.0	0.0	0.4	53.9	0.0
BA	1015.8	1017.2	0.0	0.0	912.3	237.3	673.7	
35	45061.5	54409.8	0.0	1.1	0.0	-9740.5	391.2	-9740.0
IT	9606.9	11942.3	0.0	147.7	12392.8	-801.6	10711.3	
40	3433.2	4359.0	0.0	0.0	0.0	-999.1	73.3	-1000.0
HR	526.6	1075.9	0.0	0.0	1531.4	185.6	796.6	
45	6101.1	7180.0	0.1	0.0	0.0	-1198.1	119.0	-1200.0
HU	1400.4	2128.1	178.5	-29.2	2402.2	-19.2	1544.3	
50	11750.5	11426.0	0.0	0.0	0.0	0.1	324.4	0.0
GR	3133.3	5724.7	203.8	9.4	6662.2	128.1	3715.9	
55	5223.0	-4356.2	0.0	4.8	0.0	9445.2	129.2	9450.0
UX	375.1	622.8	0.0	12.7	2297.7	338.4	1698.9	
60	1940.6	2001.9	0.0	0.0	0.0	-99.9	38.5	-100.0
MK	765.7	752.3	-30.9	0.0	397.4	10.4	430.0	
65	1700.9	0.0	0.0	0.0	0.0	1690.9	10.0	1690.0
UA	-188.0	0.0	0.0	0.0	652.2	319.0	145.2	
70	13257.0	12110.2	0.0	90.3	0.0	799.9	256.7	800.0
RO	3097.7	4455.6	783.8	286.0	5605.5	-11.5	3189.2	
75	3457.5	2990.0	0.0	8.9	0.0	400.2	58.4	400.0
SI	1223.7	964.6	0.0	53.7	867.2	408.2	664.5	
80	77661.6	77342.9	0.0	0.0	0.0	-800.0	1118.7	-800.0
TR	9836.8	11034.0	996.9	0.0	22660.7	-169.6	20636.2	
90	7770.7	8298.8	0.0	17.3	0.0	-749.5	204.1	-750.0
RS	2907.7	2986.6	0.0	73.3	1730.8	-677.2	2255.6	
91	864.7	938.0	0.5	2.1	0.0	-100.0	24.0	-100.0
ME	350.5	346.6	-34.6	11.4	237.0	52.0	212.0	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-314.7	0.0	0.0	0.0	39.9	-289.4	14.6	
101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-GR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-HR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-ME)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (IT-AL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XX (RO-TR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTALS	192960.4	189732.9	0.6	139.9	0.0	0.0	3086.8	0.0
	37943.2	47188.4	1892.9	746.2	62141.8	0.0	50242.7	



Figure 13.17.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of Slovenia exports 400 MW

Table 13.17.14: Changes in power flow in area of SEE in winter maximum 2020, scenario when power system of Slovenia exports 400 MW

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	
78	[XSA_MU11	400.00]	24157	[MSAJ0 4	400.00]	209.0	33.0	-26.0	50.6	-235.0	112.4	
78	[XSA_MU11	400.00]	65001	[UMUKACH	400.00]	-209.0	-33.0	26.0	-50.6	235.0	112.4	
84	[XRO_MU11	400.00]	28039	[RROSIO1	400.00]	364.2	4.8	108.4	32.2	-255.9	70.2	
84	[XRO_MU11	400.00]	65001	[UMUKACH	400.00]	-364.2	-4.8	-108.4	-32.2	255.9	70.2	
501	[XCI_P111	400.00]	24076	[MHEVI 4	400.00]	-257.3	15.0	-128.0	-4.6	129.3	50.2	
501	[XCI_P111	400.00]	31435	[LCIRKO11	400.00]	257.3	-15.0	128.0	4.6	-129.3	50.2	
24058	[MGOD 4	400.00]	24200	[MDETK 4	400.00]	73.6	-18.2	218.4	-27.5	144.9	197.0	
24067	[MGYOR 4	400.00]	24763	[MGONYU1	400.00]	-569.4	-266.9	-465.3	-276.8	104.1	18.3	
24157	[MSAJ0 4	400.00]	24200	[MDETK 4	400.00]	170.9	17.5	21.1	28.7	-149.7	87.6	
24763	[MGONYU1	400.00]	24765	[MOROE 11	400.00]	216.3	314.1	320.8	308.4	104.5	48.3	
28009	[RNADAB1B	400.00]	28096	[RORADELA	400.00]	17.9	-31.4	136.0	-45.1	118.1	657.9	
28037	[RGADAL1	400.00]	28039	[RROSIO1	400.00]	69.8	7.4	176.4	-7.5	106.7	152.9	
28039	[RROSIO1	400.00]	28096	[RORADELA	400.00]	129.9	-22.8	18.6	-11.0	-111.2	85.6	
30006	[LTES G5	21.000]	31401	[LTESOS1	400.00]	5	84.4	-45.9	276.7	-45.9	192.3	227.7
30066	[LTES G6	22.000]	31401	[LTESOS1	400.00]	6	300.0	22.6	600.0	41.5	300.0	100.0
31401	[LTESOS1	400.00]	31425	[LPDLO1	400.00]	1P	191.7	-22.7	437.2	-47.3	245.5	128.0
31401	[LTESOS1	400.00]	31425	[LPDLO1	400.00]	2	191.7	-22.7	437.2	-47.3	245.5	128.0
31425	[LPDLO1	400.00]	31435	[LCIRKO11	400.00]	1	-117.6	-20.2	20.5	-41.6	138.0	117.4
31425	[LPDLO1	400.00]	31435	[LCIRKO11	400.00]	2	-117.6	-20.2	20.5	-41.6	138.0	117.4

Table 13.17.15: Changes in power flow greater than 50 MW through tie-lines in area of interest in winter maximum 2020, scenario when power system of Slovenia exports 400 MW

X	FROM BUS	X	TO BUS	X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	MVAR	%	
31049	[LHFORM5	110.00]	329	[XNE_F051	110.00]	1	69.2	1.4	73.1	0.7	3.9	5.7	-0.7	48.4
31050	[LILBIS5	110.00]	328	[XMA_IB51	110.00]	1	1.8	-4.4	4.7	-5.8	2.9	165.2	-1.4	32.5
31067	[LKOPER5	110.00]	327	[XBU_K051	110.00]	1	60.3	19.3	63.0	18.5	2.6	4.3	-0.8	4.4

31201	[LPDLO2	220.00]	109	[XOB_PO21	220.00]	1	-182.9	-35.8	-164.8	-40.5	18.2	9.9	-4.8	13.3
31210	[LDIVAC2	220.00]	153	[XPE_DI21	220.00]	1	-71.2	-11.4	-62.6	-13.5	8.6	12.1	-2.1	18.0
31210	[LDIVAC2	220.00]	156	[XPA_DI21	220.00]	1	146.5	-21.4	141.6	-20.0	-4.9	3.4	1.4	6.6
31220	[LCIRKO2	220.00]	152	[XZE_CI21	220.00]	1	-8.4	-4.5	-0.1	-6.4	8.2	98.5	-1.9	42.2
31405	[LOKROG1	400.00]	503	[XUD_OK11	400.00]	1	283.1	89.2	305.4	87.6	22.3	7.9	-1.6	1.8
31410	[LDIVAC1	400.00]	71	[XME_DI11	400.00]	1	-268.2	-112.6	-210.3	-123.4	57.9	21.6	-10.8	9.6
31410	[LDIVAC1	400.00]	80	[XRE_DI11	400.00]	1	509.5	236.1	512.9	237.2	3.5	0.7	1.2	0.5
31415	[LKRKSO1	400.00]	72	[XTU_KR11	400.00]	1	162.5	-13.1	206.3	-18.8	43.8	27.0	-5.7	43.6
31415	[LKRKSO1	400.00]	73	[XTU_KR12	400.00]	2	162.5	-13.1	206.3	-18.8	43.8	27.0	-5.7	43.6
31420	[LMARIB1	400.00]	9	[XKA_MAl1	400.00]	1	-307.7	49.7	-258.3	42.0	49.4	16.0	-7.8	15.7
31435	[LCIRKO11	400.00]	501	[XCI_PI11	400.00]	A	-256.8	-1.7	-127.9	-25.2	128.9	50.2	-23.6	999.9
31435	[LCIRKO11	400.00]	502	[XCI_PI12	400.00]	B	46.0	-41.9	100.8	-49.3	54.8	119.1	-7.4	17.7
31445	[LHAVCE1	400.00]	504	[XUD_AV11	400.00]	1	248.0	105.2	263.6	103.5	15.5	6.3	-1.7	1.7
31450	[LKOZJK1	400.00]	10	[XKA_KO11	400.00]	1	-184.4	28.4	-154.8	24.4	29.6	16.1	-4.0	14.1

Table 13.17.16: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of Slovenia exports 400 MW

<----- MONITORED BRANCH ----->	CONTINGENCY	RATING	FLOW	%
10010*AELBS22	220.00 10125 ACEKIN2 220.00 1 SINGLE 19	370.0	386.3	102.9
10009*AELBS12	220.00 10125 ACEKIN2 220.00 1 SINGLE 22	370.0	384.3	102.6
316 XTR_HN51	110.00 36050*OHNOVI51 110.00 1 SINGLE 207	89.6	91.9	103.7
24034*MDUME 2	220.00 24096 MMART 21 220.00 1 SINGLE 367	426.8	541.2	120.9
24094*MMART 4	400.00 24096 MMART 21 220.00 1 SINGLE 367	500.0	550.3	110.1
24034*MDUME 2	220.00 24095 MMART 22 220.00 1 SINGLE 368	426.8	545.1	121.8
24094*MMART 4	400.00 24095 MMART 22 220.00 1 SINGLE 368	500.0	554.2	110.8
24034*MDUME 2	220.00 24096 MMART 21 220.00 1 SINGLE 379	426.8	541.6	121.0
24094*MMART 4	400.00 24096 MMART 21 220.00 1 SINGLE 379	500.0	550.7	110.1
24034*MDUME 2	220.00 24095 MMART 22 220.00 1 SINGLE 380	426.8	545.5	121.8
24094*MMART 4	400.00 24095 MMART 22 220.00 1 SINGLE 380	500.0	554.6	110.9
28040*RLOTRU2	220.00 28366 RSIBIU2 220.00 1 SINGLE 621	333.4	393.0	112.2
28040*RLOTRU2	220.00 28100 RSIBIU21 220.00 1 SINGLE 622	333.4	393.0	112.2
28040*RLOTRU2	220.00 28366 RSIBIU2 220.00 1 SINGLE 719	333.4	392.8	111.6
28040*RLOTRU2	220.00 28100 RSIBIU21 220.00 1 SINGLE 720	333.4	392.8	111.6
34100*JBGD172	220.00 34111 JBGD8 22 220.00 2 SINGLE 819	445.8	466.9	105.6
34100*JBGD172	220.00 34111 JBGD8 22 220.00 1 SINGLE 820	445.8	466.9	105.6

MONITORED VOLTAGE REPORT:		CONTINGENCY		<----- B U S ----->		V-CONT	V-INIT	V-MAX	V-MIN	
SYSTEM		RANGE	BASE CASE	24025	MDETK 2	220.00	1.05000	1.05000	1.05000	0.90000
'HU220	'	RANGE	SINGLE 80	12473	VMI3 12	400.00	1.05011	1.03230	1.05000	0.90000
'BG220	'	RANGE	SINGLE 134	12286	VUZUND2	220.00	0.88866	1.01024	1.10000	0.90000
'BG220	'	RANGE	SINGLE 136	12282	VORFEJ2	220.00	1.10515	1.04387	1.10000	0.90000
'HU220	'	RANGE	SINGLE 356	24005	MALBF 22	220.00	0.89275	1.04262	1.05000	0.90000
'HU220	'	RANGE	SINGLE 357	24006	MALBF 21	220.00	0.89461	1.04267	1.05000	0.90000
'HU220	'	RANGE	SINGLE 367	24095	MMART 22	220.00	1.06652	1.04917	1.05000	0.90000
'HU220	'	RANGE	SINGLE 368	24096	MMART 21	220.00	1.06648	1.04915	1.05000	0.90000
'RO220	'	RANGE	SINGLE 691	28855	RMOSTI2	220.00	0.82172	1.01476	1.10000	0.90000
'RS400	'	RANGE	SINGLE 796	34085	JSOMB31	400.00	0.86317	0.99058	1.05000	0.90000
'RS220	'	RANGE	SINGLE 844	34200	JSABA32	220.00	0.88250	1.01908	1.10000	0.90000

CONTINGENCY LEGEND:	
LABEL	EVENTS
SINGLE 19	: OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	: OPEN LINE FROM BUS 10010 [AELBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 207	: OPEN LINE FROM BUS 13 [XTR_PG11 400.00] TO BUS 36005 [OPDGG211 400.00] CKT 1
SINGLE 367	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 368	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 379	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 380	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 621	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 719	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 819	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 820	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2

## 13.18. Turkish Power Balance Uncertainty

### 13.18.1. Turkish Power System Exports 1000 MW

Table 13.18.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of Turkey exports 1000 MW

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1340.5	1491.9	0.0	0.0	0.0	-200.0	48.6	-200.0
AL			475.6	689.7	-199.6	0.0	458.0	4.6	438.8	
20			8814.7	7603.7	0.0	14.4	0.0	1000.0	196.5	1000.0
BG			2996.0	3045.8	-44.8	120.5	2983.0	303.5	2553.9	
30			3157.8	2610.1	0.0	0.0	0.0	490.1	57.6	490.0
BA			777.6	724.5	0.0	0.0	903.5	320.2	636.4	
35			40260.8	49222.0	0.0	1.1	0.0	-9400.0	437.8	-9400.0
IT			7018.3	10816.5	0.0	-157.0	12573.4	-533.9	9466.2	
40			3130.4	3483.0	0.0	0.0	0.0	-434.9	82.3	-435.0
HR			530.6	1074.2	0.0	0.0	1387.5	-80.4	924.3	
45			5414.3	6500.0	0.1	0.0	0.0	-1199.9	114.1	-1200.0
HU			1239.0	1926.6	177.3	-29.6	2410.6	137.7	1437.6	
50			10311.6	10371.1	0.0	0.0	0.0	-350.0	290.5	-350.0
GR			2239.3	5312.0	171.4	9.3	6592.1	58.9	3266.1	
55			2550.4	-4593.5	0.0	4.9	0.0	7085.1	54.0	7086.0
UX			-428.6	637.5	0.0	12.9	2334.2	647.7	607.5	
60			1505.7	1577.0	0.0	0.0	0.0	-100.0	28.7	-100.0
MK			478.1	573.6	-31.1	0.0	401.4	33.1	303.9	
65			1207.0	0.0	0.0	0.0	0.0	1200.0	7.0	1200.0
UA			-163.7	0.0	0.0	0.0	653.2	378.4	111.0	
70			10288.4	9416.9	0.0	87.5	0.0	545.3	238.8	545.0
RO			2776.3	4075.6	509.1	271.2	4571.3	-329.4	2821.1	
75			3007.5	2514.0	0.0	8.7	0.0	424.1	60.6	424.0
SI			1094.8	811.0	0.0	53.5	601.5	160.8	671.0	
80			56398.8	54622.1	0.0	0.0	0.0	1000.0	776.8	1000.0
TR			4659.8	7792.0	1174.1	0.0	17198.4	-207.2	13099.3	
90			7731.4	7871.1	0.0	17.7	0.0	-359.9	202.4	-360.0
RS			2798.3	2853.5	0.0	76.2	1718.1	-655.3	2242.1	
91			626.5	805.2	0.6	1.9	0.0	-200.0	18.8	-200.0
ME			294.0	299.2	-35.2	11.0	240.2	80.2	179.2	
95			501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK			-343.9	0.0	0.0	0.0	40.0	-318.9	15.0	
TOTALS			156247.2	153494.7	0.6	136.2	0.0	0.0	2615.7	0.0
			26441.6	40631.6	1721.3	367.9	55066.4	0.0	38773.6	



Figure 13.18.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of Turkey exports 1000 MW

Table 13.18.2: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2015, scenario when power system of Turkey exports 1000 MW

FRMBUS,	FROMBUSNAME,	TOBUS,	TOBUSNAME,CKT,STS,	MW,	MVAR,	MVA,	%I
***** NONE *****							

Table 13.18.3: Changes in power flow greater than 50 MW in area of SEE in winter maximum 2015, scenario when power system of Turkey exports 1000 MW

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 50.0 MW:												
IN WORKING CASE					IN BASE CASE							
X-----	FROM BUS	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%	
2	[XZE_KA11	400.00]	10020	[AZEMLA1	400.00]	1	394.4	34.1	171.2	55.3	-223.2	56.6
2	[XZE_KA11	400.00]	22461	[GKARDI11	400.00]	1	-394.4	-34.1	-171.2	-55.3	223.2	56.6
11	[XMO_KO11	400.00]	18401	[WMOST41	400.00]	1	-318.9	-23.8	-96.7	-30.9	222.2	69.7
11	[XMO_KO11	400.00]	20060	[HKONJS11	400.00]	1	318.9	23.8	96.7	30.9	-222.2	69.7
13	[XTR_PG11	400.00]	14405	[WTREB11	400.00]	1	-8.1	-119.9	-279.0	-80.8	-270.9	999.9
13	[XTR_PG11	400.00]	36005	[OPODG211	400.00]	1	8.1	119.9	279.0	80.8	270.9	999.9
22	[XKO_TI11	400.00]	12440	[VAEC_41	400.00]	1	-48.4	-31.4	193.4	-52.8	241.8	499.7
22	[XKO_TI11	400.00]	28001	[RTANTA1	400.00]	1	48.4	31.4	-193.4	52.8	-241.8	499.7
23	[XKO_TI12	400.00]	12440	[VAEC_41	400.00]	1	-48.4	-31.4	193.4	-52.8	241.8	499.7
23	[XKO_TI12	400.00]	28001	[RTANTA1	400.00]	2	48.4	31.4	-193.4	52.8	-241.8	499.7

24	[XSO_NI11	400.00]	12431	[VSOFIW1	400.00]	1	-565.6	-57.8	-180.4	-89.6	385.2	68.1
24	[XSO_NI11	400.00]	34020	[JNIS2 1	400.00]	1	565.6	57.8	180.4	89.6	-385.2	68.1
71	[XME_DT11	400.00]	20078	[HMELIN11	400.00]	1	-761.4	13.3	-447.4	-21.4	314.0	41.2
71	[XME_DT11	400.00]	31410	[LDIVAC1	400.00]	1	761.4	-13.3	447.4	21.4	-314.0	41.2
74	[XER_SM11	400.00]	20030	[HERNES11	400.00]	1	468.1	-82.3	164.9	-62.2	-303.2	64.8
74	[XER_SM11	400.00]	34045	[JSMIT21	400.00]	1	-468.1	82.3	-164.9	62.2	303.2	64.8
79	[XSA_SU11	400.00]	24148	[MSAFA 4	400.00]	1	166.3	-124.0	-44.4	-87.8	-210.7	126.7
79	[XSA_SU11	400.00]	34050	[JSUBO31	400.00]	1	-166.3	124.0	44.4	87.8	210.7	126.7
81	[XSK_KB11	400.00]	26111	[YSK 5 1	400.00]	1	-240.4	1.7	10.6	-28.8	251.0	104.4
81	[XSK_KB11	400.00]	34072	[JKURO21	400.00]	1	240.4	-1.7	-10.6	28.8	-251.0	104.4
184	[XRI_PE11	400.00]	34089	[JKPEC31	400.00]	1	-38.6	87.7	189.8	58.1	228.4	592.1
184	[XRI_PE11	400.00]	36001	[ORIBAR11	400.00]	1	38.6	-87.7	-189.8	-58.1	-228.4	592.1
197	[XMI_BA11	400.00]	12474	[VMI 1	400.00]	1	123.8	-79.1	-411.5	-40.3	-535.3	432.4
198	[XMI_HA11	400.00]	12471	[VMI3 11	400.00]	1	136.2	-100.2	-578.7	-58.2	-714.9	524.9
219	[XBE_OR11	400.00]	24013	[MBEKO 4	400.00]	1	179.9	-42.5	-64.9	-0.4	-244.8	136.1
219	[XBE_OR11	400.00]	28009	[RNADAB1	400.00]	1	-179.9	42.5	64.9	0.4	244.8	136.1
220	[XKA_PG11	400.00]	10015	[AKASHA1	400.00]	1	-72.5	8.5	129.0	-24.6	201.5	277.9
220	[XKA_PG11	400.00]	36005	[OPODG211	400.00]	1	72.5	-8.5	-129.0	24.6	-201.5	277.9
501	[XCI_PI11	400.00]	24076	[MHEVI 4	400.00]	1	-291.3	25.2	-68.7	-5.7	222.6	76.4
501	[XCI_PI11	400.00]	31435	[LCIRK011	400.00]	A	291.3	-25.2	68.7	5.7	-222.6	76.4
10011	[AELBS21	400.00]	10020	[AZEMLA1	400.00]	1	-293.1	-51.7	-80.8	-90.4	212.3	72.4
12420	[VMTAL1	400.00]	12430	[VSTOLN1	400.00]	1	-200.6	63.7	17.4	41.1	218.1	108.7
12420	[VMTAL1	400.00]	12431	[VSOFIW1	400.00]	1	91.1	-102.3	-141.0	-79.8	-232.2	254.8
12430	[VSTOLN1	400.00]	12434	[VZLATI1	400.00]	1	-216.1	44.5	7.5	5.2	223.6	103.5
12432	[VCMOG11	400.00]	12437	[VVETRE1	400.00]	1	-361.9	-32.5	-148.9	-66.1	213.0	58.8
12434	[VZLATI1	400.00]	12480	[VPLOVD1	400.00]	1	-426.4	-45.2	-199.4	-83.1	227.0	53.2
12437	[VVETRE1	400.00]	12480	[VPLOVD1	400.00]	1	-341.6	28.9	-137.0	-0.6	204.7	59.9
12450	[VCAREV1	400.00]	12451	[VKARLO1	400.00]	1	-193.0	35.1	101.5	-6.8	294.4	152.6
12460	[VVARNA1	400.00]	12470	[VBURGA1	400.00]	1	-207.1	1.9	46.0	-28.6	253.1	122.2
12474	[VMI 1	400.00]	12480	[VPLOVD1	400.00]	1	439.9	9.3	233.2	2.5	-206.7	47.0
12474	[VMI 1	400.00]	12480	[VPLOVD1	400.00]	2	439.9	9.3	233.2	2.5	-206.7	47.0
20030	[HERNES11	400.00]	20166	[HZERJA11	400.00]	1	418.0	-67.8	163.7	-75.9	-254.3	60.8
20060	[HKONJS11	400.00]	20120	[HOBROV11	400.00]	1	231.2	-27.1	2.5	-21.4	-228.6	98.9
20078	[HMELIN11	400.00]	20120	[HOBROV11	400.00]	1	-371.4	-12.8	-111.8	-58.6	259.5	69.9
22238	[GK_NSA11	400.00]	22279	[GFILIP11	400.00]	1	306.5	-42.6	58.8	-16.5	-247.7	80.8
22238	[GK_NSA11	400.00]	22279	[GFILIP11	400.00]	2	306.5	-42.6	58.8	-16.5	-247.7	80.8
22279	[GFILIP11	400.00]	22366	[GK_LAG11	400.00]	1	120.7	-91.8	-100.0	-39.8	-220.7	182.9
22279	[GFILIP11	400.00]	22366	[GK_LAG11	400.00]	3	137.8	-99.7	-112.3	-48.6	-250.0	181.5
24002	[MAISA 4	400.00]	24768	[MSZOL 11	400.00]	1	98.2	58.8	346.0	35.9	247.8	252.4
24013	[MBEKO 4	400.00]	24768	[MSZOL 11	400.00]	1	27.7	-73.4	-189.3	-33.9	-217.0	784.6
24067	[MGYOR 4	400.00]	24087	[MLITR 4	400.00]	1	-193.4	72.8	35.5	34.1	229.0	118.4
24067	[MGYOR 4	400.00]	24763	[MGONYU1	400.00]	1	-774.6	-253.1	-451.1	-244.4	323.5	41.8
24076	[MHEVI 4	400.00]	24182	[MTOPN 4	400.00]	1	-373.6	46.9	-172.7	21.7	200.9	53.8
24087	[MLITR 4	400.00]	24122	[MPAKS 4	400.00]	1	-542.3	16.7	-319.6	-7.2	222.7	41.1
24094	[MMART 4	400.00]	24766	[METYEK1	400.00]	1	687.8	-78.7	400.2	-61.6	-287.6	41.8
24122	[MPAKS 4	400.00]	24148	[MSAFA 4	400.00]	1	-4.4	65.3	317.0	27.1	321.4	999.9
24763	[MGONYU1	400.00]	24765	[MOROE 11	400.00]	1	-40.5	317.1	284.4	272.9	324.9	801.4
24765	[MOROE 11	400.00]	24766	[METYEK1	400.00]	1	-341.8	174.9	-52.4	133.2	289.4	84.7
26064	[YSK 41	400.00]	26111	[YSK 5 1	400.00]	1	354.8	70.8	130.0	92.7	-224.8	63.4
28001	[RTANTA1	400.00]	28002	[RURECH1	400.00]	1	-176.5	57.6	-385.2	93.4	-208.7	118.2
28002	[RURECH1	400.00]	28004	[RP.D.F1	400.00]	1	300.0	-7.3	97.6	-0.7	-202.4	67.5
28003	[RMINTI1A	400.00]	28008	[RARAD 1	400.00]	1	392.6	-44.5	166.2	-38.6	-226.4	57.7
28031	[RBRASO1	400.00]	28034	[RSIBIU1	400.00]	1	-36.2	-65.8	-240.7	-48.2	-204.5	564.3
31420	[LMARIB1	400.00]	31435	[LCIRK011	400.00]	1	-260.8	29.6	-41.7	-4.4	219.0	84.0
31420	[LMARIB1	400.00]	31435	[LCIRK011	400.00]	2	-281.2	31.7	-45.0	-4.7	236.2	84.0
34001	[JBGD8 1	400.00]	34030	[JOBREN11	400.00]	1	-202.2	-222.2	-431.3	-184.6	-229.1	113.3
34015	[JKRAG21	400.00]	34080	[JJAGO41	400.00]	A	71.9	22.8	315.2	-2.2	243.3	338.4
34015	[JKRAG21	400.00]	34920	[JTKOLB1	400.00]	A	-306.7	-98.4	-551.4	-70.3	-244.6	79.8
34020	[JNIS2 1	400.00]	34080	[JJAGO41	400.00]	A	109.6	-26.4	-148.6	11.0	-258.2	235.5
34030	[JOBREN11	400.00]	34040	[JRPMLA1	400.00]	2	238.6	-95.0	-22.5	-104.2	-261.1	109.4
34031	[JOBREN12	400.00]	34040	[JRPMLA1	400.00]	1	239.6	-98.1	-23.6	-104.9	-263.3	109.9
34031	[JOBREN12	400.00]	34920	[JTKOLB1	400.00]	A	-303.6	-17.6	-56.0	-3.7	247.6	81.6
34040	[JRPMLA1	400.00]	34045	[JSMIT21	400.00]	1	868.4	-31.4	486.0	-62.6	-382.4	44.0
34070	[JTKOSB1	400.00]	34072	[JKURO21	400.00]	1	-33.2	3.5	191.2	-25.5	224.3	676.3
34071	[JTKOSC1	400.00]	34089	[JKPEC31	400.00]	1	225.4	-50.6	7.2	-25.5	-218.2	96.8

Table 13.18.4: Changes in power flow through tie-lines connecting Turkey to the rest of the system, in winter maximum 2015, scenario when power system of Turkey exports 1000 MW

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:											
IN WORKING CASE		IN BASE CASE									
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW %
	215 [XNS_BA11	400.00]	22238	[GK_NSA11	400.00]	1	740.0	-27.9	190.0	-33.1	-550.0 74.3
	60009 [THAMIT1	400.00]	198	[XMI_HA11	400.00]	1	136.5	-148.9	-575.5	-70.1	-712.0 521.5
	60037 [TBABA21F	400.00]	197	[XMI_BA11	400.00]	1	124.1	-116.5	-409.2	-58.1	-533.3 429.8



Table 13.18.5: Results of contingency (n-1) analysis in winter maximum 2015, scenario when power system of Turkey exports 1000 MW

MONITORED BRANCH				CONTINGENCY		RATING	FLOW	%
153*XPE_DI21	220.00	20101 HPEHLI21	220.00	1	SINGLE 269	362.0	376.9	101.3
153*XPE_DI21	220.00	31210 LDIVAC2	220.00	1	SINGLE 269	320.1	376.8	114.5
328*XMA_IB51	110.00	31050 LILBIS5	110.00	1	SINGLE 269	65.0	87.6	128.9
31210*LDIVAC2	220.00	156 XPA_DI21	220.00	1	SINGLE 269	320.1	416.3	127.7
24034*MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE 344	426.8	493.6	110.3
24094*MMART 4	400.00	24096 MMART 21	220.00	1	SINGLE 344	500.0	502.8	100.6
24034*MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE 345	426.8	497.2	111.1
24094*MMART 4	400.00	24095 MMART 22	220.00	1	SINGLE 345	500.0	506.5	101.3
24034*MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE 356	426.8	494.0	110.3
24094*MMART 4	400.00	24096 MMART 21	220.00	1	SINGLE 356	500.0	503.2	100.6
24034*MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE 357	426.8	497.6	111.1
24094*MMART 4	400.00	24095 MMART 22	220.00	1	SINGLE 357	500.0	506.9	101.4
31210*LDIVAC2	220.00	156 XPA_DI21	220.00	1	SINGLE 684	320.1	358.1	108.9
153*XPE_DI21	220.00	31210 LDIVAC2	220.00	1	SINGLE 707	320.1	339.5	103.0
31210*LDIVAC2	220.00	156 XPA_DI21	220.00	1	SINGLE 707	320.1	799.3	246.3

MONITORED VOLTAGE REPORT:		CONTINGENCY	<----- B U S ----->		V-CONT	V-INIT	V-MAX	V-MIN	
SYSTEM									
'BG220	'	RANGE SINGLE 100	12252	VOCHIF2	220.00	0.81870	0.95798	1.10000	0.90000
'BG220	'	RANGE SINGLE 124	12286	VUZUND2	220.00	0.89430	1.00340	1.10000	0.90000
'GR400	'	RANGE SINGLE 432	22759	GTH_AG11	400.00	1.05179	1.02476	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23123	GKPATR11	400.00	1.05187	1.03777	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23125	GKPATC11	400.00	1.05197	1.03775	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23126	GKPATC12	400.00	1.05191	1.03786	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23173	GDISTO11	400.00	1.05281	1.03749	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23174	GDISTO12	400.00	1.05243	1.03763	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23180	GAXELO12	400.00	1.05207	1.03831	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23181	GAXELO11	400.00	1.05203	1.03852	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23064	GK_MEG13	400.00	1.05355	1.04075	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23066	GK_MEG11	400.00	1.05355	1.04075	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23123	GKPATR11	400.00	1.05300	1.03777	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23125	GKPATC11	400.00	1.05309	1.03775	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23126	GKPATC12	400.00	1.05303	1.03786	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23173	GDISTO11	400.00	1.05372	1.03749	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23174	GDISTO12	400.00	1.05353	1.03763	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23180	GAXELO12	400.00	1.05321	1.03831	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23181	GAXELO11	400.00	1.05326	1.03852	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23036	GK_KOR13	400.00	1.06286	1.01706	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23068	GK_MEG14	400.00	1.06046	1.02909	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23037	GK_KOR14	400.00	1.06286	1.01706	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23067	GK_MEG12	400.00	1.06046	1.02909	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23126	GKPATC12	400.00	1.06837	1.03786	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23180	GAXELO12	400.00	1.06836	1.03831	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23181	GAXELO11	400.00	1.06817	1.03852	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23180	GAXELO12	400.00	1.06781	1.03831	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23181	GAXELO11	400.00	1.06763	1.03852	1.05000	0.90000
'RO220	'	RANGE SINGLE 567	28042	RRIURE2	220.00	0.89290	0.97511	1.10000	0.90000
'RO220	'	RANGE SINGLE 567	28043	RSTUPA2	220.00	0.88429	0.97358	1.10000	0.90000
'RO220	'	RANGE SINGLE 637	28855	RMOSTI2	220.00	0.87631	1.03721	1.10000	0.90000
'RO220	'	RANGE SINGLE 642	28907	RSTILP2	220.00	0.83867	0.97912	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28094	RROSIO2	220.00	0.89798	1.02746	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28095	RVETIS2	220.00	0.88891	1.01487	1.10000	0.90000
'RS400	'	RANGE SINGLE 739	34085	JSOMB31	400.00	0.87081	0.98794	1.05000	0.90000
'RS220	'	RANGE SINGLE 785	34200	JSABA32	220.00	0.89288	1.02211	1.10000	0.90000

CONTINGENCY LEGEND:		EVENTS	
SINGLE 100	: OPEN LINE FROM BUS 12250 [VGORIA2	220.00]	TO BUS 12252 [VOCHIF2 220.00] CKT 1
SINGLE 124	: OPEN LINE FROM BUS 12275 [VMI3 2	220.00]	TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 269	: OPEN LINE FROM BUS 71 [XME_DI11	400.00]	TO BUS 31410 [LDIVAC1 400.00] CKT 1
SINGLE 344	: OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 345	: OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 356	: OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 357	: OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 432	: OPEN LINE FROM BUS 22759 [GTH_AG11	400.00]	TO BUS 23172 [GDISTO13 400.00] CKT 1
SINGLE 433	: OPEN LINE FROM BUS 22759 [GTH_AG11	400.00]	TO BUS 23173 [GDISTO11 400.00] CKT 1
SINGLE 462	: OPEN LINE FROM BUS 23033 [GKYT_K11	400.00]	TO BUS 23036 [GK_KOR13 400.00] CKT 1
SINGLE 463	: OPEN LINE FROM BUS 23033 [GKYT_K11	400.00]	TO BUS 23037 [GK_KOR14 400.00] CKT 1
SINGLE 473	: OPEN LINE FROM BUS 23123 [GKPATR11	400.00]	TO BUS 23126 [GKPATC12 400.00] CKT 1
SINGLE 475	: OPEN LINE FROM BUS 23126 [GKPATC12	400.00]	TO BUS 23180 [GAXELO12 400.00] CKT 1
SINGLE 567	: OPEN LINE FROM BUS 28043 [RSTUPA2	220.00]	TO BUS 28044 [RBRADU2 220.00] CKT 1
SINGLE 637	: OPEN LINE FROM BUS 28855 [RMOSTI2	220.00]	TO BUS 28935 [RRAC.M2 220.00] CKT 1
SINGLE 642	: OPEN LINE FROM BUS 28906 [RTELEA2	220.00]	TO BUS 28907 [RSTILP2 220.00] CKT 1
SINGLE 670	: OPEN LINE FROM BUS 28039 [RROSIO1	400.00]	TO BUS 28094 [RROSIO2 220.00] CKT 1

SINGLE 684	:	OPEN LINE FROM BUS 31410 [LDIVAC1	400.00]	TO BUS 31430 [LBERIC1	400.00]	CKT 1
SINGLE 707	:	OPEN LINE FROM BUS 31410 [LDIVAC1	400.00]	TO BUS 80 [XRE_DI11	400.00]	CKT 1
SINGLE 739	:	OPEN LINE FROM BUS 34050 [JSUBO31	400.00]	TO BUS 34085 [JSOMB31	400.00]	CKT 1

Table 13.18.6: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of Turkey exports 1000 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1629.0	1723.7	0.0	0.0	0.0	-150.0	55.2	-150.0
AL	704.7	779.7	-202.7	0.0	468.9	69.1	527.5	
20	9670.3	8411.0	0.0	15.4	0.0	1000.0	243.8	1000.0
BG	3700.1	3357.9	0.0	180.4	3256.8	252.6	3166.0	
30	2963.0	2897.8	0.0	0.0	0.0	0.1	65.1	0.0
BA	1115.8	1017.2	0.0	0.0	901.9	233.0	767.5	
35	45055.6	54409.8	0.0	1.1	0.0	-9740.0	384.7	-9740.0
IT	9527.0	11942.3	0.0	147.8	12399.8	-805.5	10642.3	
40	3456.8	4359.0	0.0	0.0	0.0	-999.6	97.4	-1000.0
HR	660.6	1075.9	0.0	0.0	1514.1	109.1	989.6	
45	6118.2	7180.0	0.1	0.0	0.0	-1199.6	137.7	-1200.0
HU	1588.5	2128.1	177.2	-29.1	2389.8	-23.9	1726.1	
50	11772.1	11426.0	0.0	0.0	0.0	0.0	346.1	0.0
GR	3351.8	5724.7	205.1	9.3	6632.3	116.7	3914.6	
55	3356.0	-4356.2	0.0	4.9	0.0	7648.2	59.1	7650.0
UX	-369.6	622.8	0.0	12.8	2326.9	672.8	648.8	
60	1948.8	2001.9	0.0	0.0	0.0	-100.0	46.8	-100.0
MK	815.5	752.3	-30.4	0.0	391.8	-25.3	509.5	
65	1207.7	0.0	0.0	0.0	0.0	1200.0	7.7	1200.0
UA	-111.9	0.0	0.0	0.0	651.4	415.7	123.8	
70	13324.1	12110.2	0.0	88.8	0.0	800.3	324.7	800.0
RO	3601.9	4455.6	771.6	281.3	5517.1	-203.2	3813.8	
75	3956.0	2990.0	0.0	8.8	0.0	890.1	67.0	890.0
SI	1295.8	964.6	0.0	53.4	862.1	328.0	812.0	
80	79648.6	77342.9	0.0	0.0	0.0	1000.0	1305.7	1000.0
TR	12006.3	11034.0	987.1	0.0	22536.6	-277.1	22798.9	
90	7796.4	8298.8	0.0	17.1	0.0	-749.7	230.3	-750.0
RS	3196.6	2986.6	0.0	72.5	1707.9	-665.4	2510.7	
91	866.5	938.0	0.5	2.1	0.0	-100.0	25.8	-100.0
ME	357.7	346.6	-34.2	11.3	234.4	50.3	218.1	
95	501.2	0.0	0.0	0.0	0.0	500.0	1.2	500.0
SK	-272.9	0.0	0.0	0.0	39.9	-246.8	13.9	
TOTALS	193270.4	189732.9	0.6	138.2	0.0	0.0	3398.6	0.0
	41168.0	47188.4	1873.7	739.7	61831.7	0.0	53183.2	

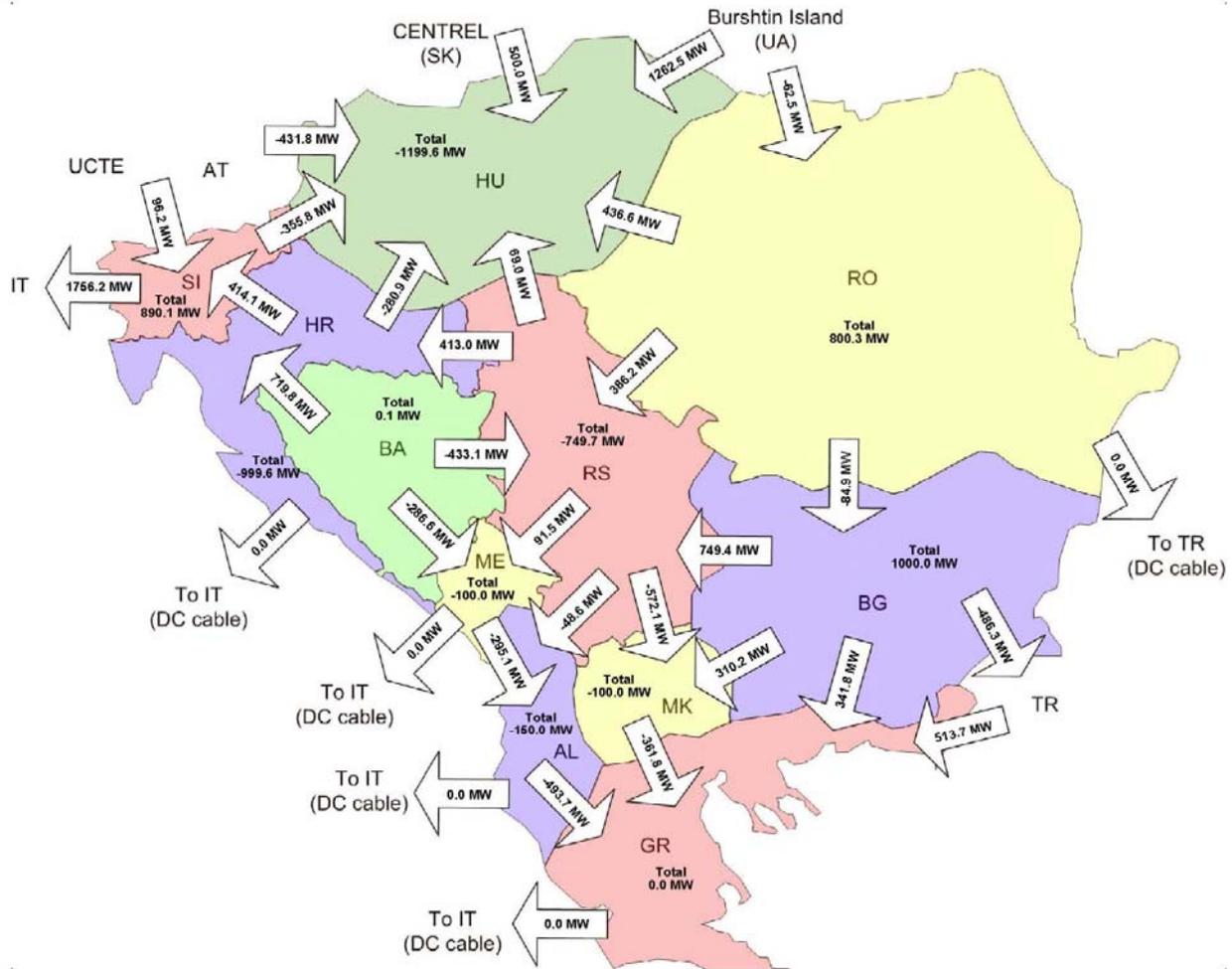


Figure 13.18.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of Turkey exports 1000 MW

Table 13.18.7: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2020, scenario when power system of Turkey exports 1000 MW

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I	
12274,VMI	2	220.00,	12474,VMI	1	400.00,	1	-624.52,	-92.86,	631.39,	95.44
24034,MDUME	2	220.00,	24095,MMART	22	220.00,	1	359.56,	-36.31,	361.39,	80.72

Table 13.18.8: Changes in power flow greater than 200 MW in area of SEE in winter maximum 2020, scenario when power system of Turkey exports 1000 MW

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 200.0 MW:											
IN WORKING CASE						IN BASE CASE					
X-----	FROM BUS	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
2	[XZE_KA11	400.00]	10020 [AZEMLA1	400.00]	1	493.7	21.7	281.1	30.6	-212.5	43.1
2	[XZE_KA11	400.00]	22461 [GKARDI11	400.00]	1	-493.7	-21.7	-281.1	-30.6	212.5	43.1
11	[XMO_KO11	400.00]	18401 [MO-4	400.00]	1	-295.8	57.3	-74.9	37.4	220.9	74.7
11	[XMO_KO11	400.00]	20060 [HKONJS11	400.00]	1	295.8	-57.3	74.9	-37.4	-220.9	74.7
13	[XTR_PG11	400.00]	14405 [RP TREBINJE	400.00]	1	117.0	-113.4	-152.4	-83.4	-269.3	230.2
13	[XTR_PG11	400.00]	36005 [OPODG211	400.00]	1	-117.0	113.4	152.4	83.4	269.3	230.2
22	[XKO_TI11	400.00]	12440 [VAEC_41	400.00]	1	-196.1	-31.0	35.2	-42.6	231.3	118.0
22	[XKO_TI11	400.00]	28001 [RTANTA1	400.00]	1	196.1	31.0	-35.2	42.6	-231.3	118.0

23	[XKO_TI12	400.00]	12440	[VAEC_41	400.00]	1	-195.9	-31.0	35.5	-42.6	231.3	118.1
23	[XKO_TI12	400.00]	28001	[RTANTA1	400.00]	2	195.9	31.0	-35.5	42.6	-231.3	118.1
24	[XSO_NI11	400.00]	12431	[VSOFIW1	400.00]	1	-749.4	-57.8	-375.1	-72.7	374.3	50.0
24	[XSO_NI11	400.00]	34020	[JNIS2 1	400.00]	1	749.4	57.8	375.1	72.7	-374.3	50.0
71	[XME_DI11	400.00]	20078	[HMELIN11	400.00]	1	-468.0	-69.5	-210.7	-110.0	257.3	55.0
71	[XME_DI11	400.00]	31410	[LDIVAC1	400.00]	1	468.0	69.5	210.7	110.0	-257.3	55.0
74	[XER_SM11	400.00]	20030	[HERNES11	400.00]	1	413.0	-101.4	126.3	-64.6	-286.7	69.4
74	[XER_SM11	400.00]	34045	[JSMIT21	400.00]	1	-413.0	101.4	-126.3	64.6	286.7	69.4
75	[XSA_AR11	400.00]	24148	[MSAFA 4	400.00]	1	198.1	-32.9	-7.4	11.4	-205.5	103.7
75	[XSA_AR11	400.00]	28008	[RARAD 1	400.00]	1	-198.1	32.9	7.4	-11.4	205.5	103.7
81	[XSK_KB11	400.00]	26111	[YSK 5 1	400.00]	1	-407.0	14.0	-149.5	-13.1	257.5	63.3
81	[XSK_KB11	400.00]	34072	[JUROS21	400.00]	1	407.0	-14.0	149.5	13.1	-257.5	63.3
181	[XVA_IS11	400.00]	12994	[VSVOB014	400.00]	1	205.9	68.3	441.0	64.2	235.1	114.2
181	[XVA_IS11	400.00]	28974	[RMEDGI1	400.00]	1	-205.9	-68.3	-441.0	-64.2	-235.1	114.2
184	[XRI_PE11	400.00]	34089	[JPEC3 1	400.00]	1	-56.7	99.3	161.1	76.0	217.8	383.9
184	[XRI_PE11	400.00]	36001	[ORIBAR11	400.00]	1	56.7	-99.3	-161.1	-76.0	-217.8	383.9
197	[XMI_BA11	400.00]	12474	[VMI 1	400.00]	1	233.5	-76.8	-278.0	-36.4	-511.5	219.1
198	[XMI_HA11	400.00]	12471	[VMI3 11	400.00]	1	252.8	-122.5	-439.0	-79.8	-691.8	273.7
219	[XBE_OR11	400.00]	24013	[MBEKO 4	400.00]	1	238.4	-29.5	-33.8	24.0	-272.2	114.2
219	[XBE_OR11	400.00]	28009	[RNADAB1B	400.00]	1	-238.4	29.5	33.8	-24.0	272.2	114.2
220	[XKA_PG11	400.00]	10015	[AKASHA1	400.00]	1	-192.7	4.2	9.5	-27.0	202.2	104.9
220	[XKA_PG11	400.00]	36005	[OPODG211	400.00]	1	192.7	-4.2	-9.5	27.0	-202.2	104.9
501	[XCI_PI11	400.00]	24076	[MHEVI 4	400.00]	1	-355.8	38.7	-128.0	-4.6	227.7	64.0
501	[XCI_PI11	400.00]	31435	[LCIRKO11	400.00]	A	355.8	-38.7	128.0	4.6	-227.7	64.0
10011	[AELBS21	400.00]	10020	[AZEMLA1	400.00]	1	-391.6	-21.4	-190.7	-59.0	200.9	51.3
12420	[VMETAL1	400.00]	12430	[VSTOLN1	400.00]	1	-285.6	46.7	-76.4	35.0	209.2	73.2
12420	[VMETAL1	400.00]	12431	[VSOFIW1	400.00]	1	165.3	-71.2	-57.3	-60.6	-222.6	134.7
12430	[VSTOLN1	400.00]	12434	[VZLATI1	400.00]	1	-245.3	3.9	-40.9	-24.4	204.4	83.3
12434	[VZLATI1	400.00]	12480	[VPLOVD1	400.00]	1	-470.8	-90.9	-263.6	-115.5	207.2	44.0
12460	[VVARNA1	400.00]	12470	[VBURGA1	400.00]	1	117.0	-44.6	352.1	-63.8	235.1	201.0
12474	[VMI 1	400.00]	12480	[VPLOVD1	400.00]	1	352.6	-3.6	145.4	-6.0	-207.2	58.8
12474	[VMI 1	400.00]	12480	[VPLOVD1	400.00]	2	352.6	-3.6	145.4	-6.0	-207.2	58.8
14404	[TE GACKO	400.00]	14405	[RP TREBINJE	400.00]	1	-46.2	92.4	155.3	70.5	201.5	436.2
14404	[TE GACKO	400.00]	18401	[MO-4	400.00]	1	333.9	-7.0	132.4	-1.0	-201.5	60.3
20030	[HERNES11	400.00]	20166	[HZERJAL1	400.00]	1	498.0	-65.5	234.8	-88.1	-263.2	52.8
20060	[HKONJS11	400.00]	20120	[HOBROV11	400.00]	1	124.1	-28.3	-97.8	-6.7	-221.9	178.8
20078	[HMELIN11	400.00]	20120	[HOBROV11	400.00]	1	-386.1	38.3	-134.5	-6.7	251.5	65.1
22238	[GK_NSA11	400.00]	22279	[GFILIP11	400.00]	1	493.1	24.8	248.3	16.6	-244.8	49.6
22238	[GK_NSA11	400.00]	22279	[GFILIP11	400.00]	2	493.1	24.8	248.3	16.6	-244.8	49.6
24002	[MAISA 4	400.00]	24768	[MSZOL 11	400.00]	1	89.5	59.7	351.2	32.7	261.7	292.2
24013	[MBEKO 4	400.00]	24768	[MSZOL 11	400.00]	1	33.0	-68.2	-196.9	-22.4	-229.9	696.9
24067	[MGYOR 4	400.00]	24087	[MLITR 4	400.00]	1	-161.4	79.2	73.7	42.4	235.1	145.6
24067	[MGYOR 4	400.00]	24763	[MGONYU1	400.00]	1	-800.5	-232.0	-465.3	-276.8	335.2	41.9
24076	[MHEVI 4	400.00]	24182	[MTOFN 4	400.00]	1	-410.1	46.2	-203.1	16.7	207.0	50.5
24087	[MLITR 4	400.00]	24122	[MPAKS 4	400.00]	1	-569.4	-4.7	-341.5	-26.9	227.9	40.0
24094	[MMART 4	400.00]	24766	[METYEK1	400.00]	1	728.9	-60.2	432.3	-55.9	-296.6	40.7
24122	[MPAKS 4	400.00]	24148	[MSAFA 4	400.00]	1	-3.0	81.5	334.7	36.1	337.7	999.9
24763	[MGONYU1	400.00]	24765	[MOROE 11	400.00]	1	-15.8	336.6	320.8	308.4	336.6	999.9
24765	[MOROE 11	400.00]	24766	[METYEK1	400.00]	1	-348.3	176.6	-49.5	146.0	298.8	85.8
26064	[YSK 41	400.00]	26111	[YSK 5 1	400.00]	1	602.4	61.4	370.3	77.4	-232.1	38.5
28000	[RSACAL1	400.00]	28013	[RTIMIS1	400.00]	1	-460.9	102.5	-260.5	64.1	200.4	43.5
28000	[RSACAL1	400.00]	29000	[RCARAD1	400.00]	1	384.2	-139.0	176.6	-99.6	-207.7	54.0
28001	[RTANTA1	400.00]	28002	[RURECH1	400.00]	1	9.5	-48.0	-195.5	-19.4	-205.0	999.9
28002	[RURECH1	400.00]	28004	[RP.D.F1	400.00]	1	315.6	51.4	84.4	59.4	-231.2	73.3
28003	[RMINTI1A	400.00]	28008	[RARAD 1	400.00]	1	352.6	13.5	152.2	23.8	-200.4	56.8
28004	[RP.D.F1	400.00]	28018	[RRESIT1A	400.00]	1	687.9	76.7	475.6	35.3	-212.4	30.9
28008	[RARAD 1	400.00]	29000	[RCARAD1	400.00]	1	-282.9	165.6	-76.3	114.5	206.6	73.0
28031	[RBRASO1	400.00]	28034	[RSIBIU1	400.00]	1	241.6	-122.9	32.6	-122.5	-209.0	86.5
31420	[LMARIB1	400.00]	31435	[LCIRKO11	400.00]	2	-114.3	19.7	87.7	-26.5	201.9	176.7
34015	[JKRAG21	400.00]	34080	[JJAGO41	400.00]	A	-0.9	57.9	233.5	20.6	234.4	999.9
34015	[JKRAG21	400.00]	34920	[JTKOLB1	400.00]	A	-251.4	-138.4	-486.3	-99.0	-234.9	93.4
34020	[JNIS2 1	400.00]	34080	[JJAGO41	400.00]	A	200.5	-48.3	-49.4	-13.3	-249.9	124.7
34030	[JOBREN11	400.00]	34040	[JRPMLA1	400.00]	2	234.0	-98.7	-2.1	-103.0	-236.2	100.9
34031	[JOBREN12	400.00]	34040	[JRPMLA1	400.00]	1	234.9	-101.9	-3.2	-103.8	-238.1	101.3
34031	[JOBREN12	400.00]	34920	[JTKOLB1	400.00]	A	-359.0	-12.1	-122.0	-8.2	237.1	66.0
34040	[JRPMLA1	400.00]	34045	[JSMIT21	400.00]	1	897.4	9.1	533.3	-23.6	-364.1	40.6
34071	[JTKOSCI	400.00]	34089	[JPEC3 1	400.00]	1	260.8	-60.9	52.4	-44.8	-208.5	79.9
16.1	26.4											

Table 13.18.9: Changes in power flow through tie-lines connecting Turkey to the rest of the system in winter maximum 2020, scenario when power system of Turkey exports 1000 MW

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:											
IN WORKING CASE				IN BASE CASE							
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW %
215	[XNS_BA11	400.00]	22238	[GK_NSA11	400.00]	1	513.7	-77.8	-82.9	-55.0	-596.6 116.1
60009	[THAMIT1	400.00]	198	[XMI_HA11	400.00]	1	253.6	-165.3	-437.1	-108.7	-690.7 272.4
60037	[TBABA21F	400.00]	197	[XMI_BA11	400.00]	1	234.3	-109.0	-277.0	-66.5	-511.3 218.2

Table 13.18.10: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of Turkey exports 1000 MW

MONITORED BRANCH				CONTINGENCY		RATING	FLOW	%		
12474*VMI	1	400.00	12274 VMI	2	220.00	1	BASE CASE	630.0	647.3	102.7
10010*AELBS22		220.00	10125 ACEKIN2		220.00	1	SINGLE 19	370.0	387.7	103.8
10009*AELBS12		220.00	10125 ACEKIN2		220.00	1	SINGLE 22	370.0	385.5	103.5
24034*MDUME	2	220.00	24096 MMART	21	220.00	1	SINGLE 367	426.8	565.1	126.2
24094*MMART	4	400.00	24096 MMART	21	220.00	1	SINGLE 367	500.0	572.6	114.5
24034*MDUME	2	220.00	24095 MMART	22	220.00	1	SINGLE 368	426.8	569.2	127.1
24094*MMART	4	400.00	24095 MMART	22	220.00	1	SINGLE 368	500.0	576.6	115.3
24034*MDUME	2	220.00	24096 MMART	21	220.00	1	SINGLE 379	426.8	566.0	126.4
24094*MMART	4	400.00	24096 MMART	21	220.00	1	SINGLE 379	500.0	573.4	114.7
24034*MDUME	2	220.00	24095 MMART	22	220.00	1	SINGLE 380	426.8	570.0	127.3
24094*MMART	4	400.00	24095 MMART	22	220.00	1	SINGLE 380	500.0	577.5	115.5
28040*RLOTRU2		220.00	28366 RSIBIU2		220.00	1	SINGLE 621	333.4	393.2	113.1
28040*RLOTRU2		220.00	28100 RSIBIU21		220.00	1	SINGLE 622	333.4	393.2	113.1
28040*RLOTRU2		220.00	28366 RSIBIU2		220.00	1	SINGLE 719	333.4	393.0	112.3
28040*RLOTRU2		220.00	28100 RSIBIU21		220.00	1	SINGLE 720	333.4	393.0	112.3
34100*JBGD172		220.00	34111 JBGD8	22	220.00	2	SINGLE 819	445.8	467.3	106.4
34100*JBGD172		220.00	34111 JBGD8	22	220.00	1	SINGLE 820	445.8	467.3	106.4

MONITORED VOLTAGE REPORT:

SYSTEM	CONTINGENCY	BUS	V-CONT	V-INIT	V-MAX	V-MIN
'BG220	RANGE SINGLE 134	12286 VUZUND2	220.00	0.88416	1.00775	1.10000
'BG220	RANGE SINGLE 136	12282 VORFEJ2	220.00	1.10448	1.03804	1.10000
'HU220	RANGE SINGLE 356	24005 MALBF 22	220.00	0.89275	1.04262	1.10000
'HU220	RANGE SINGLE 357	24006 MALBF 21	220.00	0.89462	1.04267	1.10000
'RO220	RANGE SINGLE 691	28855 RMOSTI2	220.00	0.81246	1.00601	1.10000
'RS400	RANGE SINGLE 796	34085 JSOMB31	400.00	0.85150	0.98217	1.05000
'RS220	RANGE SINGLE 844	34200 JSABA32	220.00	0.87182	1.01369	1.10000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 19	: OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	: OPEN LINE FROM BUS 10010 [AELBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 80	: OPEN LINE FROM BUS 12471 [VMI3 11 400.00] TO BUS 12473 [VMI3 12 400.00] CKT 1
SINGLE 134	: OPEN LINE FROM BUS 12275 [VMI3 2 220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 136	: OPEN LINE FROM BUS 12280 [VALEKO2 220.00] TO BUS 12282 [VORFEJ2 220.00] CKT 1
SINGLE 356	: OPEN LINE FROM BUS 24005 [MALBF 22 220.00] TO BUS 24034 [MDUME 2 220.00] CKT 1
SINGLE 357	: OPEN LINE FROM BUS 24006 [MALBF 21 220.00] TO BUS 24034 [MDUME 2 220.00] CKT 1
SINGLE 367	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 368	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 379	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 380	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 621	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	: OPEN LINE FROM BUS 28040 [RLOTRU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 719	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 796	: OPEN LINE FROM BUS 34050 [JSUBO31 400.00] TO BUS 34085 [JSOMB31 400.00] CKT 1
SINGLE 819	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 820	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2
SINGLE 844	: OPEN LINE FROM BUS 34170 [JOBREN2 220.00] TO BUS 34200 [JSABA32 220.00] CKT 1

### 13.18.2. Turkish Power System Imports 1000 MW

Table 13.18.11: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of Turkey imports 1000 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1338.7	1491.9	0.0	0.0	0.0	-200.0	46.8	-200.0
AL	480.1	689.7	-199.6	0.0	458.4	28.7	419.7	
20	8807.4	7603.7	0.0	14.4	0.0	1000.1	189.2	1000.0
BG	2929.1	3045.8	-44.9	120.8	2993.5	321.8	2479.0	
30	3148.3	2610.1	0.0	0.0	0.0	490.0	48.1	490.0

BA	701.3	724.5	0.0	0.0	911.1	324.9	563.0	
35	40265.9	49222.0	0.0	1.1	0.0	-9399.9	442.7	-9400.0
IT	7060.6	10816.5	0.0	-156.9	12568.2	-534.1	9503.4	
40	3098.4	3483.0	0.0	0.0	0.0	-435.0	50.4	-435.0
HR	354.1	1074.2	0.0	0.0	1409.1	23.6	665.4	
45	5391.8	6500.0	0.1	0.0	0.0	-1200.0	91.7	-1200.0
HU	956.5	1926.6	178.2	-29.6	2423.7	91.8	1213.2	
50	10298.3	10371.1	0.0	0.0	0.0	-350.0	277.2	-350.0
GR	2152.7	5312.0	170.2	9.3	6611.7	114.6	3144.5	
55	4607.4	-4593.5	0.0	4.8	0.0	9085.7	110.3	9086.0
UX	131.9	637.5	0.0	12.7	2315.1	336.6	1460.1	
60	1501.4	1577.0	0.0	0.0	0.0	-100.0	24.4	-100.0
MK	454.9	573.6	-31.3	0.0	403.4	52.4	263.6	
65	1207.2	0.0	0.0	0.0	0.0	1200.0	7.2	1200.0
UA	-194.2	0.0	0.0	0.0	653.8	346.6	113.0	
70	10253.1	9416.9	0.0	88.4	0.0	545.0	202.8	545.0
RO	2510.8	4075.6	512.9	273.9	4617.2	-225.8	2491.5	
75	2993.5	2514.0	0.0	8.8	0.0	424.0	46.6	424.0
SI	981.7	811.0	0.0	54.0	608.4	184.4	540.7	
80	54395.2	54622.1	0.0	0.0	0.0	-999.9	773.2	-1000.0
TR	4589.8	7792.0	1175.5	0.0	17195.3	-117.7	12935.4	
90	7714.2	7871.1	0.0	17.8	0.0	-360.0	185.3	-360.0
RS	2627.0	2853.5	0.0	76.5	1729.0	-643.4	2069.4	
91	629.4	805.2	0.5	1.9	0.0	-200.0	21.7	-200.0
ME	301.5	299.2	-35.0	10.9	239.1	56.3	209.1	
95	501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK	-384.8	0.0	0.0	0.0	40.0	-360.6	15.9	
TOTALS	156151.7	153494.7	0.6	137.2	0.0	0.0	2519.2	0.0
	25653.0	40631.6	1726.0	371.8	55176.8	0.0	38086.9	

Table 13.18.12: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2015, scenario when power system of Turkey imports 1000 MW

FRMBUS,	FROMBUSNAME,	TOBUS,	TOBUSNAME,CKT,STS,	MW,	MVAR,	MVA,	%I
			***** NONE *****				



Figure 13.18.3: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of Turkey imports 1000 MW

Table 13.18.13: Changes in power flow greater than 50 MW in area of SEE in winter maximum 2015, scenario when power system of Turkey imports 1000 MW

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 50.0 MW:												
IN WORKING CASE			IN BASE CASE									
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
8	[XWI_GY11	400.00]	24067	[MGYOR 4	400.00]	1	36.4	28.2	-14.2	34.8	-50.6	138.9
8	[XWI_GY11	400.00]	50010	[OWIEN 1	400.00]	1	-36.4	-28.2	14.2	-34.8	50.6	138.9
197	[XMI_BA11	400.00]	12474	[VMI 1	400.00]	1	-470.7	-36.0	-411.5	-40.3	59.2	12.6
197	[XMI_BA11	400.00]	60037	[TBABA21F	400.00]	1	470.7	36.0	411.5	40.3	-59.2	12.6
198	[XMI_HA11	400.00]	12471	[VMI3 11	400.00]	1	-657.6	-52.5	-578.7	-58.2	78.9	12.0
198	[XMI_HA11	400.00]	60009	[THAMIT1	400.00]	1	657.6	52.5	578.7	58.2	-78.9	12.0
215	[XNS_BA11	400.00]	22238	[GK_NSA11	400.00]	1	128.4	-29.3	190.0	-33.1	61.7	48.0
215	[XNS_BA11	400.00]	60007	[TBABA11	400.00]	1	-128.4	29.3	-190.0	33.1	-61.7	48.0
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	1	-945.5	68.9	-880.0	51.8	65.5	6.9
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	2	-945.5	68.9	-880.0	51.8	65.5	6.9
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	1	-1041.0	93.8	-936.2	78.3	104.8	10.1
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	2	-1041.0	93.8	-936.2	78.3	104.8	10.1
50011	[OZELL 1	400.00]	50042	[OZELL 2	220.00]	1	-781.3	57.0	-609.5	64.7	171.8	22.0
60009	[THAMIT1	400.00]	60037	[TBABA21F	400.00]	1	-466.7	-50.5	-408.4	-64.3	58.3	12.5
60009	[THAMIT1	400.00]	60047	[TBASAT1	400.00]	1	769.9	10.2	714.0	16.7	-55.9	7.3



Table 13.18.14: Changes in power flow through tie-lines connecting Turkey to the rest of the system, in winter maximum 2015, scenario when power system of Turkey imports 1000 MW

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:												
IN WORKING CASE					IN BASE CASE							
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
	215 [XNS_BA11	400.00]	22238 [GK_NSA11	400.00]	1		128.4	-29.3	190.0	-33.1	61.7	48.0
	60009 [THAMIT1	400.00]	198 [XMI_HA11	400.00]	1		-653.5	-52.6	-575.5	-70.1	78.0	11.9
	60037 [TBABA21F	400.00]	197 [XMI_BA11	400.00]	1		-467.8	-46.9	-409.2	-58.1	58.5	12.5

Table 13.18.15: Results of contingency (n-1) analysis in winter maximum 2015, scenario when power system of Turkey imports 1000 MW

<----- MONITORED BRANCH ----->				CONTINGENCY		RATING	FLOW	%
316*XTR_HN51	110.00	36050 OHNOVI51	110.00	1	SINGLE 196	89.6	97.9	111.1
24034*MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE 345	426.8	448.4	100.2
24034*MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE 357	426.8	448.5	100.2
31210*LDIVAC2	220.00	156 XPA_DI21	220.00	1	SINGLE 707	320.1	520.0	157.0

MONITORED VOLTAGE REPORT:									
SYSTEM		CONTINGENCY	<----- B U S ----->		V-CONT	V-INIT	V-MAX	V-MIN	
'BG220	'	RANGE SINGLE 100	12252	VOCHIF2	220.00	0.81810	0.95833	1.10000	0.90000
'BG220	'	RANGE SINGLE 124	12286	VUZUND2	220.00	0.89532	1.00410	1.10000	0.90000
'GR400	'	RANGE SINGLE 432	22759	GTH_AG11	400.00	1.05199	1.02523	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23123	GKPATR11	400.00	1.05212	1.03816	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23125	GKPATC11	400.00	1.05222	1.03814	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23126	GKPATC12	400.00	1.05216	1.03825	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23173	GDISTO11	400.00	1.05306	1.03789	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23174	GDISTO12	400.00	1.05268	1.03802	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23180	GAXELO12	400.00	1.05233	1.03870	1.05000	0.90000
'GR400	'	RANGE SINGLE 432	23181	GAXELO11	400.00	1.05230	1.03891	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23064	GK_MEG13	400.00	1.05382	1.04113	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23066	GK_MEG11	400.00	1.05382	1.04113	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23123	GKPATR11	400.00	1.05326	1.03816	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23125	GKPATC11	400.00	1.05335	1.03814	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23126	GKPATC12	400.00	1.05329	1.03825	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23173	GDISTO11	400.00	1.05398	1.03789	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23174	GDISTO12	400.00	1.05380	1.03802	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23180	GAXELO12	400.00	1.05347	1.03870	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23181	GAXELO11	400.00	1.05353	1.03891	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23036	GK_KOR13	400.00	1.06323	1.01746	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23068	GK_MEG14	400.00	1.06083	1.02948	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23037	GK_KOR14	400.00	1.06323	1.01746	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23067	GK_MEG12	400.00	1.06083	1.02948	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23126	GKPATC12	400.00	1.06896	1.03825	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23180	GAXELO12	400.00	1.06895	1.03870	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23181	GAXELO11	400.00	1.06876	1.03891	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23180	GAXELO12	400.00	1.06840	1.03870	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23181	GAXELO11	400.00	1.06822	1.03891	1.05000	0.90000
'RO220	'	RANGE SINGLE 567	28043	RSTUPA2	220.00	0.89307	0.98044	1.10000	0.90000
'RO220	'	RANGE SINGLE 637	28855	RMOSTI2	220.00	0.88220	1.04056	1.10000	0.90000
'RO220	'	RANGE SINGLE 642	28907	RSTILP2	220.00	0.84376	0.98220	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28095	RVETIS2	220.00	0.89805	1.02195	1.10000	0.90000
'RS400	'	RANGE SINGLE 739	34085	JSOMB31	400.00	0.88003	0.99518	1.05000	0.90000

CONTINGENCY LEGEND:									
LABEL	EVENTS								
SINGLE 100	:	OPEN LINE FROM BUS 12250 [VGORIA2	220.00]	TO BUS 12252 [VOCHIF2	220.00]	CKT 1			
SINGLE 124	:	OPEN LINE FROM BUS 12275 [VMI3 2	220.00]	TO BUS 12286 [VUZUND2	220.00]	CKT 1			
SINGLE 196	:	OPEN LINE FROM BUS 13 [XTR_PG11	400.00]	TO BUS 36005 [OPODG211	400.00]	CKT 1			
SINGLE 269	:	OPEN LINE FROM BUS 71 [XME_DI11	400.00]	TO BUS 31410 [LDIVAC1	400.00]	CKT 1			
SINGLE 345	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1			
SINGLE 357	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1			
SINGLE 432	:	OPEN LINE FROM BUS 22759 [GTH_AG11	400.00]	TO BUS 23172 [GDISTO13	400.00]	CKT 1			
SINGLE 433	:	OPEN LINE FROM BUS 22759 [GTH_AG11	400.00]	TO BUS 23173 [GDISTO11	400.00]	CKT 1			
SINGLE 462	:	OPEN LINE FROM BUS 23033 [GKYT_K11	400.00]	TO BUS 23036 [GK_KOR13	400.00]	CKT 1			
SINGLE 463	:	OPEN LINE FROM BUS 23033 [GKYT_K11	400.00]	TO BUS 23037 [GK_KOR14	400.00]	CKT 1			
SINGLE 473	:	OPEN LINE FROM BUS 23123 [GKPATR11	400.00]	TO BUS 23126 [GKPATC12	400.00]	CKT 1			
SINGLE 475	:	OPEN LINE FROM BUS 23126 [GKPATC12	400.00]	TO BUS 23180 [GAXELO12	400.00]	CKT 1			
SINGLE 567	:	OPEN LINE FROM BUS 28043 [RSTUPA2	220.00]	TO BUS 28044 [RBRADU2	220.00]	CKT 1			
SINGLE 637	:	OPEN LINE FROM BUS 28855 [RMOSTI2	220.00]	TO BUS 28935 [RRAC.M2	220.00]	CKT 1			
SINGLE 642	:	OPEN LINE FROM BUS 28906 [RTELEA2	220.00]	TO BUS 28907 [RSTILP2	220.00]	CKT 1			
SINGLE 670	:	OPEN LINE FROM BUS 28039 [RROSIO1	400.00]	TO BUS 28094 [RROSIO2	220.00]	CKT 1			
SINGLE 707	:	OPEN LINE FROM BUS 31410 [LDIVAC1	400.00]	TO BUS 80 [XRE_DI11	400.00]	CKT 1			
SINGLE 739	:	OPEN LINE FROM BUS 34050 [JSUBO31	400.00]	TO BUS 34085 [JSOMB31	400.00]	CKT 1			

Table 13.18.16: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of Turkey imports 1000 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1621.8	1723.7	0.0	0.0	0.0	-150.0	48.1	-150.0
AL	668.6	779.7	-204.7	0.0	475.3	102.3	466.6	
20	9661.7	8411.0	0.0	15.5	0.0	1000.0	235.2	1000.0
BG	3537.6	3357.9	0.0	181.1	3278.1	193.4	3083.4	
30	2949.4	2897.8	0.0	0.0	0.0	0.0	51.6	0.0
BA	1001.7	1017.2	0.0	0.0	914.0	244.5	654.0	
35	45062.6	54409.8	0.0	1.1	0.0	-9740.0	391.7	-9740.0
IT	9622.3	11942.3	0.0	147.7	12391.5	-796.5	10720.3	
40	3427.0	4359.0	0.0	0.0	0.0	-1000.0	68.0	-1000.0
HR	503.1	1075.9	0.0	0.0	1534.8	207.9	754.1	
45	6093.4	7180.0	0.1	0.0	0.0	-1200.0	113.3	-1200.0
HU	1354.2	2128.1	178.7	-29.1	2405.0	-0.7	1482.2	
50	11749.3	11426.0	0.0	0.0	0.0	0.0	323.3	0.0
GR	3122.4	5724.7	203.7	9.4	6663.7	127.6	3707.0	
55	5438.2	-4356.2	0.0	4.8	0.0	9649.8	139.8	9650.0
UX	497.0	622.8	0.0	12.6	2293.4	288.1	1866.8	
60	1939.5	2001.9	0.0	0.0	0.0	-100.0	37.5	-100.0
MK	760.5	752.3	-30.9	0.0	397.9	15.3	420.4	
65	1207.7	0.0	0.0	0.0	0.0	1200.0	7.7	1200.0
UA	-165.6	0.0	0.0	0.0	652.3	364.4	122.3	
70	13257.1	12110.2	0.0	90.3	0.0	800.1	256.5	800.0
RO	3092.9	4455.6	783.9	286.1	5606.3	-11.9	3185.6	
75	3949.6	2990.0	0.0	8.9	0.0	890.0	60.7	890.0
SI	1238.4	964.6	0.0	53.8	867.7	344.9	742.9	
80	77455.3	77342.9	0.0	0.0	0.0	-1000.0	1112.4	-1000.0
TR	9741.5	11034.0	997.2	0.0	22665.1	-157.9	20533.3	
90	7767.4	8298.8	0.0	17.3	0.0	-750.0	201.3	-750.0
RS	2886.1	2986.6	0.0	73.4	1732.4	-667.5	2226.0	
91	864.8	938.0	0.5	2.1	0.0	-100.0	24.2	-100.0
ME	350.3	346.6	-34.6	11.4	237.1	48.1	215.8	
95	501.3	0.0	0.0	0.0	0.0	500.0	1.3	500.0
SK	-327.1	0.0	0.0	0.0	40.0	-302.0	14.8	
TOTALS	192946.3	189732.9	0.6	139.9	0.0	0.0	3072.7	0.0
	37884.0	47188.4	1893.3	746.4	62154.5	0.0	50195.5	



Figure 13.18.4: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of Turkey imports 1000 MW

Table 13.18.17: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2020, scenario when power system of Turkey imports 1000 MW

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I
***** NONE *****									

Table 13.18.18: Changes in power flow greater than 50 MW in area of SEE in winter maximum 2020, scenario when power system of Turkey imports 1000 MW

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 50.0 MW:													
IN WORKING CASE					IN BASE CASE								
X-----	FROM BUS	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%		
	8	[XWI_GY11	400.00]	24067	[MGYOR 4	400.00]	1	134.3	3.9	84.1	12.2	-50.1	37.3
	8	[XWI_GY11	400.00]	50010	[OWIEN 1	400.00]	1	-134.3	-3.9	-84.1	-12.2	50.1	37.3
	197	[XMI_BA11	400.00]	12474	[VMI 1	400.00]	1	-334.8	-32.2	-278.0	-36.4	56.8	17.0
	197	[XMI_BA11	400.00]	60037	[TBABA21F	400.00]	1	334.8	32.2	278.0	36.4	-56.8	17.0
	198	[XMI_HA11	400.00]	12471	[VMI3 11	400.00]	1	-515.6	-74.7	-439.0	-79.8	76.6	14.9
	198	[XMI_HA11	400.00]	60009	[THAMIT1	400.00]	1	515.6	74.7	439.0	79.8	-76.6	14.9
	215	[XNS_BA11	400.00]	22238	[GK_NSA11	400.00]	1	-149.6	-50.9	-82.9	-55.0	66.6	44.5
	215	[XNS_BA11	400.00]	60007	[TBABA11	400.00]	1	149.6	50.9	82.9	55.0	-66.6	44.5
	50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	1	-1035.4	87.6	-969.3	69.8	66.2	6.4
	50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	2	-1035.4	87.6	-969.3	69.8	66.2	6.4
	50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	1	-1127.5	107.5	-1023.0	92.2	104.5	9.3



50008 [OTAUER1	400.00]	50011 [OZELL 1	400.00]	2	-1127.5	107.5	-1023.0	92.2	104.5	9.3
50011 [OZELL 1	400.00]	50042 [OZELL 2	220.00]	1	-570.6	-9.6	-398.8	4.3	171.9	30.1
60009 [THAMIT1	400.00]	60037 [TBABA21F	400.00]	1	-332.8	-66.7	-276.6	-77.2	56.2	16.9
60009 [THAMIT1	400.00]	60047 [TBASAT1	400.00]	1	539.2	19.5	487.6	25.6	-51.5	9.6

Table 13.18.19: Changes in power flow through tie-lines connecting Turkey to the rest of the system in winter maximum 2020, scenario when power system of Turkey imports 1000 MW

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:										
IN WORKING CASE					IN BASE CASE					
X-----	FROM BUS	-----X	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW %
	215 [XNS_BA11	400.00]	22238 [GK_NSAll	400.00]	1	-149.6	-50.9	-82.9	-55.0	66.6 44.5
	60009 [THAMIT1	400.00]	198 [XMI_HA11	400.00]	1	-513.0	-94.9	-437.1	-108.7	75.9 14.8
	60037 [TBABA21F	400.00]	197 [XMI_BA11	400.00]	1	-333.3	-57.7	-277.0	-66.5	56.4 16.9

Table 13.18.20: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of Turkey imports 1000 MW

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%			
10010*	AELBS22	220.00	10125 ACEKIN2	220.00	1	SINGLE 19	370.0	386.3	102.9
10009*	AELBS12	220.00	10125 ACEKIN2	220.00	1	SINGLE 22	370.0	384.2	102.6
316	XTR_HN51	110.00	36050*OHNOVI51	110.00	1	SINGLE 207	89.6	99.6	112.6
24034*	MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE 367	426.8	513.4	114.7
24094*	MMART 4	400.00	24096 MMART 21	220.00	1	SINGLE 367	500.0	522.6	104.5
24034*	MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE 368	426.8	517.1	115.5
24094*	MMART 4	400.00	24095 MMART 22	220.00	1	SINGLE 368	500.0	526.3	105.3
24034*	MDUME 2	220.00	24096 MMART 21	220.00	1	SINGLE 379	426.8	513.6	114.7
24094*	MMART 4	400.00	24096 MMART 21	220.00	1	SINGLE 379	500.0	522.8	104.6
24034*	MDUME 2	220.00	24095 MMART 22	220.00	1	SINGLE 380	426.8	517.3	115.5
24094*	MMART 4	400.00	24095 MMART 22	220.00	1	SINGLE 380	500.0	526.6	105.3
28040*	RLOTRU2	220.00	28366 RSIBIU2	220.00	1	SINGLE 621	333.4	393.1	112.2
28040*	RLOTRU2	220.00	28100 RSIBIU21	220.00	1	SINGLE 622	333.4	393.1	112.2
28040*	RLOTRU2	220.00	28366 RSIBIU2	220.00	1	SINGLE 719	333.4	392.8	111.6
28040*	RLOTRU2	220.00	28100 RSIBIU21	220.00	1	SINGLE 720	333.4	392.8	111.6
34100*	JBGD172	220.00	34111 JBGD8 22	220.00	2	SINGLE 819	445.8	466.9	105.5
34100*	JBGD172	220.00	34111 JBGD8 22	220.00	1	SINGLE 820	445.8	466.9	105.5

MONITORED VOLTAGE REPORT:									
SYSTEM		CONTINGENCY	<-----	B U S	----->	V-CONT	V-INIT	V-MAX	V-MIN
'BG400	'	RANGE SINGLE 80	12473	VMI3 12	400.00	1.05005	1.03199	1.05000	0.90000
'BG220	'	RANGE SINGLE 134	12286	VUZUND2	220.00	0.88859	1.01010	1.10000	0.90000
'BG220	'	RANGE SINGLE 136	12282	VORFEJ2	220.00	1.10513	1.04411	1.10000	0.90000
'HU220	'	RANGE SINGLE 356	24005	MALBF 22	220.00	0.89275	1.04262	1.10000	0.90000
'HU220	'	RANGE SINGLE 357	24006	MALBF 21	220.00	0.89462	1.04267	1.10000	0.90000
'RO220	'	RANGE SINGLE 691	28855	RMOSTI2	220.00	0.82206	1.01502	1.10000	0.90000
'RS400	'	RANGE SINGLE 796	34085	JSOMB31	400.00	0.86352	0.99047	1.05000	0.90000
'RS220	'	RANGE SINGLE 844	34200	JSABA32	220.00	0.88420	1.01971	1.10000	0.90000

CONTINGENCY LEGEND:									
LABEL	EVENTS								
SINGLE 19	:	OPEN LINE FROM BUS 10009 [AELBS12	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1			
SINGLE 22	:	OPEN LINE FROM BUS 10010 [AELBS22	220.00]	TO BUS 10125 [ACEKIN2	220.00]	CKT 1			
SINGLE 80	:	OPEN LINE FROM BUS 12471 [VMI3 11	400.00]	TO BUS 12473 [VMI3 12	400.00]	CKT 1			
SINGLE 134	:	OPEN LINE FROM BUS 12275 [VMI3 2	220.00]	TO BUS 12286 [VUZUND2	220.00]	CKT 1			
SINGLE 136	:	OPEN LINE FROM BUS 12280 [VALEKO2	220.00]	TO BUS 12282 [VORFEJ2	220.00]	CKT 1			
SINGLE 207	:	OPEN LINE FROM BUS 13 [XTR_PG11	400.00]	TO BUS 36005 [OPODG211	400.00]	CKT 1			
SINGLE 356	:	OPEN LINE FROM BUS 24005 [MALBF 22	220.00]	TO BUS 24034 [MDUME 2	220.00]	CKT 1			
SINGLE 357	:	OPEN LINE FROM BUS 24006 [MALBF 21	220.00]	TO BUS 24034 [MDUME 2	220.00]	CKT 1			
SINGLE 367	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1			
SINGLE 368	:	OPEN LINE FROM BUS 24034 [MDUME 2	220.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1			
SINGLE 379	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24095 [MMART 22	220.00]	CKT 1			
SINGLE 380	:	OPEN LINE FROM BUS 24094 [MMART 4	400.00]	TO BUS 24096 [MMART 21	220.00]	CKT 1			
SINGLE 621	:	OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1			
SINGLE 622	:	OPEN LINE FROM BUS 28040 [RLOTRU2	220.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1			
SINGLE 691	:	OPEN LINE FROM BUS 28855 [RMOSTI2	220.00]	TO BUS 28935 [RRAC.M2	220.00]	CKT 1			
SINGLE 719	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28100 [RSIBIU21	220.00]	CKT 1			
SINGLE 720	:	OPEN LINE FROM BUS 28034 [RSIBIU1	400.00]	TO BUS 28366 [RSIBIU2	220.00]	CKT 1			
SINGLE 796	:	OPEN LINE FROM BUS 34050 [JSUBO31	400.00]	TO BUS 34085 [JSOMB31	400.00]	CKT 1			
SINGLE 819	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 1			
SINGLE 820	:	OPEN LINE FROM BUS 34100 [JBGD172	220.00]	TO BUS 34111 [JBGD8 22	220.00]	CKT 2			
SINGLE 844	:	OPEN LINE FROM BUS 34170 [JOBREN2	220.00]	TO BUS 34200 [JSABA32	220.00]	CKT 1			

## 13.19. UNMIK Zone Power Balance Uncertainty

### 13.19.1. UNMIK Zone Power System Is Self-Balanced

Table 13.19.1: Area totals (MW/MVar) in area of SEE in winter maximum 2015, scenario when power system of UNMIK zone is self-balanced

X--	AREA	--X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10			1338.0	1491.9	0.0	0.0	0.0	-200.0	46.1	-200.0
AL			455.9	689.7	-201.1	0.0	462.6	15.2	414.9	
20			8802.3	7603.7	0.0	14.4	0.0	1000.0	184.1	1000.0
BG			2859.0	3045.8	-44.9	121.1	3001.4	316.3	2422.1	
30			3147.4	2610.1	0.0	0.0	0.0	490.0	47.2	490.0
BA			690.3	724.5	0.0	0.0	911.5	311.0	566.3	
35			40263.3	49222.0	0.0	1.1	0.0	-9400.0	440.3	-9400.0
IT			7007.7	10816.5	0.0	-157.0	12573.2	-549.5	9471.0	
40			3104.9	3483.0	0.0	0.0	0.0	-434.9	56.8	-435.0
HR			384.9	1074.2	0.0	0.0	1405.5	-2.1	718.4	
45			5393.7	6500.0	0.1	0.0	0.0	-1199.9	93.5	-1200.0
HU			992.1	1926.6	178.1	-29.6	2422.9	106.0	1233.9	
50			10298.1	10371.1	0.0	0.0	0.0	-350.0	277.0	-350.0
GR			2118.3	5312.0	170.2	9.3	6617.4	90.4	3140.1	
55			3868.6	-4593.5	0.0	4.9	0.0	8375.6	81.8	8376.0
UX			-233.0	637.5	0.0	12.8	2330.5	474.2	973.0	
60			1500.8	1577.0	0.0	0.0	0.0	-100.0	23.8	-100.0
MK			431.6	573.6	-31.5	0.0	405.4	37.8	257.2	
65			1207.0	0.0	0.0	0.0	0.0	1200.0	7.0	1200.0
UA			-197.1	0.0	0.0	0.0	653.8	346.4	110.3	
70			10258.4	9416.9	0.0	88.3	0.0	545.2	208.0	545.0
RO			2518.5	4075.6	512.7	273.7	4614.2	-267.2	2537.9	
75			2997.0	2514.0	0.0	8.8	0.0	424.1	50.1	424.0
SI			996.2	811.0	0.0	54.0	607.6	166.1	572.7	
80			54592.3	54622.1	0.0	0.0	0.0	-800.0	770.3	-800.0
TR			4569.6	7792.0	1175.4	0.0	17195.7	-135.2	12933.1	
90			8220.0	7871.1	0.0	17.9	0.0	150.0	180.9	150.0
RS			2657.1	2853.5	0.0	77.0	1737.1	-615.7	2079.5	
91			626.3	805.2	0.6	1.9	0.0	-200.0	18.7	-200.0
ME			276.0	299.2	-35.4	11.0	241.9	64.2	178.8	
95			501.4	0.0	0.0	0.0	0.0	500.0	1.4	500.0
SK			-382.2	0.0	0.0	0.0	40.0	-357.9	15.8	
TOTALS			156119.5	153494.7	0.6	137.3	0.0	0.0	2487.0	0.0
			25145.1	40631.6	1723.4	372.4	55220.9	0.0	37625.0	

Table 13.19.2: Totals (MW/MVar) of zones in Serbia in SEE in winter maximum 2015, scenario when power system of UNMIK zone is self-balanced

X-- ZONE --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES
90	6887.0	6567.2	0.0	13.7	0.0	149.6	156.5
EMS	2200.0	2379.7	0.0	55.7	1474.4	-551.1	1790.2
901	1333.0	1303.9	0.0	4.2	0.0	0.5	24.4
UNMIK	457.1	473.7	0.0	21.3	262.7	-64.6	289.3
TOTALS	8220.0	7871.1	0.0	17.9	0.0	150.0	180.9
	2657.1	2853.5	0.0	77.0	1737.1	-615.7	2079.5



Figure 13.19.1: Aggregated border flows in area of SEE in winter maximum 2015, scenario when power system of UNMIK zone is self-balanced

Table 13.19.3: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2015, scenario when power system of UNMIK zone is self-balanced

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,CKT,STS,	MW,	MVAR,	MVA,	%I
***** NONE *****							

Table 13.19.4: Changes in power flow greater than 100 MW in area of SEE in winter maximum 2015, scenario when power system of UNMIK zone is self-balanced

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 100.0 MW:												
IN WORKING CASE					IN BASE CASE							
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
8	[XWI_GY11	400.00]	24067	[MGYOR 4	400.00]	1	-136.3	48.0	-14.2	34.8	122.1	89.6
8	[XWI_GY11	400.00]	50010	[OWIEN 1	400.00]	1	136.3	-48.0	14.2	-34.8	-122.1	89.6
13	[XTR_PG11	400.00]	14405	[WTREB11	400.00]	1	-173.5	-88.4	-279.0	-80.8	-105.5	60.8
13	[XTR_PG11	400.00]	36005	[OPODG211	400.00]	1	173.5	88.4	279.0	80.8	105.5	60.8
80	[XRE_DI11	400.00]	31410	[LDIVAC1	400.00]	1	-849.5	-186.5	-730.1	-211.1	119.5	14.1
80	[XRE_DI11	400.00]	52189	[IRDPV11	400.00]	1	849.5	186.4	730.1	211.1	-119.5	14.1
184	[XRI_PE11	400.00]	34089	[JKPEC31	400.00]	1	49.8	61.9	189.8	58.1	140.0	280.9
184	[XRI_PE11	400.00]	36001	[ORIBAR11	400.00]	1	-49.8	-61.9	-189.8	-58.1	-140.0	280.9
34020	[JNIS2 1	400.00]	34070	[JTKOSB1	400.00]	1	51.1	-38.0	200.4	-34.0	149.2	291.8
34070	[JTKOSB1	400.00]	34071	[JTKOSC1	400.00]	1	-5.1	-19.3	117.9	15.5	123.0	999.9
34070	[JTKOSB1	400.00]	34071	[JTKOSC1	400.00]	2	-5.1	-19.3	117.9	15.5	123.0	999.9
34071	[JTKOSC1	400.00]	34089	[JKPEC31	400.00]	1	144.7	-29.6	7.2	-25.5	-137.5	95.0
34071	[JTKOSC1	400.00]	35043	[JTKOSCG1	24.0000]	1	-469.8	-77.5	0.3	1.8	470.1	100.1
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	1	-713.9	14.7	-880.0	51.8	-166.1	23.3
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	2	-713.9	14.7	-880.0	51.8	-166.1	23.3
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	1	-675.0	46.9	-936.2	78.3	-261.2	38.7
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	2	-675.0	46.9	-936.2	78.3	-261.2	38.7
50011	[OZELL 1	400.00]	50042	[OZELL 2	220.00]	1	-181.7	84.4	-609.5	64.7	-427.8	235.4

Table 13.19.5: Changes in power flow through tie-lines connecting UNMIK to the rest of the system, in winter maximum 2015, scenario when power system of UNMIK is self-balanced

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:												
IN WORKING CASE				IN BASE CASE								
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW	%
182	[XPL_BB21	220.00]	36023	[OTPLJE21	220.00]	1	83.5	-48.9	108.1	-50.5	24.6	29.5
183	[XPL_BI21	220.00]	36023	[OTPLJE21	220.00]	1	-13.6	-51.8	1.8	-53.1	15.4	113.2
184	[XRI_PE11	400.00]	36001	[ORIBAR11	400.00]	1	-49.8	-61.9	-189.8	-58.1	-140.0	280.9
326	[XPL_ZA51	110.00]	36040	[OPLJEV51	110.00]	1	-2.1	-11.7	0.0	-12.0	2.2	102.1
34010	[JHDJE11	400.00]	85	[XPF_DJ11	400.00]	1	-114.5	46.8	-139.8	31.6	-25.3	22.1
34020	[JNIS2 1	400.00]	24	[XSO_NI11	400.00]	1	-153.0	-105.7	-179.9	-116.5	-27.0	17.6
34035	[JPNAC21	400.00]	86	[XRE_PA11	400.00]	1	-145.7	-35.4	-129.2	-39.0	16.5	11.3
34045	[JSMIT21	400.00]	74	[XER_SM11	400.00]	1	250.4	-87.1	165.1	-86.7	-85.2	34.0
34045	[JSMIT21	400.00]	211	[XUG_SM11	400.00]	1	194.1	-85.2	168.2	-76.4	-25.9	13.3
34050	[JSUBO31	400.00]	79	[XSA_SU11	400.00]	1	23.5	-111.3	-44.4	-100.2	-67.8	289.3
34071	[JTKOSC1	400.00]	82	[XKA_KC11	400.00]	1	120.8	-63.8	55.1	-67.5	-65.7	54.4
34072	[JKURO21	400.00]	81	[XSK_KB11	400.00]	1	104.9	-33.5	10.6	-46.2	-94.3	89.9
34087	[JVVRAN31	400.00]	208	[XST_NI11	400.00]	1	30.6	-52.2	45.4	-58.6	14.8	48.2
34180	[JPOZEG2	220.00]	117	[XVI_VA21	220.00]	1	-37.6	-68.5	-64.5	-66.4	-26.9	71.6
34190	[JKPRZ22	220.00]	87	[XFI_PR21	220.00]	1	-137.4	-37.9	-161.8	-35.8	-24.4	17.7

Table 13.19.6: Results of contingency (n-1) analysis in winter maximum 2015, scenario when power system of UNMIK zone a is self-balanced

<-----	MONITORED BRANCH	----->	CONTINGENCY	RATING	FLOW	%
24034*MDUME 2	220.00	24096 MMART 21	220.00 1 SINGLE 344	426.8	458.2	102.4
24034*MDUME 2	220.00	24095 MMART 22	220.00 1 SINGLE 345	426.8	461.6	103.1
24034*MDUME 2	220.00	24096 MMART 21	220.00 1 SINGLE 356	426.8	458.4	102.4
24034*MDUME 2	220.00	24095 MMART 22	220.00 1 SINGLE 357	426.8	461.8	103.2
31210*LDIVAC2	220.00	156 XPA_DI21	220.00 1 SINGLE 707	320.1	628.3	190.8

MONITORED VOLTAGE REPORT:									
SYSTEM	CONTINGENCY	<-----	B U S	----->	V-CONT	V-INIT	V-MAX	V-MIN	
'BG220	RANGE SINGLE 100	12252	VOCHIF2	220.00	0.81938	0.95918	1.10000	0.90000	
'BG220	RANGE SINGLE 124	12286	VUZUND2	220.00	0.89653	1.00506	1.10000	0.90000	
'GR400	RANGE SINGLE 432	22759	GTH_AG11	400.00	1.05216	1.02551	1.05000	0.90000	
'GR400	RANGE SINGLE 432	23123	GKPATR11	400.00	1.05234	1.03844	1.05000	0.90000	
'GR400	RANGE SINGLE 432	23125	GKPATC11	400.00	1.05243	1.03841	1.05000	0.90000	
'GR400	RANGE SINGLE 432	23126	GKPATC12	400.00	1.05238	1.03853	1.05000	0.90000	
'GR400	RANGE SINGLE 432	23173	GDISTO11	400.00	1.05327	1.03817	1.05000	0.90000	
'GR400	RANGE SINGLE 432	23174	GDISTO12	400.00	1.05289	1.03830	1.05000	0.90000	
'GR400	RANGE SINGLE 432	23180	GAXELO12	400.00	1.05255	1.03898	1.05000	0.90000	
'GR400	RANGE SINGLE 432	23181	GAXELO11	400.00	1.05252	1.03919	1.05000	0.90000	
'GR400	RANGE SINGLE 433	23064	GK_MEG13	400.00	1.05408	1.04140	1.05000	0.90000	

'GR400	'	RANGE SINGLE 433	23066	GK_MEG11	400.00	1.05408	1.04140	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23123	GKPATR11	400.00	1.05352	1.03844	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23125	GKPATC11	400.00	1.05361	1.03841	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23126	GKPATC12	400.00	1.05356	1.03853	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23173	GDISTO11	400.00	1.05424	1.03817	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23174	GDISTO12	400.00	1.05406	1.03830	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23180	GAXELO12	400.00	1.05374	1.03898	1.05000	0.90000
'GR400	'	RANGE SINGLE 433	23181	GAXELO11	400.00	1.05380	1.03919	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23036	GK_KOR13	400.00	1.06348	1.01770	1.05000	0.90000
'GR400	'	RANGE SINGLE 462	23068	GK_MEG14	400.00	1.06108	1.02972	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23037	GK_KOR14	400.00	1.06348	1.01770	1.05000	0.90000
'GR400	'	RANGE SINGLE 463	23067	GK_MEG12	400.00	1.06108	1.02972	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23126	GKPATC12	400.00	1.06932	1.03853	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23180	GAXELO12	400.00	1.06932	1.03898	1.05000	0.90000
'GR400	'	RANGE SINGLE 473	23181	GAXELO11	400.00	1.06912	1.03919	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23180	GAXELO12	400.00	1.06876	1.03898	1.05000	0.90000
'GR400	'	RANGE SINGLE 475	23181	GAXELO11	400.00	1.06858	1.03919	1.05000	0.90000
'RO220	'	RANGE SINGLE 567	28043	RSTUPA2	220.00	0.89219	0.97974	1.10000	0.90000
'RO220	'	RANGE SINGLE 637	28855	RMOSTI2	220.00	0.88198	1.04032	1.10000	0.90000
'RO220	'	RANGE SINGLE 642	28907	RSTILP2	220.00	0.84333	0.98192	1.10000	0.90000
'RO220	'	RANGE SINGLE 670	28095	RVETIS2	220.00	0.89824	1.02148	1.10000	0.90000
'RS400	'	RANGE SINGLE 739	34085	JSOMB31	400.00	0.87876	0.99437	1.05000	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 100	: OPEN LINE FROM BUS 12250 [VGORIA2 220.00] TO BUS 12252 [VOCHIF2 220.00] CKT 1
SINGLE 124	: OPEN LINE FROM BUS 12275 [VMI3 2 220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 344	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 345	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 356	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 357	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 432	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23172 [GDISTO13 400.00] CKT 1
SINGLE 433	: OPEN LINE FROM BUS 22759 [GTH_AG11 400.00] TO BUS 23173 [GDISTO11 400.00] CKT 1
SINGLE 462	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23036 [GK_KOR13 400.00] CKT 1
SINGLE 463	: OPEN LINE FROM BUS 23033 [GKYT_K11 400.00] TO BUS 23037 [GK_KOR14 400.00] CKT 1
SINGLE 473	: OPEN LINE FROM BUS 23123 [GKPATR11 400.00] TO BUS 23126 [GKPATC12 400.00] CKT 1
SINGLE 475	: OPEN LINE FROM BUS 23126 [GKPATC12 400.00] TO BUS 23180 [GAXELO12 400.00] CKT 1
SINGLE 567	: OPEN LINE FROM BUS 28043 [RSTUPA2 220.00] TO BUS 28044 [RBRADU2 220.00] CKT 1
SINGLE 637	: OPEN LINE FROM BUS 28855 [RMOSTI2 220.00] TO BUS 28935 [RRAC.M2 220.00] CKT 1
SINGLE 642	: OPEN LINE FROM BUS 28906 [RTELEA2 220.00] TO BUS 28907 [RSTILP2 220.00] CKT 1
SINGLE 670	: OPEN LINE FROM BUS 28039 [RROSIO1 400.00] TO BUS 28094 [RROSIO2 220.00] CKT 1
SINGLE 707	: OPEN LINE FROM BUS 31410 [LDIVAC1 400.00] TO BUS 80 [XRE_DI11 400.00] CKT 1
SINGLE 739	: OPEN LINE FROM BUS 34050 [JSUBO31 400.00] TO BUS 34085 [JSOMB31 400.00] CKT 1

### 13.19.2. UNMIK Zone Power System Exports 1000 MW

Table 13.19.7: Area totals (MW/MVar) in area of SEE in winter maximum 2020, scenario when power system of UNMIK zone exports 1000 MW

X-- AREA --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES	DESIRED NET INT
10	1625.8	1723.7	0.0	0.0	0.0	-150.0	52.1	-150.0
AL	647.6	779.7	-205.7	0.0	479.0	54.4	498.3	
20	9647.4	8411.0	0.0	15.6	0.0	1000.0	220.8	1000.0
BG	3394.6	3357.9	0.0	181.8	3294.7	221.1	2928.5	
30	2964.9	2897.8	0.0	0.0	0.0	0.1	67.0	0.0
BA	1095.8	1017.2	0.0	0.0	903.7	201.3	781.1	
35	45057.2	54409.8	0.0	1.1	0.0	-9740.0	386.3	-9740.0
IT	9545.7	11942.3	0.0	147.8	12399.0	-788.8	10643.6	
40	3459.5	4359.0	0.0	0.0	0.0	-999.6	100.1	-1000.0
HR	666.8	1075.9	0.0	0.0	1513.1	94.9	1009.1	

45	6112.5	7180.0	0.1	0.0	0.0	-1199.7	132.1	-1200.0
HU	1537.4	2128.1	177.6	-29.1	2393.1	-14.9	1668.7	
50	11748.5	11426.0	0.0	0.0	0.0	0.0	322.5	0.0
GR	3058.9	5724.7	203.5	9.4	6672.2	81.5	3698.4	
55	3469.7	-4356.2	0.0	4.8	0.0	7733.5	87.6	7735.0
UX	117.6	622.8	0.0	12.8	2318.7	633.8	1166.9	
60	1935.9	2001.9	0.0	0.0	0.0	-100.0	33.9	-100.0
MK	694.2	752.3	-31.4	0.0	402.5	-11.2	385.7	
65	1207.5	0.0	0.0	0.0	0.0	1200.0	7.5	1200.0
UA	-137.1	0.0	0.0	0.0	651.7	393.2	121.4	
70	13292.9	12110.2	0.0	89.6	0.0	800.3	292.8	800.0
RO	3282.3	4455.6	779.9	284.0	5568.9	-187.2	3518.9	
75	3957.3	2990.0	0.0	8.8	0.0	890.1	68.3	890.0
SI	1307.7	964.6	0.0	53.4	860.8	325.3	825.3	
80	77661.2	77342.9	0.0	0.0	0.0	-800.0	1118.3	-800.0
TR	9817.0	11034.0	996.9	0.0	22661.1	-183.3	20630.6	
90	9526.7	8328.8	0.0	17.8	0.0	965.2	215.0	965.0
RS	3257.8	3006.6	0.0	76.1	1741.9	-575.7	2492.6	
91	869.1	938.0	0.5	2.1	0.0	-100.0	28.4	-100.0
ME	333.6	346.6	-34.8	11.5	238.7	12.0	237.0	
95	501.2	0.0	0.0	0.0	0.0	500.0	1.2	500.0
SK	-282.4	0.0	0.0	0.0	39.9	-256.5	14.0	
TOTALS	193037.4	189762.9	0.6	139.9	0.0	0.0	3133.9	0.0
	38337.5	47208.4	1886.0	747.4	62139.1	0.0	50619.9	

Table 13.19.8: Totals (MW/MVar) of zones in Serbia in SEE in winter maximum 2020, scenario when power system of UNMIK zone exports 1000 MW

X-- ZONE --X	FROM GENERATION	TO LOAD	TO BUS SHUNT	TO LINE SHUNT	FROM CHARGING	TO NET INT	LOSSES
90	7024.7	6865.0	0.0	13.5	0.0	-34.5	180.8
EMS	2593.4	2480.4	0.0	54.8	1522.5	-440.3	2021.0
901	2502.0	1463.8	0.0	4.3	0.0	999.7	34.2
UNMIK	664.4	526.2	0.0	21.3	219.4	-135.4	471.6
TOTALS	9526.7	8328.8	0.0	17.8	0.0	965.2	215.0
	3257.8	3006.6	0.0	76.1	1741.9	-575.7	2492.6

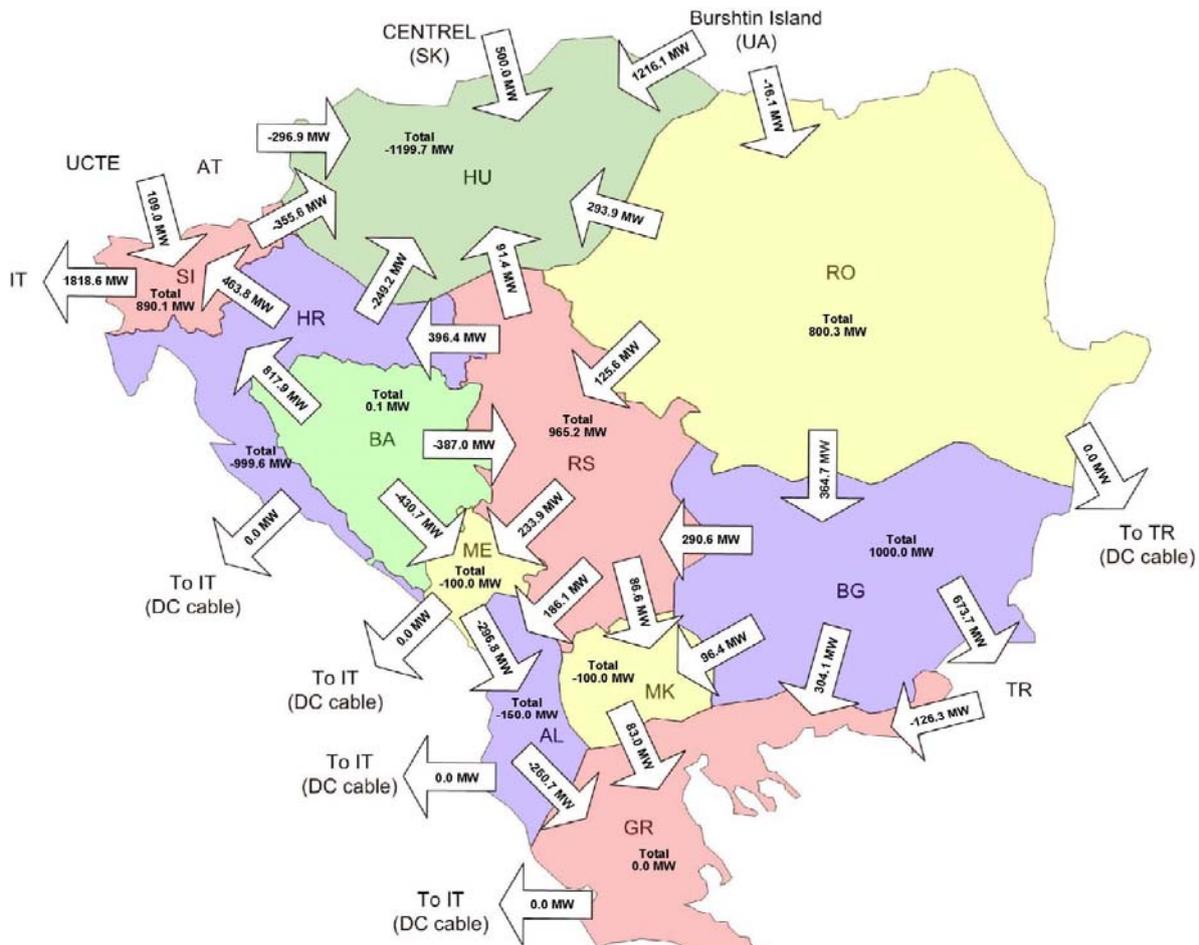


Figure 13.19.2: Aggregated border flows in area of SEE in winter maximum 2020, scenario when power system of UNMIK exports 1000 MW

Table 13.19.9: Branches loaded more than 80% of their thermal limits in monitored grid in winter maximum 2020, scenario when power system of UNMIK zone exports 1000 MW

FRMBUS,	FROMBUSEXNAME,	TOBUS,	TOBUSEXNAME,	CKT,	STS,	MW,	MVAR,	MVA,	%I		
12274,VMI	2	220.00,	12474,VMI	1	400.00,	1	1,	-539.74,	-108.84,	550.61,	82.93

Table 13.19.10: Changes in power flow greater than 250 MW in area of SEE in winter maximum 2020, scenario when power system of UNMIK zone exports 1000 MW

BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 250.0 MW:												
IN WORKING CASE						IN BASE CASE						
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW %	
	8	[XWI_GY11	400.00]	24067	[MGYOR 4	400.00]	1	-325.3	60.5	84.1	12.2	409.5 125.9
	8	[XWI_GY11	400.00]	50010	[OWIEN 1	400.00]	1	325.3	-60.5	-84.1	-12.2	-409.5 125.9
	11	[XMO_KO11	400.00]	18401	[MO-4	400.00]	1	-325.8	54.9	-74.9	37.4	250.9 77.0
	11	[XMO_KO11	400.00]	20060	[HKONJS11	400.00]	1	325.8	-54.9	74.9	-37.4	-250.9 77.0
	13	[XTR_PG11	400.00]	14405	[RP TREBINJE	400.00]	1	203.3	-97.1	-152.4	-83.4	-355.6 175.0
	13	[XTR_PG11	400.00]	36005	[OPODG211	400.00]	1	-203.3	97.1	152.4	83.4	355.6 175.0
	71	[XME_DI11	400.00]	20078	[HMELIN11	400.00]	1	-494.9	-65.7	-210.7	-110.0	284.2 57.4
	71	[XME_DI11	400.00]	31410	[LDIVAC1	400.00]	1	494.9	65.7	210.7	110.0	-284.2 57.4
	74	[XER_SM11	400.00]	20030	[HERNES11	400.00]	1	396.4	-93.0	126.3	-64.6	-270.1 68.1

74	[XER_SM11	400.00]	34045	[JSMIT21	400.00]	1	-396.4	93.0	-126.3	64.6	270.1	68.1
80	[XRE_DI11	400.00]	31410	[LDIVAC1	400.00]	1	-790.9	-178.5	-511.6	-235.9	279.3	35.3
80	[XRE_DI11	400.00]	53357	[IRDPV11	400.00]	1	790.9	178.5	511.6	235.9	-279.3	35.3
81	[XSK_KB11	400.00]	26111	[YSK 5 1	400.00]	1	169.6	11.5	-149.5	-13.1	-319.1	188.1
81	[XSK_KB11	400.00]	34072	[JUROS21	400.00]	1	-169.6	-11.5	149.5	13.1	319.1	188.1
184	[XRI_PE11	400.00]	34089	[JPEC3 1	400.00]	1	-304.8	63.0	161.1	76.0	465.8	152.8
184	[XRI_PE11	400.00]	36001	[ORIBAR11	400.00]	1	304.8	-63.0	-161.1	-76.0	-465.8	152.8
221	[XLI_CO11	400.00]	50005	[OLIENZ1	400.00]	A	-725.2	-86.0	-1009.3	-29.7	-284.1	39.2
221	[XLI_CO11	400.00]	52049	[ICRDV111	400.00]	1	725.2	86.0	1009.3	29.7	284.1	39.2
222	[XLI_CO12	400.00]	50005	[OLIENZ1	400.00]	B	-725.2	-86.0	-1009.3	-29.7	-284.1	39.2
222	[XLI_CO12	400.00]	52049	[ICRDV111	400.00]	2	725.2	86.0	1009.3	29.7	284.1	39.2
14404	[TE GACKO	400.00]	14405	[RP TREBINJE	400.00]	1	-110.0	83.7	155.3	70.5	265.3	241.2
14404	[TE GACKO	400.00]	18401	[MO-4	400.00]	1	397.7	-3.1	132.4	-1.0	-265.2	66.7
20030	[HERNES11	400.00]	20166	[HZERJA11	400.00]	1	492.5	-63.7	234.8	-88.1	-257.6	52.3
20060	[HKONJS11	400.00]	20120	[HOBROV11	400.00]	1	153.9	-28.0	-97.8	-6.7	-251.7	163.5
20078	[HMELIN11	400.00]	20120	[HOBROV11	400.00]	1	-417.4	45.2	-134.5	-6.7	282.8	67.8
24067	[MGYOR 4	400.00]	24763	[MGONYU1	400.00]	1	-746.5	-242.4	-465.3	-276.8	281.2	37.7
24094	[MMART 4	400.00]	24766	[METYEK1	400.00]	1	682.4	-59.5	432.3	-55.9	-250.1	36.6
24122	[MPAKS 4	400.00]	24148	[MSAFA 4	400.00]	1	60.2	63.9	334.7	36.1	274.5	456.0
24763	[MGONYU1	400.00]	24765	[MOROE 11	400.00]	1	38.5	329.5	320.8	308.4	282.3	733.9
24765	[MOROE 11	400.00]	24766	[METYEK1	400.00]	1	-300.7	169.8	-49.5	146.0	251.3	83.6
26064	[YSK 41	400.00]	26111	[YSK 5 1	400.00]	1	86.4	61.5	370.3	77.4	283.8	328.3
34020	[JNIS2 1	400.00]	34070	[JTKOSB1	400.00]	1	-231.8	-39.6	264.2	-39.5	496.0	214.0
34040	[JRPMLA1	400.00]	34045	[JSMIT21	400.00]	1	822.1	5.9	533.3	-23.6	-288.8	35.1
34070	[JTKOSB1	400.00]	34071	[JTKOSC1	400.00]	1	-251.8	-44.5	153.9	20.2	405.7	161.1
34070	[JTKOSB1	400.00]	34071	[JTKOSC1	400.00]	2	-251.8	-44.5	153.9	20.2	405.7	161.1
34070	[JTKOSB1	400.00]	34072	[JUROS21	400.00]	1	402.9	-9.2	102.4	-38.9	-300.6	74.6
34071	[JTKOSC1	400.00]	34089	[JPEC3 1	400.00]	1	506.2	-5.8	52.4	-44.8	-453.9	89.7
34071	[JTKOSC1	400.00]	35043	[JTKOSCG1	24.000]	1	-498.7	-60.6	0.3	1.8	499.0	100.1
34071	[JTKOSC1	400.00]	35044	[JTKOSCG2	24.000]	1	-498.7	-60.6	0.3	1.8	499.0	100.1
34071	[JTKOSC1	400.00]	35045	[JTKOSCG3	24.000]	1	-498.7	-60.6	0.3	1.8	499.0	100.1
50004	[OKAINA1	400.00]	50006	[OOBERS1	400.00]	1	203.5	20.4	-46.6	63.1	-250.1	122.9
50004	[OKAINA1	400.00]	50006	[OOBERS1	400.00]	2	203.5	20.4	-46.6	63.1	-250.1	122.9
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	1	-396.0	-30.4	-969.3	69.8	-573.2	144.7
50005	[OLIENZ1	400.00]	50008	[OTAUER1	400.00]	2	-396.0	-30.4	-969.3	69.8	-573.2	144.7
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	1	-146.6	24.7	-1023.0	92.2	-876.4	597.9
50008	[OTAUER1	400.00]	50011	[OZELL 1	400.00]	2	-146.6	24.7	-1023.0	92.2	-876.4	597.9
50009	[OWESTT1	400.00]	50024	[OWESTT2	220.00]	1	459.2	-116.9	127.1	-155.2	-332.1	72.3
50011	[OZELL 1	400.00]	50042	[OZELL 2	220.00]	1	1036.0	122.9	-398.8	4.3	-1434.8	138.5
52049	[ICRDV111	400.00]	53531	[IUDOV11	400.00]	1	-456.2	-22.6	-44.4	-162.0	411.9	90.3

Table 13.19.11: Changes in power flow through tie-lines connecting UNMIK to the rest of the system in winter maximum 2020, scenario when power system of UNMIK zone exports 1000 MW

TIE BRANCHES WITH FROM BUS END MW FLOWS DIFFERING BY MORE THAN 0.0 MW:											
IN WORKING CASE						IN BASE CASE					
X-----	FROM BUS	-----X	X-----	TO BUS	-----X	CKT	MW	MVAR	MW	MVAR	DELTA MW %
182	[XPL_BB21	220.00]	36023	[OTPLJE21	220.00]	1	7.9	-39.7	91.0	-49.8	83.1 999.9
183	[XPL_BI21	220.00]	36023	[OTPLJE21	220.00]	1	-66.1	-51.2	-14.2	-57.2	51.8 78.5
184	[XRI_PE11	400.00]	36001	[ORIBAR11	400.00]	1	304.8	-63.0	-161.1	-76.0	-465.8 152.8
326	[XPL_ZA51	110.00]	36040	[OPLJEV51	110.00]	1	-12.8	-9.2	-5.3	-11.6	7.4 58.4
34010	[JHDJE11	400.00]	85	[XPF_DJ11	400.00]	1	-9.0	63.4	-100.9	18.5	-91.9 999.9
34020	[JNIS2 1	400.00]	24	[XSO_NI11	400.00]	1	-289.6	-72.7	-373.3	-85.2	-83.8 28.9
34035	[JPANC21	400.00]	86	[XRE_PA11	400.00]	1	-116.4	-30.5	-107.7	-46.0	8.7 7.5
34045	[JSMIT21	400.00]	74	[XER_SM11	400.00]	1	397.9	-103.7	126.5	-89.6	-271.4 68.2
34045	[JSMIT21	400.00]	211	[XUG_SM11	400.00]	1	338.0	-47.3	254.2	-39.5	-83.8 24.8
34050	[JSUBO31	400.00]	79	[XSA_SU11	400.00]	1	91.6	-145.1	-111.7	-113.1	-203.2 222.0
34072	[JUROS21	400.00]	81	[XSK_KB11	400.00]	1	169.8	-4.1	-149.3	-28.6	-319.1 188.0
34073	[JGJAK31	400.00]	82	[XKA_KC11	400.00]	1	226.7	-35.3	6.5	-57.3	-220.3 97.1
34087	[JVRAN31	400.00]	208	[XST_NI11	400.00]	1	-83.0	-35.6	-35.3	-49.2	47.7 57.5
34180	[JPOZEG2	220.00]	117	[XVI_VA21	220.00]	1	50.3	-72.1	-37.5	-68.4	-87.8 174.5
34190	[JPRIZ22	220.00]	87	[XFI_PR21	220.00]	1	-40.1	-69.5	-127.2	-60.1	-87.1 217.4

Table 13.19.12: Results of contingency (n-1) analysis in winter maximum 2020, scenario when power system of UNMIK zone exports 1000 MW

<-----	MONITORED	BRANCH	----->	CONTINGENCY	RATING	FLOW	%			
10010*	AELBS22	220.00	10125	ACEKIN2	220.00	1	SINGLE 19	370.0	385.6	102.5
10009*	AELBS12	220.00	10125	ACEKIN2	220.00	1	SINGLE 22	370.0	383.7	102.2
24034*	MDUME 2	220.00	24096	MMART 21	220.00	1	SINGLE 367	426.8	555.4	124.1
24094*	MMART 4	400.00	24096	MMART 21	220.00	1	SINGLE 367	500.0	563.3	112.7
24034*	MDUME 2	220.00	24095	MMART 22	220.00	1	SINGLE 368	426.8	559.4	124.9
24094*	MMART 4	400.00	24095	MMART 22	220.00	1	SINGLE 368	500.0	567.3	113.5



24034*MDUME 2	220.00	24096	MMART 21	220.00	1	SINGLE 379	426.8	556.1	124.2
24094*MMART 4	400.00	24096	MMART 21	220.00	1	SINGLE 379	500.0	564.0	112.8
24034*MDUME 2	220.00	24095	MMART 22	220.00	1	SINGLE 380	426.8	560.1	125.1
24094*MMART 4	400.00	24095	MMART 22	220.00	1	SINGLE 380	500.0	568.0	113.6
28040*RLOTTRU2	220.00	28366	RSIBIU2	220.00	1	SINGLE 621	333.4	393.1	112.7
28040*RLOTTRU2	220.00	28100	RSIBIU21	220.00	1	SINGLE 622	333.4	393.1	112.7
28040*RLOTTRU2	220.00	28366	RSIBIU2	220.00	1	SINGLE 719	333.4	392.9	111.9
28040*RLOTTRU2	220.00	28100	RSIBIU21	220.00	1	SINGLE 720	333.4	392.9	111.9
31210*LDIVAC2	220.00	156	XPA_DI21	220.00	1	SINGLE 763	320.1	341.9	102.9
34100*JBGD172	220.00	34111	JBGD8 22	220.00	2	SINGLE 819	445.8	467.1	106.0
34100*JBGD172	220.00	34111	JBGD8 22	220.00	1	SINGLE 820	445.8	467.1	106.0

MONITORED VOLTAGE REPORT:

SYSTEM	CONTINGENCY	<----- B U S ----->	V-CONT	V-INIT	V-MAX	V-MIN	
'BG400	RANGE SINGLE 80	12473 VMI3 12	400.00	1.05118	1.03376	1.05000	0.90000
'BG220	RANGE SINGLE 134	12286 VUZUND2	220.00	0.89132	1.01192	1.10000	0.90000
'BG220	RANGE SINGLE 136	12282 VORFEJ2	220.00	1.10551	1.04700	1.10000	0.90000
'HU220	RANGE SINGLE 356	24005 MALBF 22	220.00	0.89275	1.04262	1.10000	0.90000
'HU220	RANGE SINGLE 357	24006 MALBF 21	220.00	0.89462	1.04267	1.10000	0.90000
'GR400	RANGE SINGLE 499	23126 GKPATC12	400.00	1.05046	1.02540	1.05000	0.90000
'GR400	RANGE SINGLE 499	23180 GAXELO12	400.00	1.05045	1.02577	1.05000	0.90000
'GR400	RANGE SINGLE 499	23181 GAXELO11	400.00	1.05026	1.02585	1.05000	0.90000
'RO220	RANGE SINGLE 691	28855 RMOSTI2	220.00	0.81893	1.01212	1.10000	0.90000
'RS400	RANGE SINGLE 796	34085 JSOMB31	400.00	0.85499	0.98473	1.05000	0.90000
'RS220	RANGE SINGLE 844	34200 JSABA32	220.00	0.87426	1.01559	1.10000	0.90000

CONTINGENCY LEGEND:

LABEL	EVENTS
SINGLE 19	: OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 19	: OPEN LINE FROM BUS 10009 [AELBS12 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 22	: OPEN LINE FROM BUS 10010 [AELBS22 220.00] TO BUS 10125 [ACEKIN2 220.00] CKT 1
SINGLE 80	: OPEN LINE FROM BUS 12471 [VMI3 11 400.00] TO BUS 12473 [VMI3 12 400.00] CKT 1
SINGLE 134	: OPEN LINE FROM BUS 12275 [VMI3 2 220.00] TO BUS 12286 [VUZUND2 220.00] CKT 1
SINGLE 136	: OPEN LINE FROM BUS 12280 [VALEKO2 220.00] TO BUS 12282 [VORFEJ2 220.00] CKT 1
SINGLE 356	: OPEN LINE FROM BUS 24005 [MALBF 22 220.00] TO BUS 24034 [MDUME 2 220.00] CKT 1
SINGLE 357	: OPEN LINE FROM BUS 24006 [MALBF 21 220.00] TO BUS 24034 [MDUME 2 220.00] CKT 1
SINGLE 367	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 368	: OPEN LINE FROM BUS 24034 [MDUME 2 220.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 379	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24095 [MMART 22 220.00] CKT 1
SINGLE 380	: OPEN LINE FROM BUS 24094 [MMART 4 400.00] TO BUS 24096 [MMART 21 220.00] CKT 1
SINGLE 499	: OPEN LINE FROM BUS 23123 [GKPATR11 400.00] TO BUS 23126 [GKPATC12 400.00] CKT 1
SINGLE 621	: OPEN LINE FROM BUS 28040 [RLOTTRU2 220.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 622	: OPEN LINE FROM BUS 28040 [RLOTTRU2 220.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 691	: OPEN LINE FROM BUS 28855 [RMOSTI2 220.00] TO BUS 28935 [RRAC.M2 220.00] CKT 1
SINGLE 719	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28100 [RSIBIU21 220.00] CKT 1
SINGLE 720	: OPEN LINE FROM BUS 28034 [RSIBIU1 400.00] TO BUS 28366 [RSIBIU2 220.00] CKT 1
SINGLE 796	: OPEN LINE FROM BUS 34050 [JSUBO31 400.00] TO BUS 34085 [JSOMB31 400.00] CKT 1
SINGLE 819	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 1
SINGLE 820	: OPEN LINE FROM BUS 34100 [JBGD172 220.00] TO BUS 34111 [JBGD8 22 220.00] CKT 2
SINGLE 844	: OPEN LINE FROM BUS 34170 [JOBREN2 220.00] TO BUS 34200 [JSABA32 220.00] CKT 1