

COLOMBIAN SYSTEM OPERATION



WEBINAR:

Emergency Communications in the Control Room

USEA – September 30, 2021



Agenda

- **Basic Facts**
 - **Power System Operation**
 - **Control rooms in XM**
 - **Challenges**
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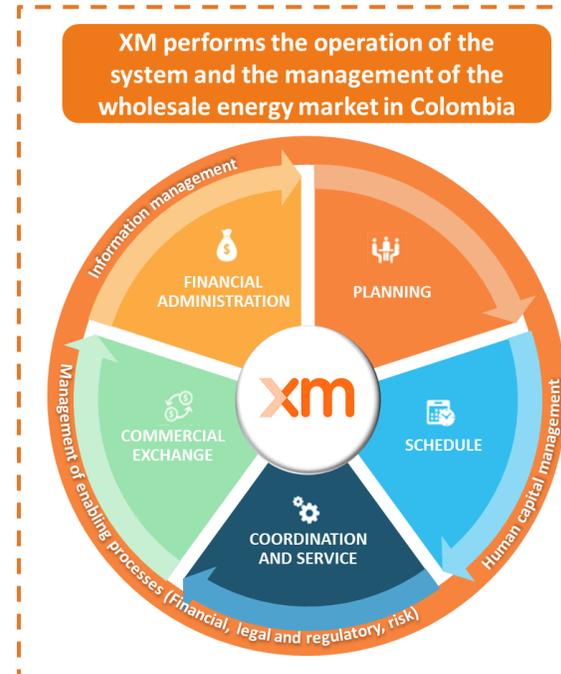


Basic Facts

Colombian Basic Facts



- **Area:** 1,141,748 Km²
- **Population:** 49,583,637 (2017-calculated)
- **Number of ISOs:** 1
- **Number of Transmission Companies:** 16
- **Number of Generation Companies:** 73
- **Number of Distribution Companies:** 36
- **Number of Retailers/Traders:** 122
- **Peak load:** 10.6 GW
- **Annual energy consumption:** 69,127 GWh

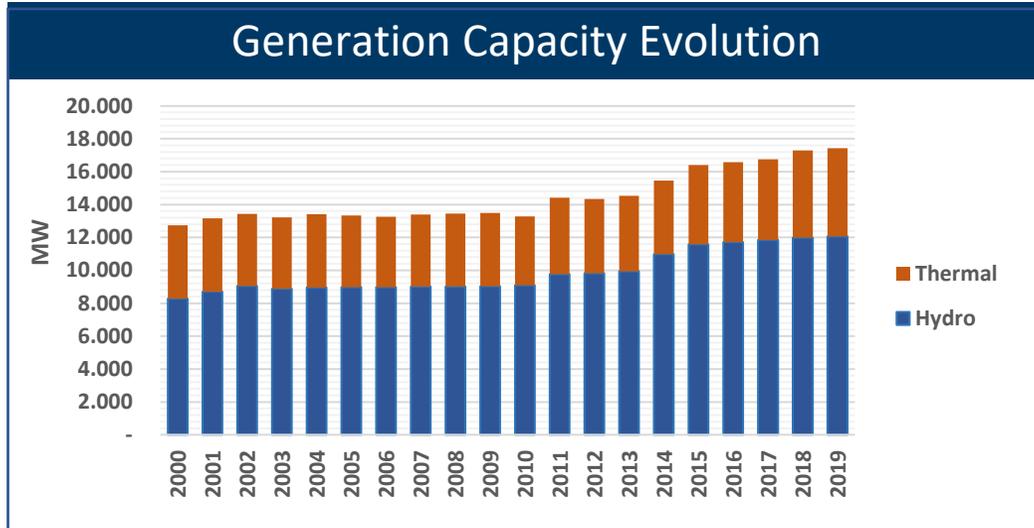




Power System Operation

Colombian Power System

Capacity & Energy



2019

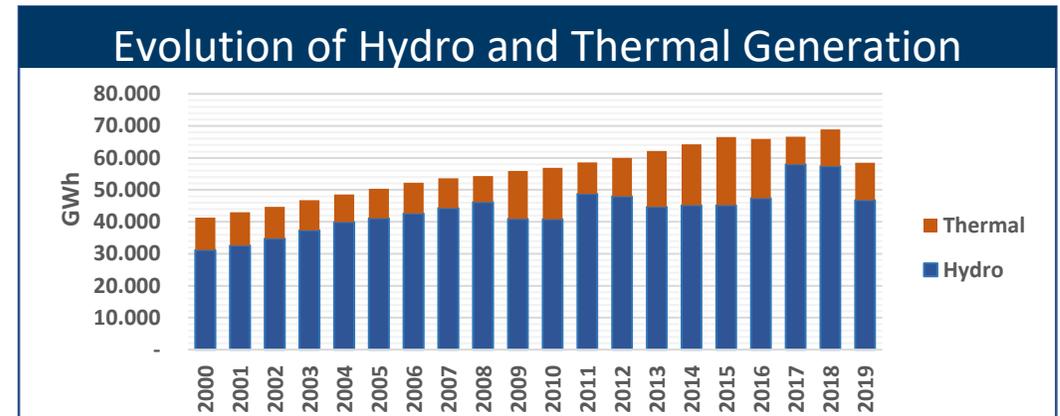
Hydro: 11.0 GW
 Thermal: 5.1 GW
 Solar: 84.8 MW
 Wind: 18.4 MW
 Other: 1,2 GW
Total: 17.5 GW



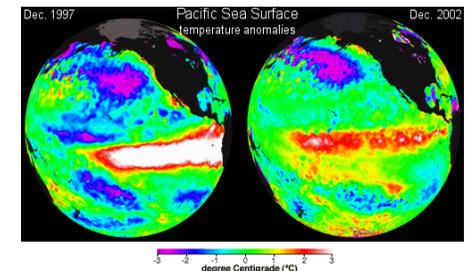
Colombia is high dependent of hydro generation, which makes Colombia's power system vulnerable to dry events

Hydro and thermal Generation

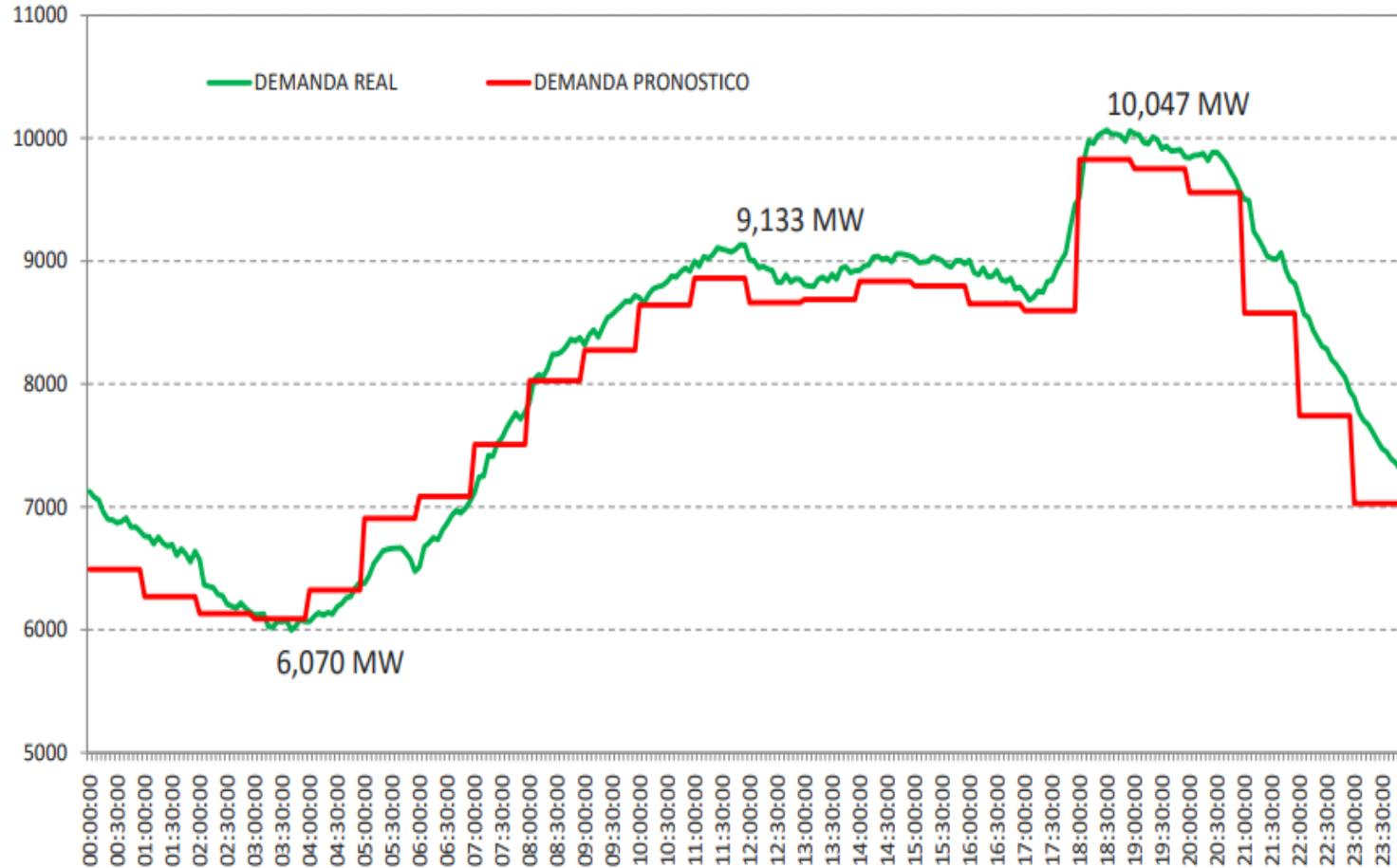
Usualy: Hydro 80% - Thermal 20%
 Dry Season: Hydro 49% - Thermal 51%



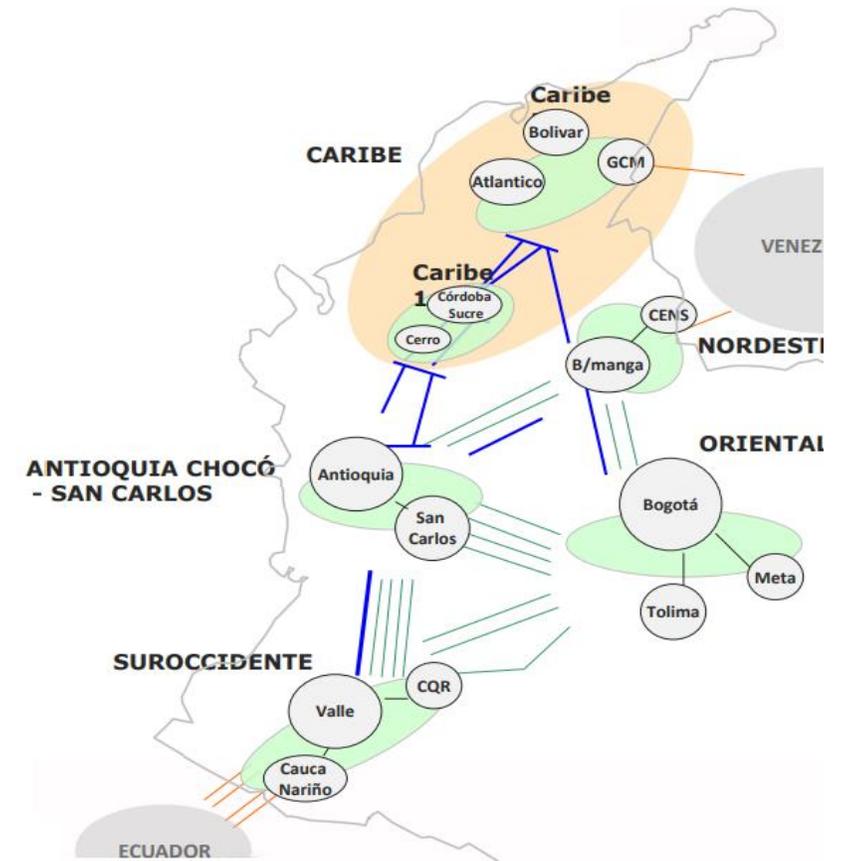
Extreme Dry events - El Niño Southern Oscillation (ENSO)



Colombian Power System



Real time changes in the demand



Transmission congestions



Control Rooms in XM

Control Rooms in XM

Control Room 1



Control Room 2



Training Rooms

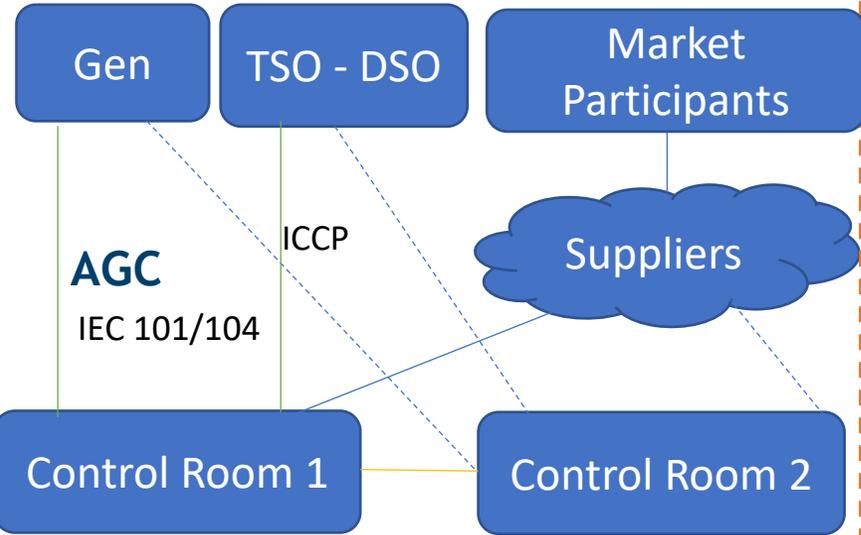


Cibersecurity Room

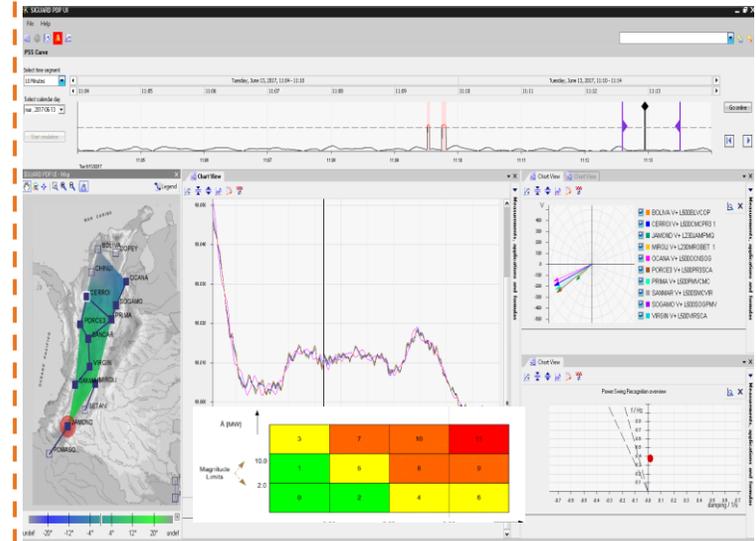
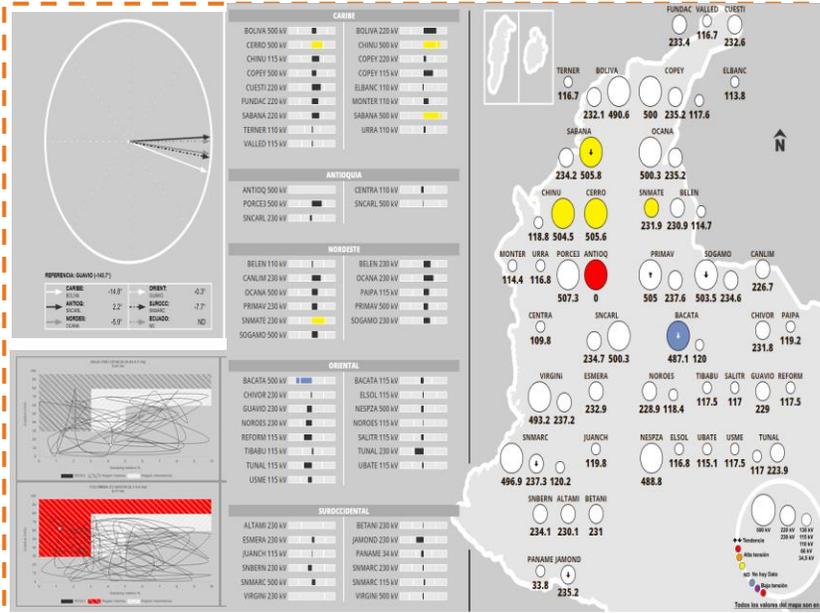


Communications

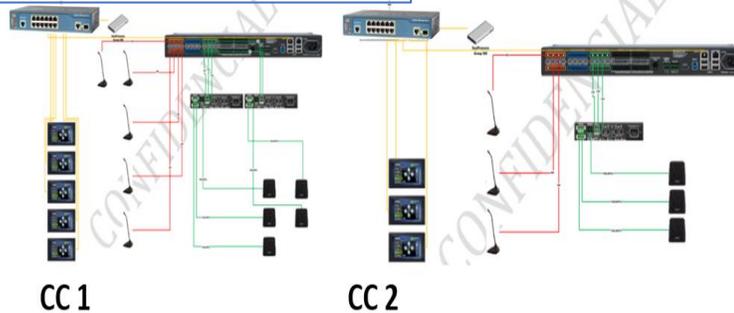
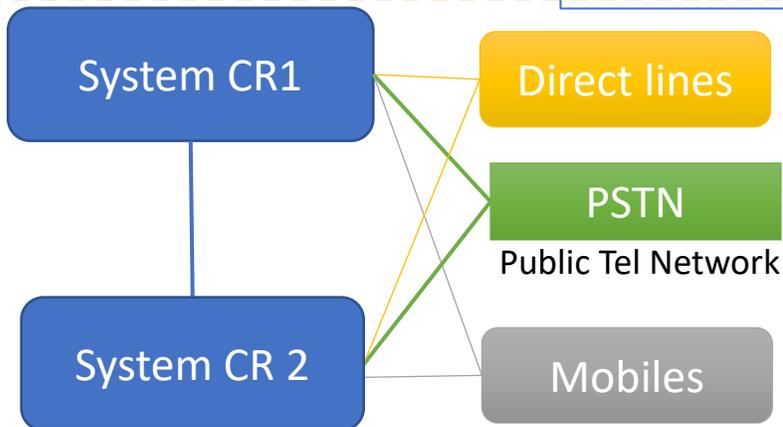
SCADA



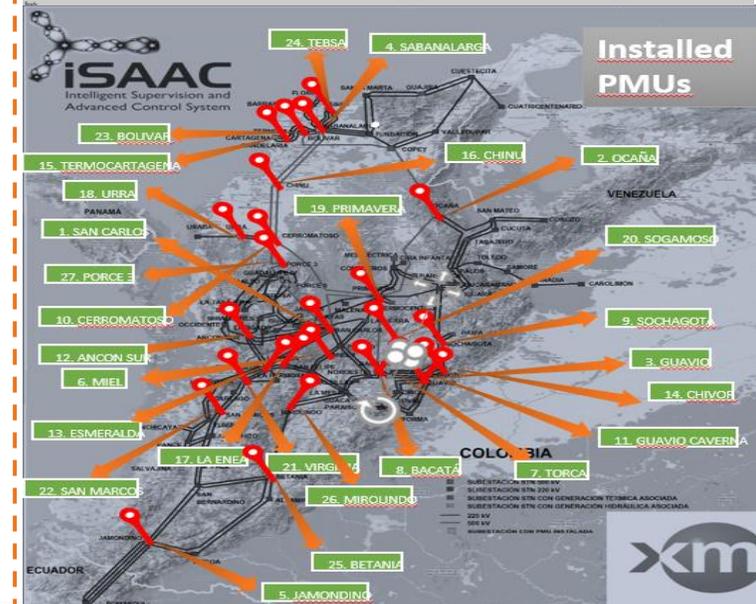
PMU and WAMS



Audio Video Communications



Remote Site Camera & Grupal and individual Audio



Challenges



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- A hand is shown holding a glowing, wireframe globe. The globe is surrounded by a network of lines and dots, suggesting a global communication or data network. The background is a dark blue gradient with a subtle grid pattern.
- ❖ **Improve audio& video communications between control centres during restoration process**
 - ❖ **Analyze options to improve reliability of communications during emergencies**
 - ❖ **Increase the remote operation and improve the supervision in the system**
 - ❖ **Improve the integration between SOC and Control Centres**
 - ❖ **High level of DER requires better communications between ISO – TSO - DSO**
 - ❖ **Incorporate new displays for control rooms with the new renewables resources**

A sunset scene with a wind farm reflected in the water. The sky is a mix of orange, yellow, and dark blue, with wispy clouds. The wind turbines are silhouetted against the bright part of the sunset. The water in the foreground is calm, reflecting the colors of the sky and the shapes of the turbines.

THANK YOU !!
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