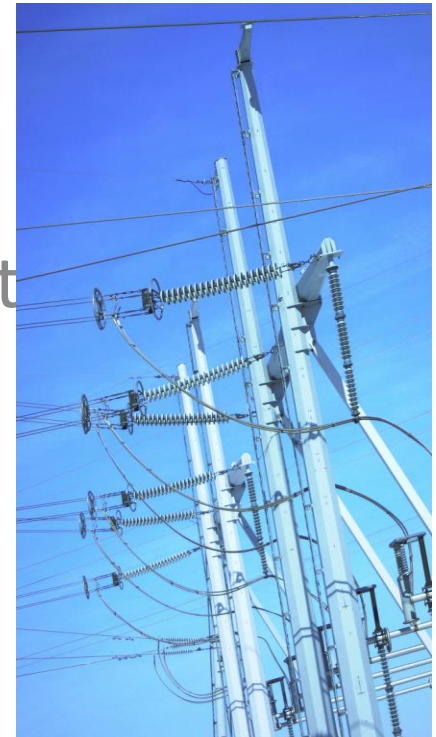
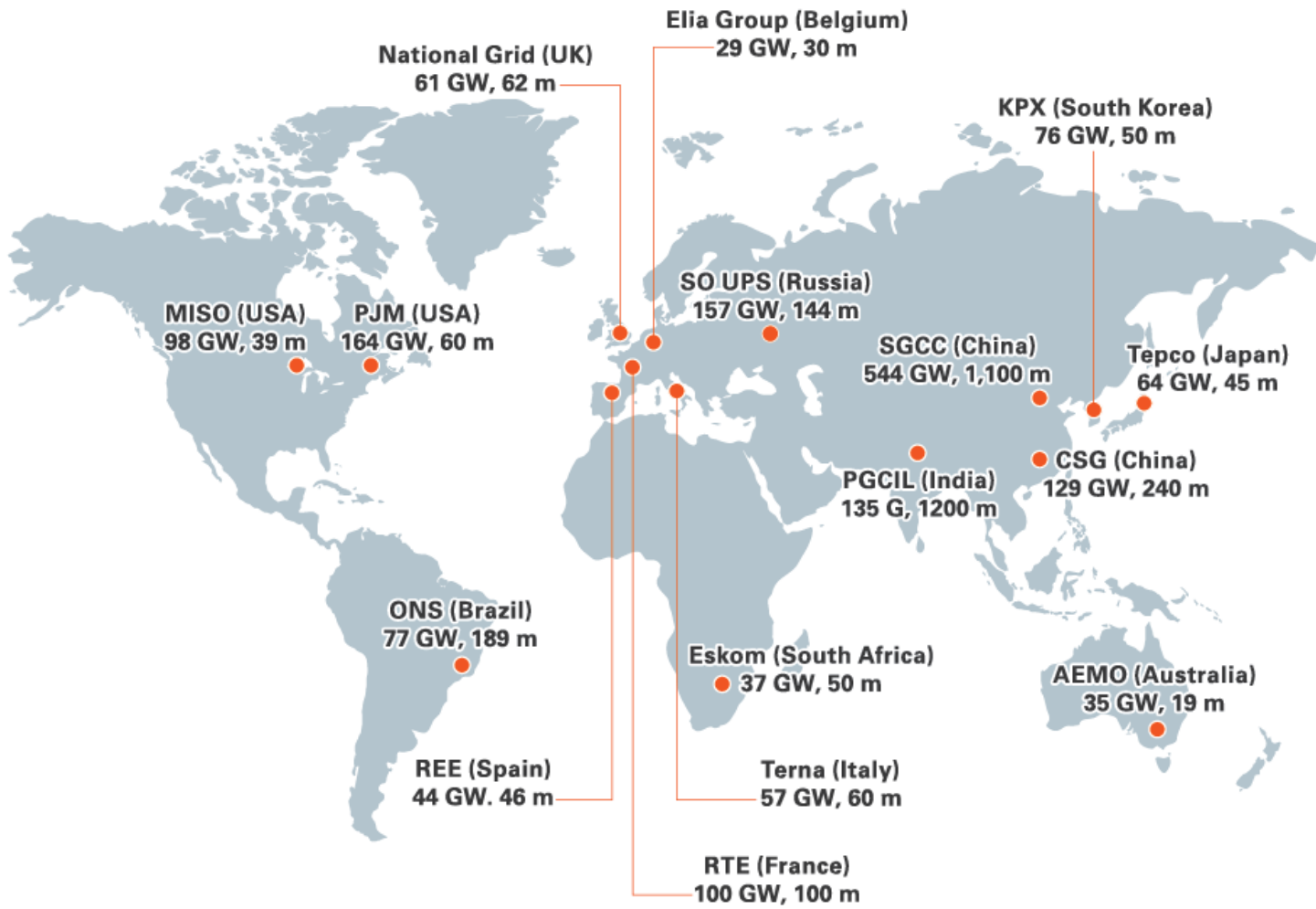


South Asia Market Development: A Global View of Key Ingredients for Success

Craig Glazer
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Information for each member refers to peak load and customers served | Source: GO15

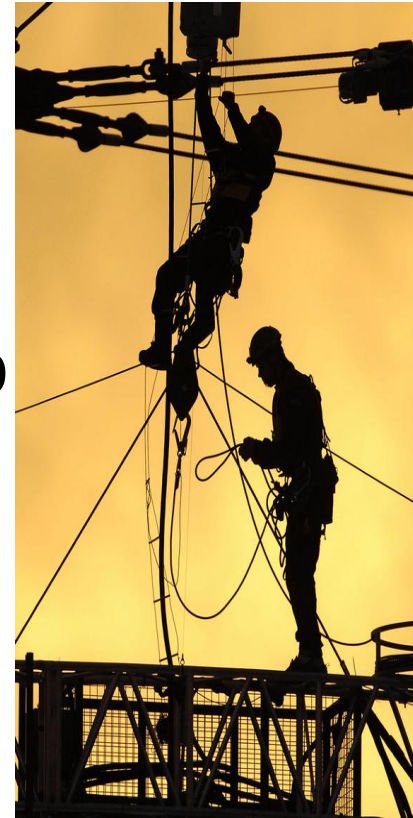
Cross Border Trading: Key Ingredients



March 2012 Report

March, 2012 Analysis: “*Evaluation of Sub-Regional Grids and Role of Energy Markets*”: US AID Sponsorship

- Tetra Tech ES and Tetra Tech India
- Technical Assistance:
 - Craig Glazer, PJM
 - Bhanu Bhushan, CERC (retired)
 - USEA
 - Discussions with grid operator, ministry, exchanges, state utilities et al.



Key Themes

Value of New Cross-Border Infrastructure

- Development of cross-border interconnections would enhance resource diversity: wind resources (Sri Lanka), hydro resources (Bhutan/Nepal), natural gas resources (Bangladesh)
- India serves as the critical “connecting grid” as well as market for power

Key Themes

Value-added from markets

- Enable fair pricing and rationalizing of price and supply across the borders
- Maximize efficient use of interconnections
- Provide price transparency to support long term contracts
- Markets are at cross-border level: Markets within national borders bound up in national equity/policy issues (e.g. agriculture subsidies)

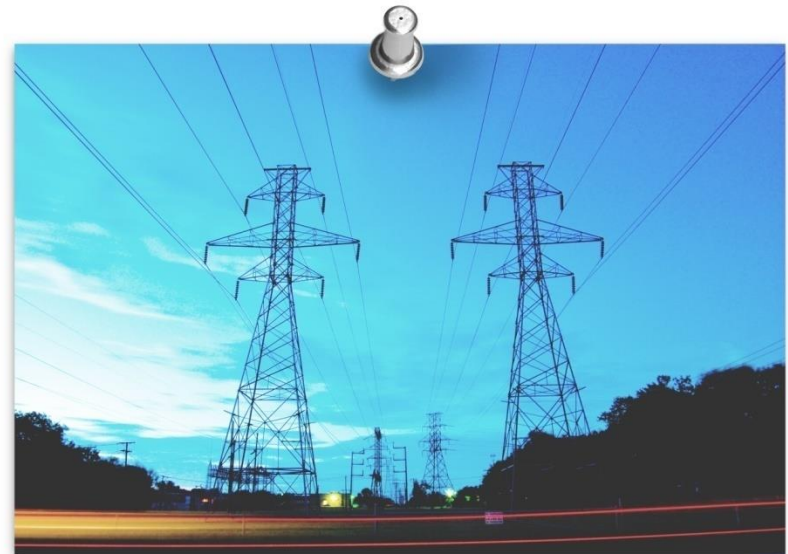
Close-In Observations

- DC ties have shown promise in cross-border applications
- Operational rules must accompany infrastructure development
- Allocation of generation and transmission rights must accompany development: financial vs. physical
- Continued support at all levels of government: Utility can't "choose" between national policy and financial viability

Key Ingredients

The Obvious

- Adequate transmission and generation infrastructure
- Long term purchase power arrangements
- Operational Protocols for cross-border facilities
- Cross-border regulatory regime



Key Ingredients

The Less Obvious

- Transmission pricing
- Access rights to transmission—physical vs. financial
- Congestion Management
- Counterparty Rules and settlement processes
- Grid Code Enforcement



Lessons Learned...

- **Jurisdictional similarities: US/India**
 - Federal/State issues
- **Helpful US Experiences**
 - Transmission rights allocation
 - Integrated dispatch
 - Institutional structures
- **Divergent Experiences**
 - Unique national issues
 - Regional institutions



Key Ingredients Summary

- Adequate Infrastructure
- Grid Code
- Transmission Pricing and Cost Allocation
- Establishment of Balancing Markets
- Handling schedules and deviations
- Emergency Procedures
- Billing and Settlements
- Dispute Resolution



Higher Level Observations

- Cross-Border Issues Create Their Own Set of Complexities
- Issues are solvable at the wholesale level without having to revamp entire retail structure
- Buy-In needed at multiple levels
- Start small and meet the achievable goals
- Build on rather than retreat from impact of game changing events—blackouts etc.

LET'S TALK...



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