

# Regional Power Sector Integration (RPSI)

## Lessons from Global Case Studies and a Literature Review | An Overview

*This report assesses the current state of regional power sector integration (RPSI) efforts around the world based on twelve Case Studies. It draws upon these experiences to develop a set of findings to help practitioners address the major challenges that can commonly impede enhanced international electricity cooperation and trade.*

### Twelve Case Studies and Literature Review

- The twelve case studies cover developing and industrialized countries in five continents and together, include participation from 96 utilities and IPPs with more than 1,200 GW in generation.
  - Greater Mekong Sub-region (GMS)
  - Southern Africa Power Pool (SAPP)
  - Argentina-Brazil
  - South East Europe (SEE)
  - SIEPAC (Central America)
  - Gulf Cooperation Council (GCC)
  - Nile Basin Initiative (NBI)
  - Cahora Bassa
  - Manantali
  - Nam Theun 2
  - PJM Interconnection
  - Continental Europe (UCTE/ENTSO-E)
- The Literature Review covers more than 70 academic and other papers, and summarizes their analysis along major themes with suggestions for further investigation.
- All Case Studies and a Literature Review are included in full in the attached CD-ROM.

### Current State of RPSI Worldwide

- RPSI continues to draw great interest from developing countries.
- Recently, the financial crisis, as well as political and other challenges, have slowed development of several RPSI schemes. This has led to some frustration about RPSI when progress has not matched expectations.
- Despite these ongoing challenges, no RPSI schemes have been abandoned or reversed, and a number of regions are now starting major new initiatives to link their countries' power sectors even further.
- Perseverance is needed to overcome the often non-linear advancement of RPSI to realize the benefits.

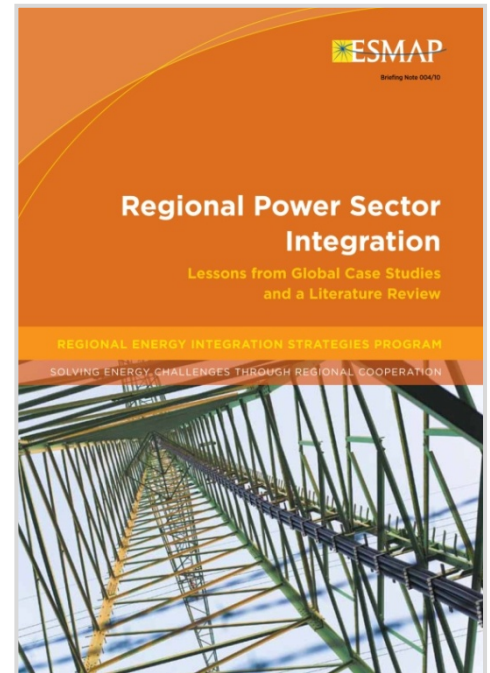
### Findings on Common Challenges for RPSI Schemes

#### THE PROPER LEVEL OF INTEGRATION

- There are many types and levels of RPSI, ranging from simple cross-border trade between fully integrated utilities to fully unified multinational power markets.
- A fully integrated regional power market offers the greatest benefits from RPSI. However, few regions have achieved this and it takes many decades to develop.
- Less extensive integration between countries can still yield substantial benefits and may serve as a helpful intermediate and even ultimate stage of RPSI for some regions.

#### OPTIMIZING REGIONAL INVESTMENTS

- Optimizing generation and transmission investment on a regional basis can substantially reduce costs.
- However, doing so is often undermined by national energy security and sovereignty concerns, and economic nationalism.
- Acknowledging these factors, and developing mechanisms to address them and share benefits across countries, can help realize regionally planned investment.
- With the exception of PJM in the United States, none of the regions studied has mandatory regional planning/investments.



#### APPROPRIATE REGIONAL INSTITUTIONS

- Well-functioning regional institutions are necessary for successful RPSI but due to widely different local circumstances there is no single structure appropriate for all regions.
- The strongest institutions are formed organically from local initiatives rather than imposed from outside.
- Special purpose vehicles have been successful for stand-alone regional projects.

#### TECHNICAL AND REGULATORY HARMONIZATION

- A minimum level of technical harmonization is needed for any type of RPSI.
- Regulatory harmonization is not a requirement for initial stages of RPSI but is increasingly necessary as cross-border competitive power trade develops.
- Achieving this regulatory harmonization requires consistent approaches by national regulators. While a true regional regulator has not been created anywhere, a common regulatory framework can be achieved.

#### POWER SECTOR REFORM

- Although competitive power markets are not a prerequisite to initial RPSI, they can very effectively complement and facilitate RPSI at later stages.
- Deeper levels of integration require participating national power markets to be at similar stages of reform so that undue RPSI benefits do not fall to remaining monopolies.
- Competitive reform can also sometimes impede trade if incumbent utilities protect their territory from imports, or developers cannot obtain financing without long-term contracts.

#### ROLE OF DONOR AGENCIES

- Donors can play an important role in developing RPSI, but must avoid imposing an overly ambitious agenda that creates unrealistic expectations or rushes development beyond the pace determined by participants.

#### CARBON EMISSION SAVINGS FROM RPSI

- Excepting increased generation from hydropower, carbon savings from RPSI have been modest.
- Several RPSI schemes are pursuing CDM to monetize carbon reductions, but none has yet obtained CDM certification.

#### RPSI AND RENEWABLES

- Enhanced RPSI can enable increased renewable energy penetration, already demonstrated repeatedly with hydropower.
- However, RPSI has not yet been shown to enable non-hydro RE at low penetration levels.
- Lessons on managing cross-border renewable power flows must be shared as more experience is gained in this area.

The Energy Sector Management Assistance Program (ESMAP) is a global knowledge and technical assistance program administered by the World Bank and assists low- and middle-income countries to acquire know-how and increase institutional capability to secure clean, reliable, and affordable energy services for sustainable economic development.

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