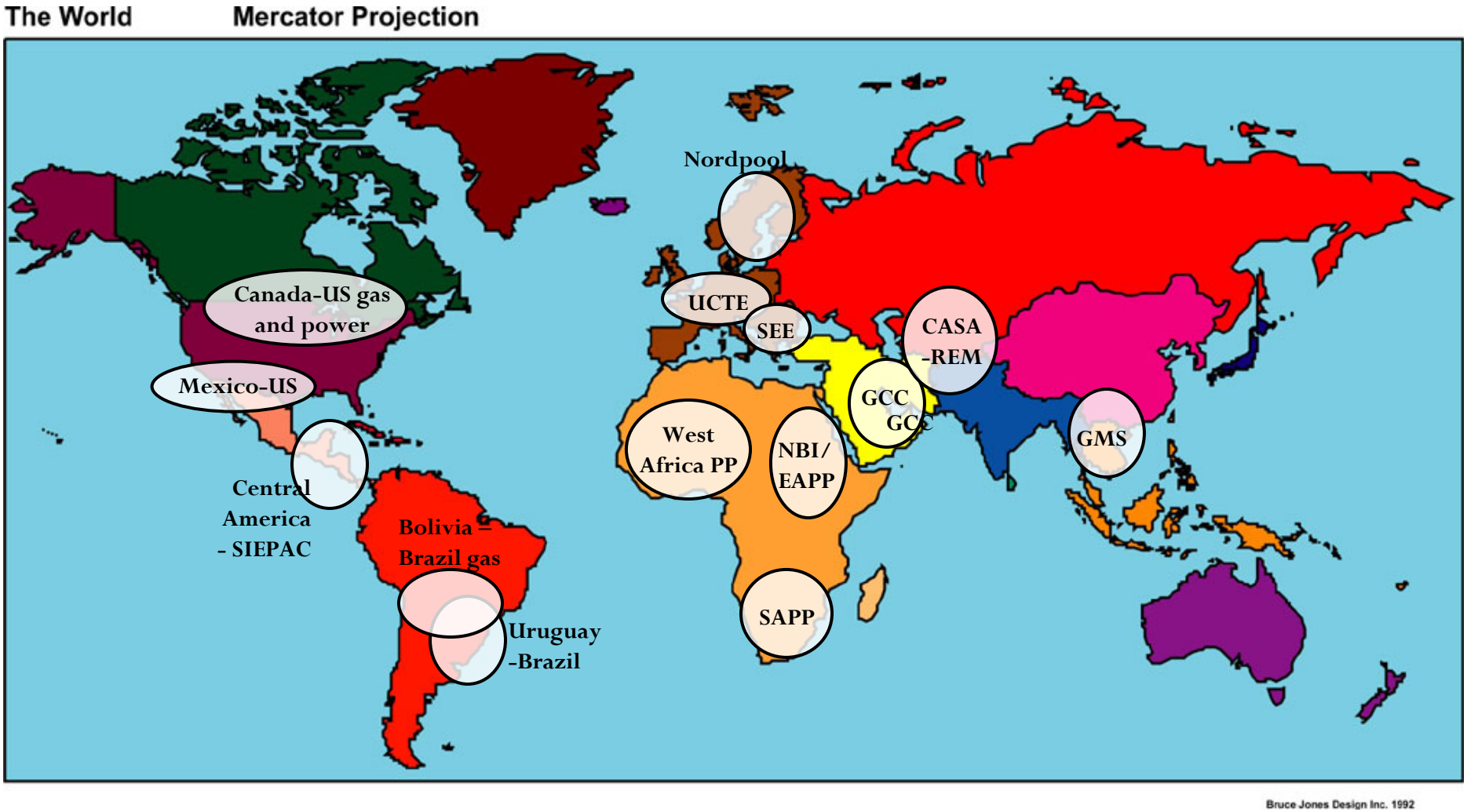
CENTRAL ASIA REGIONAL ECONOMIC COOPERATION
Energy Sector Coordinating Committee

Regional Power Integration
Experience from other Jurisdictions

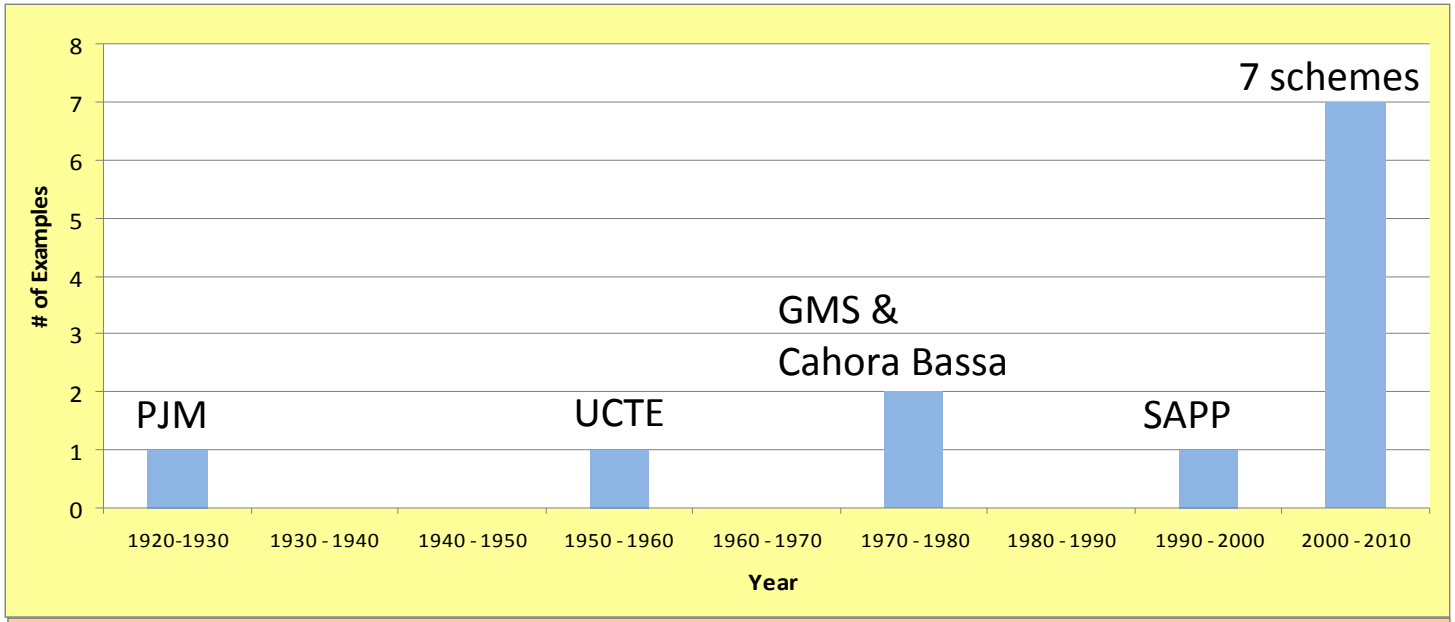
Meeting 25-26 March 2010

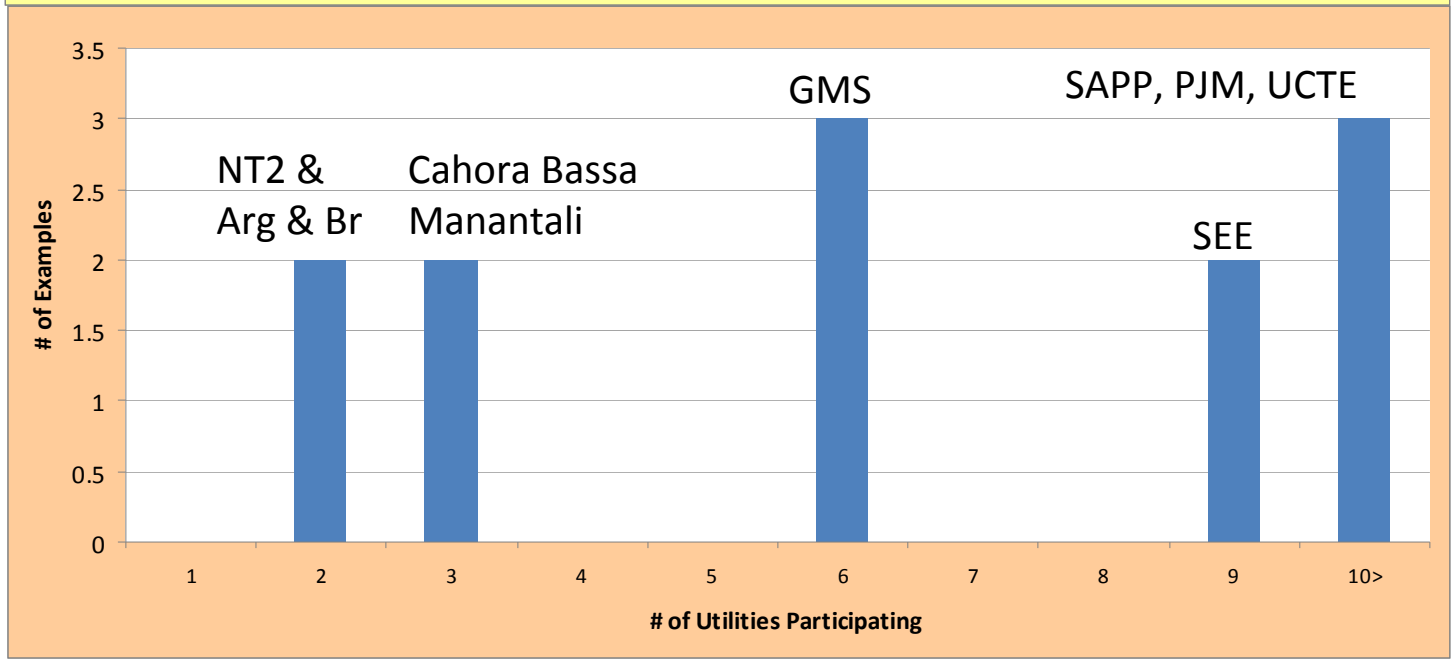
Almaty, Kazakhstan

Regional Integration (RI) is being increasingly pursued



Number of schemes per decade and per number of utilities





Numerous benefits are expected from Regional integration … (1)

- Enhanced energy security
- Export potential from natural resources
- Optimized use of infrastructure and more efficient dispatch of power plants
- Investment catalyst for generation and transmission
- Supply mix diversification
- Enhance reliability at lower cost, by sharing reserves and providing backup energy during emergencies
- Economies of scale and share benefits of hydro resource potential or build generating plants serving multiple markets

Numerous benefits are expected from Regional integration …(2)

- Better framework to implement market competition, leading to lower electricity supply costs
- Facilitation of the development of regional scale energy companies that are world class and can compete with

…and new incentive: addresses key barriers to renewable energy deployment … (CTF initiative in MENA Region)

The potential of Regional Power Sector Integration has not been fully realized (especially in developing countries)

- Underlying economics extremely strong, yet RPSI achievements have been modest
- RPSI has proved difficult to achieve fundamentally because of lack of political will:
  - Countries have strong risk perceptions about regional schemes, gravitating towards autarchy
  - Regional institutions are not given the mandate to enforce cost-saving regional solutions
- Hopes that the power sector would drive a broad regional integration agenda amongst developing countries have not materialised
  - Instead RPSI has not infrequently been a follower rather than a leader

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Where to now?

- Challenge going-forward is to identify specific approaches and interventions that would help build and/or sustain momentum for RPSI
  - Major lessons are that there is no linear progression and no ‘one size fits all’ solution
  - RPSI schemes go through cycles of development and have different needs at different times
  - Approach thus must be to offer a range of options grounded in theory and experience

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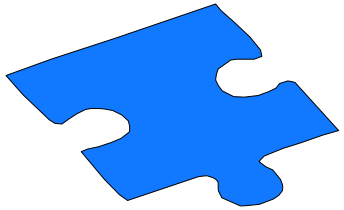
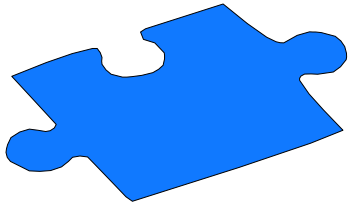
Power Trade frameworks: All Has to Fit Together

Legislation & Protocols on Trade



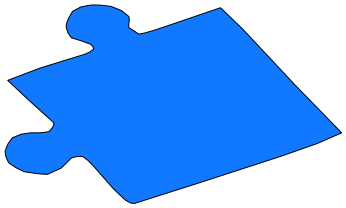
Regulation



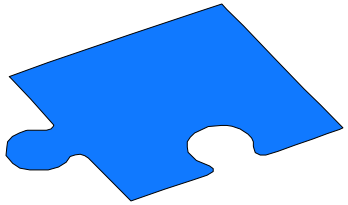
Institutional Arrangements

Infrastructure

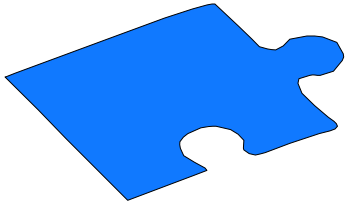
Generation



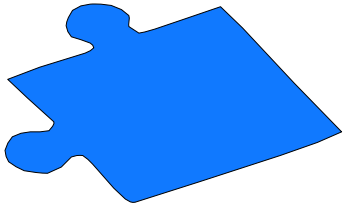
Commercial Rules



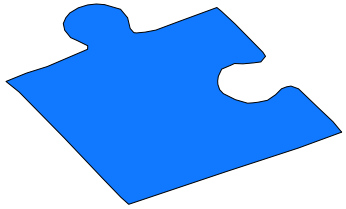
Bilateral Contracts



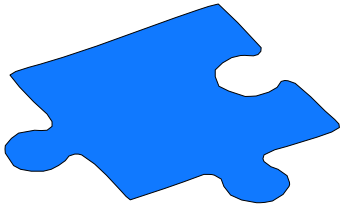
Transmission



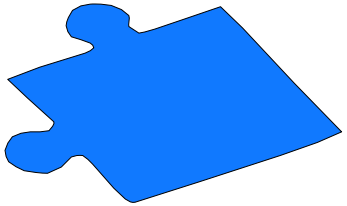
Technical Rules (Grid Code)



Transmission tariff



System Operations



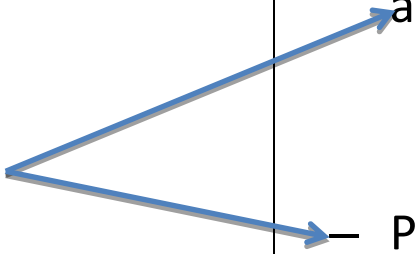
The Need for Regional Institutions

- Power Trade Regional Institutions enable parties and power trade to achieve the full potential that cannot be achieved by two parties or two countries on their own
  - Bilateral agreements can only impose conditions on the two parties, and will not apply to the other countries and entities in the region
- Capturing the benefits for all consumers and investors in the region will require more interaction within the region than can be achieved by bilateral exchanges between national institutions and utilities

Regional institutions

- SPVs obvious solution for standalones
  - *Generation*: Cahara Bassa, Manantali, NT2
  - *Transmission:* Garabi (Argentina-Brazil)
- In transmission and trade, a variety of institutional forms
  - Strong regional economic communities with power as a sub-component
    - **SEE** most extreme variant
    - SAPP, NBI, GCC
  - Power integration taking the lead
    - **SIEPAC** – Central American Electrification Council (1979), pre-cursor to PPP (2001) and Mesoamerican Project (2008)
  - Looser regional arrangement
    - GMS Economic Cooperation Program
    - Members also belong to ASEAN Mekong Basin Development Cooperation (AMBDC)

Two interesting examples



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Central America Regional Power Market and SIEPAC Transmission Project

Central America – SIEPAC Assessment of Regional Institutions

- Mandates, powers and functions set out in Treaty and Protocols are clear and reflect the design of the final market – the institutions were mobilised early and have acted "in shadow form" pending completion of the new regional transmission line, completion of market rules and opening of the final market stage in 2010 (a simpler transitional market in operation until then)
- Good quality and timely decision-making achieved, although there were delays as the process and market design was complex. An excellent Project Executive prepared decisions well and the regional regulator took the final decisions on market rules advised by an Expert Panel
- The regional regulator consists of one commissioner / regulator from each of the six countries. Their part-time participation and lack of financial resources have been difficult for this key institution, given its central role in decision-making
- Stakeholders had ample opportunity to comment on studies and draft rules and protocols. Consensus – building was assisted by the Project Executive and the Expert Panel
- National governments maintained support through a high level steering committee that met regularly with the institutions and the stakeholders

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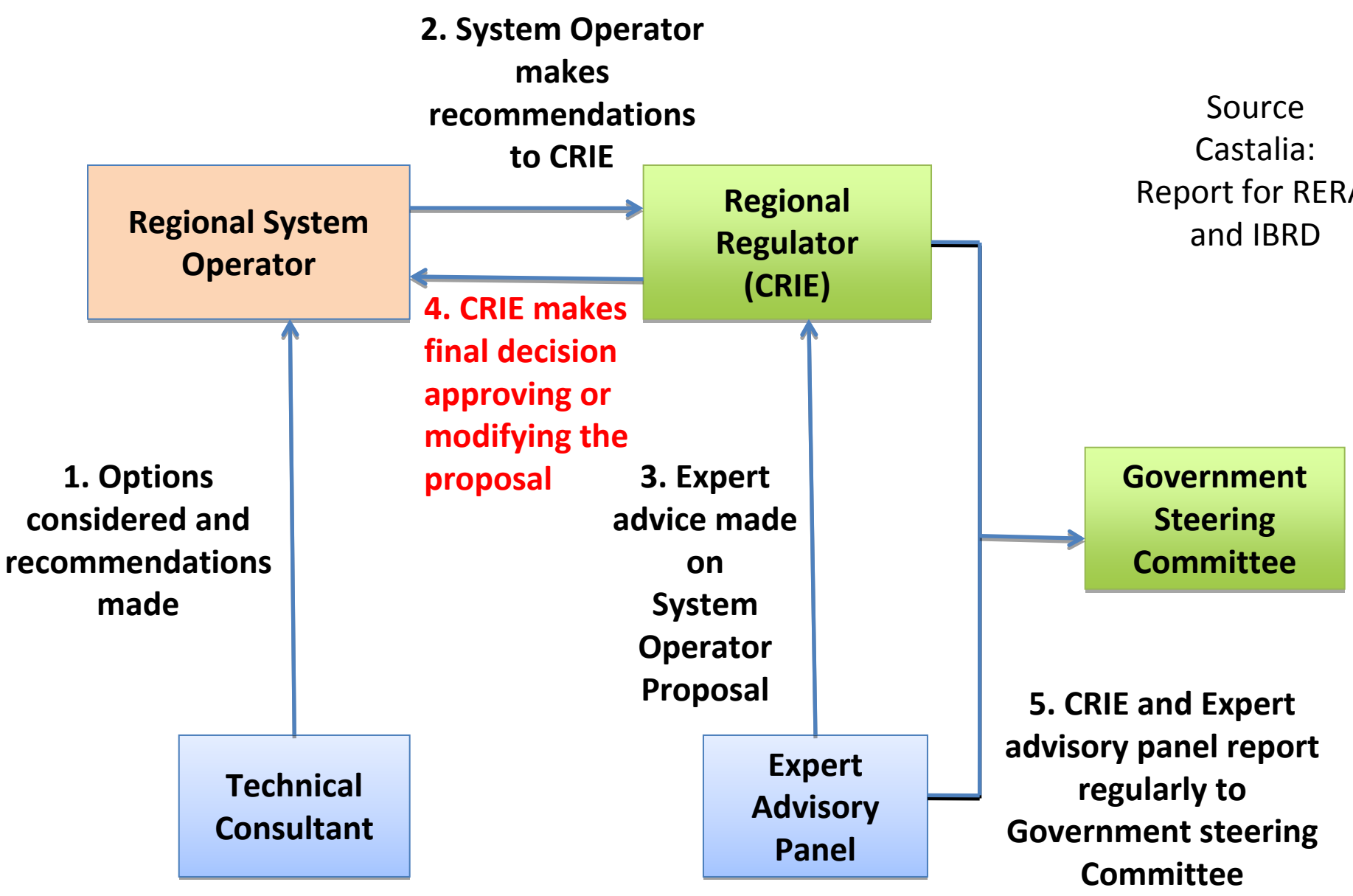

Central America: Good example of decision making process

South East Europe (SEE)

South East Europe (SEE) Assessment of Regional Institutions

- SEE Treaty has clear institutional design for a multi-party market that ultimately will be integrated with the rest of Europe – Council of Ministers has very strong powers and delegates to other institutions - there is a strong Secretariat
- There is a great deal of willingness to achieve good governance (greatly facilitated by the Secretariat) but there will be at least three layers of regional regulation because it falls within the EU - this may create confusion as to who regulates what – the national Transmission System Operators (TSOs) work well together through their own regional organisation, the SETSO
- Well resourced thanks to donor funding, but there is a need for additional capacity building in the institutions and amongst participants
- The Athens Forum and working groups provide opportunities for stakeholder participation, consensus-building and input
- A strong Treaty motivated by the desire for EU accession and the need to attract investment in infrastructure sustains government support

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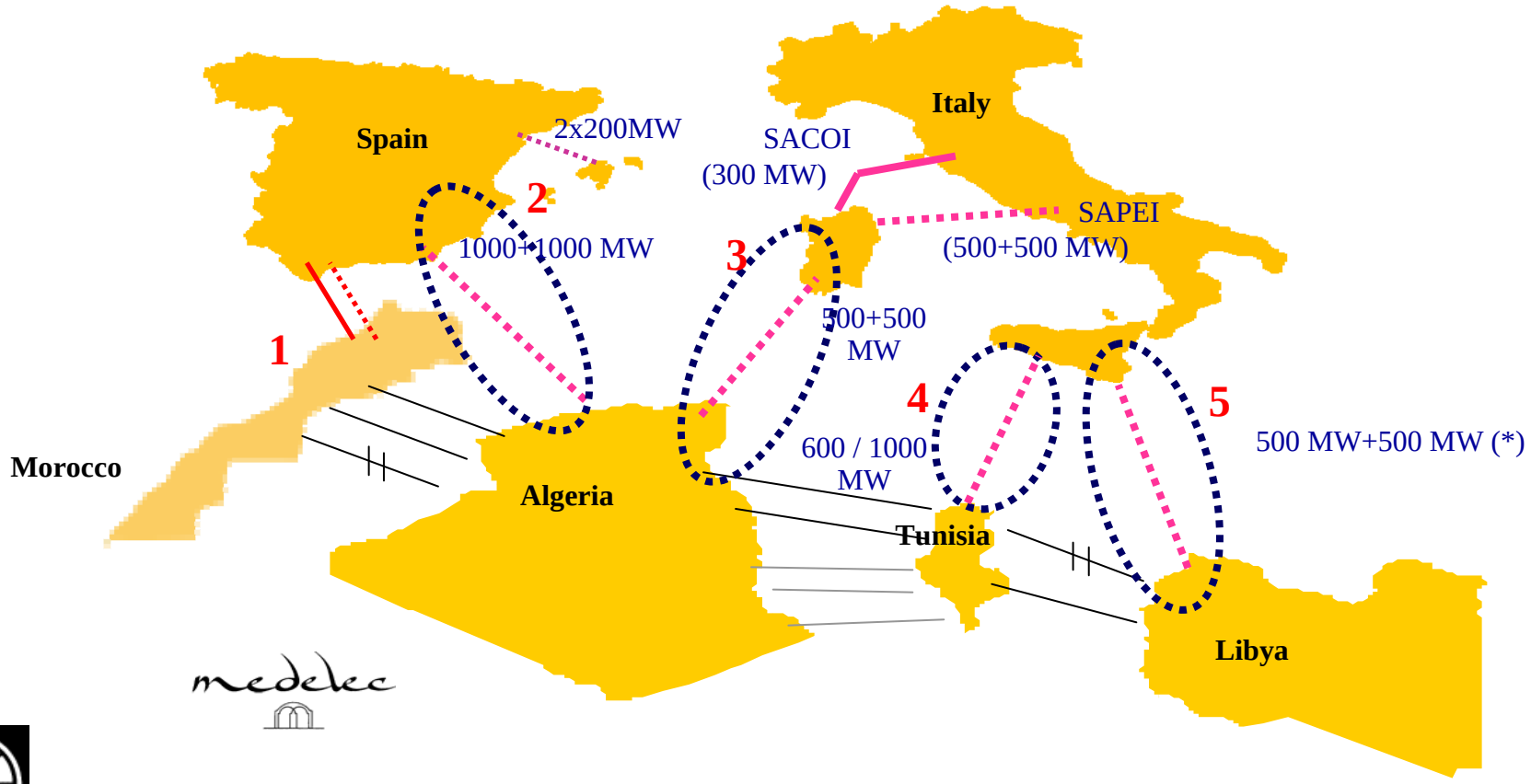
In the works: Regional Power Markets to develop RE:

Interconnections between MENA and Europe could complement Medring to facilitate green electricity exports

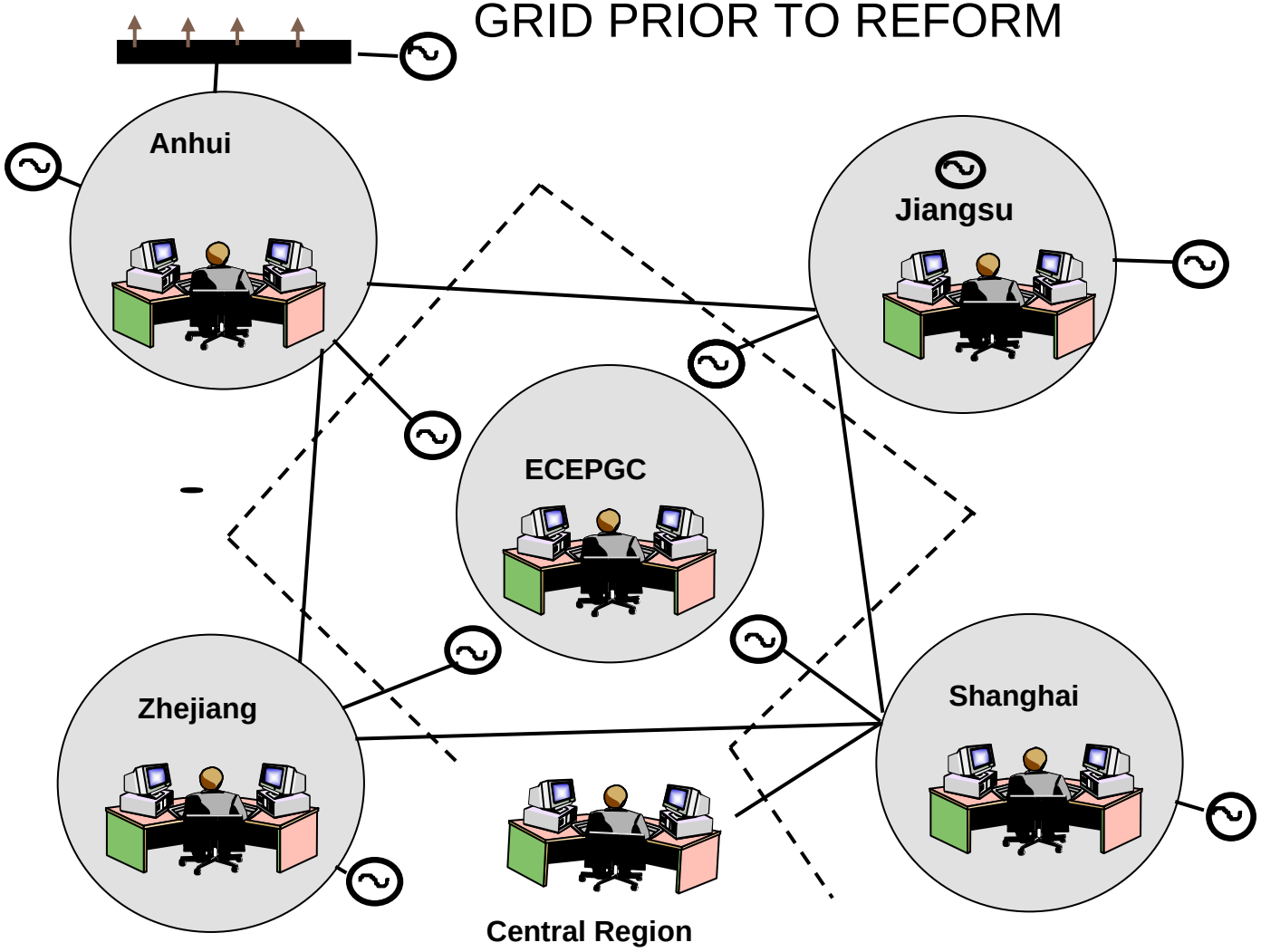


(*) Possible triterminal through Malta

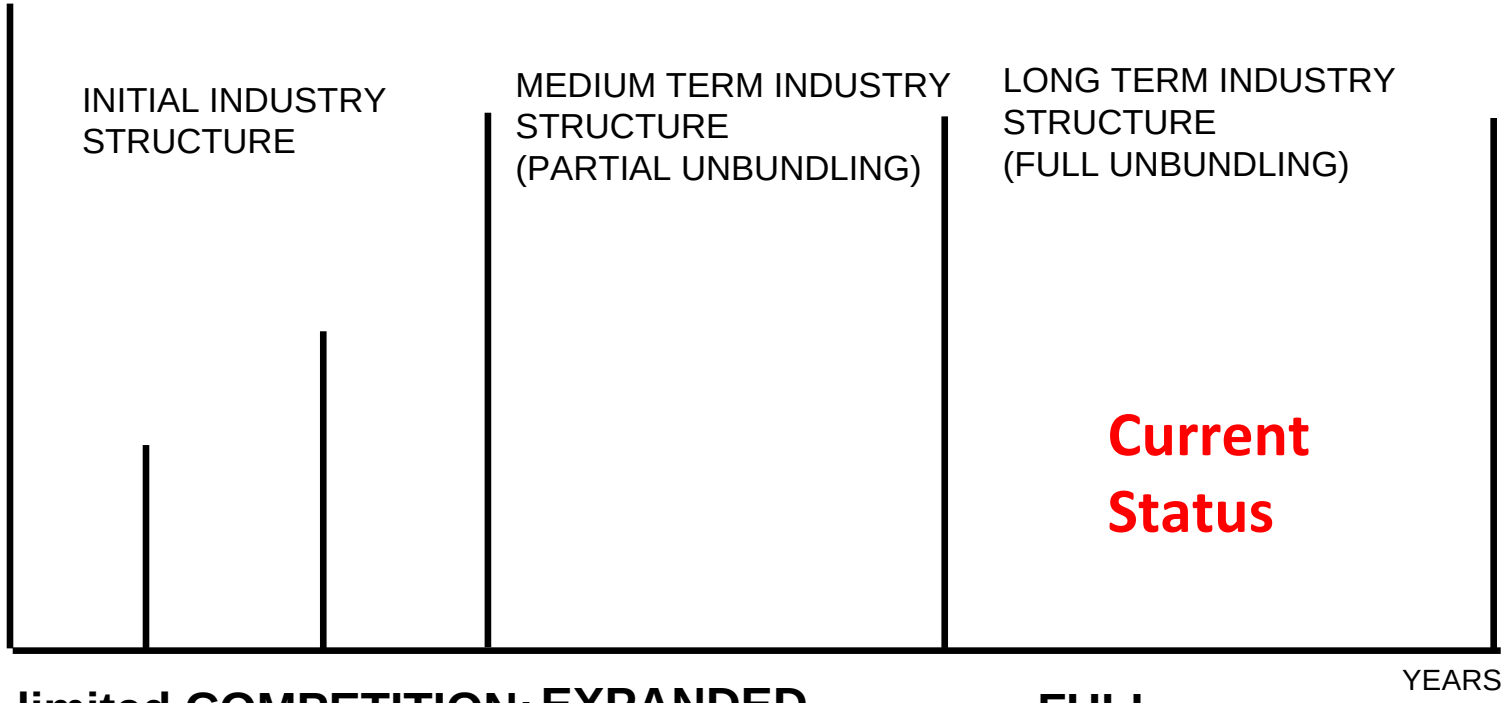
A Complete Illustrative Case: East China Regional Market

ECEPGC Market Design Team

ILLUSTRATION OF EAST CHINA REGIONAL GRID PRIOR TO REFORM



SIMPLIFIED EVOLUTION OF MARKET

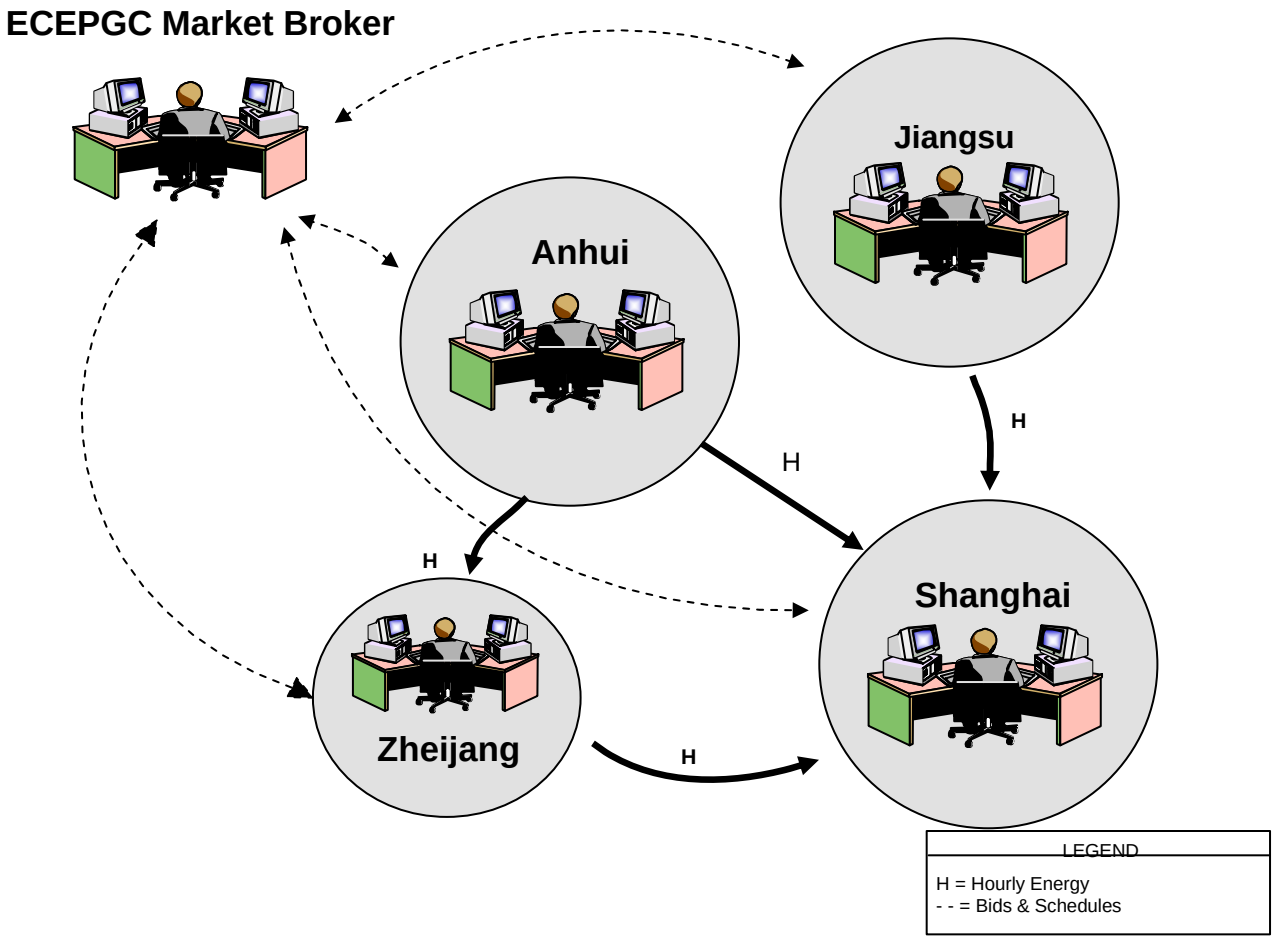


limited COMPETITION; PRICE BASED MARKET; ENERGY BROKER

EXPANDED COMPETITION; PRICE BASED MARKET; ENERGY BROKER

FULL COMPETITION; CENTRALIZED COMPETITIVE SPOT MARKET

INITIAL PHASE: East China Hourly Energy Broker



Broker and Bilateral
Price (Not Cost) based Spot market

- OPTION FOR PROVINCES TO NEGOTIATE SPOT TRADES DIRECTLY WITH EACH OTHER AND QUOTE TO ENERGY BROKER
- NOT NECESSARY TO CONVERT EXISTING GENERATION CONTRACTS TO TWO-PART
- NO INDUSTRY RESTRUCTURE REQUIRED
- POTENTIAL FOR CONFUSION AND INEFFICIENCIES: BUYER MAY CONTACT ALL OTHER PARTIES AND ENERGY BROKER
- ENERGY BROKER WOULD COMPETE WITH BILATERAL MARKET FOR SPOT TRADING
- ALL TRANSACTIONS MUST BE APPROVED BY ECEPGC FOR RELIABILITY

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The approach worked well as a transition to a competitive market!

- DEVELOPED IN THE LATE 1090S, THE BROKER MANAGED TO INCREASE POWER EXCHANGES AMONG THE EAST CHINA PROVINCIAL GRID...
- IN 2002, THE CHINESE GOVERNMENT DECIDED TO DEVELOP REGIONAL COMPETITIVE POWER MARKETS... EAST CHINA WAS ONE OF THE TWO PILOTS
- THE EAST CHINA POWER MARKET (THE SO CALLED COMPETITION IN GENERATION WITH SINGLE BUYER... THE SO CALLED CHINESE MODEL) IS CURRENTLY OPERATIONAL
- THE GOVERNMENT IS CONSIDERING TO INCREASE ACCESS OF LARGE CONSUMERS TO GENERATORS DURING THE 12TH FIVE YEAR PLAN (2011-2015)

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