# Regional Markets Evolution International Experience



**ESMAP** 







- Definitions
- Evolution of Central American Market
- Evolution of EU Market
- Roadmap for Electricity Market Evolution International Experience



### **Market Integration**

Market integration is the process of progressively harmonizing the rules of two or more subregional/national markets with special emphasis on <u>harmonization of all cross-border market rules</u> so that electricity can flow freely <u>in response to price signals and market conditions</u>.



## **Spatial Dimension of Markets**

#### Single price

offers-bids are accepted regardless of the location and physical possibility to deliver the energy. The System Operator corrects the "dispatch" to relieve congestion.

#### Zonal pricing

the region is split into zones, each one becomes a single price zones (SPZ). Congestion is only considered between SPZ. Zones are defined so as to get low internal congestions and leave structural congestions between zones.

Nodal pricing

transmission constraints are taken into consideration during the clearing process. Nodal prices (LMP) reflect the costs to consume energy in each node taking into consideration transmission constraints and (in some cases) losses.

WORLD BANK GROUP



#### MER (Central American Market)

MER = El Mercado Eléctrico Regional







# The Central American Market (MER)

The key to the development of the regional market was the SIEPAC Project, a 220kV transmission system connecting the 6 countries



#### Six participating countries

- Guatemala
- El Salvador
- Honduras
- Nicaragua
- Costa Rica
- Panamá

Guatemala is also connected to Mexico

- Regional Resources
- •Hydro
- •Geothermal
- •RES
- •No oil-gas-coal reserves







# **MER Countries Sectoral Organization**

Current Status			
	Reforms	Wholesale Market	
Costa Rica	No	No	The six countries participate in the regional market, despite their different institutional settings and market structure
El Salvador	Yes	Yes	
Guatemala	Yes	Yes	
Honduras	Partial	No	
Nicaragua	Yes	Yes	
Panama	Yes	Yes	

One of the main successes of this regional market has been to allow countries with very different organizations of their electricity sectors, to work together with minor required legal/regulatory harmonization



# **MER Institutional Organization**

- Agents (Market participants) of the six countries are allowed to participate to the MER
- Regional institutions
  - CRIE\* (Regulator)
  - EOR\*\* (System and Market Operator SO&MO)
- Countries can preserve local regulations, with the changes necessary for compatibility with regional codes.
- Regional firm contracts (firm bilateral contracts with firm transmission rights) are the basis for trading and expansion
- Spot market (DAM) for short term optimization and balancing
- \* CRIE = Comisión Regional de Interconexión Eléctrica
- \*\* EOR = Ente Operador Regional

#### EU (European Union Common Electricity Market)



## **From National to Regional Markets**

- Historically, the European grid has been developed mainly to serve national markets, mainly focused on serving security and stability purposes
- Therefore, EU regional market evolution required:
  - Harmonisation of rules
  - Efficient management of existing capacity
  - Expansion of cross-border capacity



### The Development of Power Exchanges in Europe

- Very different institutional roles:
  - Envisaged in sector/reform legislation (Spain, Italy, Slovenia, ...)
  - Spontaneous initiatives (Germany, the Netherlands, France, ...)
- Very different ownership and governance
  - Owned by TSOs (Nordic countries, Italy, the Netherlands, ...)
  - Privately owned (Germany, France, ...)
- The potential benefits from further integration, finally led to market coupling, common institutions (ACER, ENTSOE) and common network codes



### **EU Market Evolution – Power Exchanges**







ARAB FUND FOR ECONOMI

12

### Market Coupling in Europe in 2021



- 98,6% of EU consumption is coupled
- 1.530 TWh / year coupled in one market solution
- 200 M€ average daily value of matched trades

#### The EU Internal Market for Electricity Roadmap to market integration

Day-ahead market coupling in 2014 (Price Coupling of Regions - PCR)

Harmonization of the intra-daily markets: single Cross Border Intraday (XBID) trading platform continuous

Harmonization of the balancing markets and provision of reserves – common platform for each service

Hamonization on capacity mechanisms – common requirements for capacity remuneration mechanisms

Harmonization of the forward capacity allocation: Joint Allocation Office - JAO

Harmonization of the methodology to calculate the capacity of interconnections: Net transfer capacity or flow based



#### **Roadmap for Electricity Markets Evolution**



#### Market Evolution Roadmap Based on International Experience









ESMAP

#### **Market Evolution Roadmap - Workstreams**



Regional System Market Operator (RSMO) Intra Day Market (IDM) Ancillary Services (AS)

WORLD BANK GROUP



#### **Example of Analytics Needed to Implement the Roadmap**

- Institutional set up bylaws for each institution and subcommittees, data sharing bylaws, etc.
- **Develop standardized bilateral contracts -** Development of template for bilateral contracts and Transmission Services Agreements, a guidebook to the agreements
- Market design, rules, platform specifications international benchmarking, analysis of barriers to trade, identification of the best design considering the specific context and the proposed phases of the roadmap, detailed market rules, guidelines, and procedures, regional transmission pricing calculation and model to implement the methodology, transmission services calculations methodology, network losses calculation methodology,
- **Financing Instruments to increase Trade** Guidelines and Design of regional/subregional liquidity enhancing revolving facilities, payment de-risking facilities, etc.
- Technical Studies Ten Year Network Investment Plans, Regional/Subregional Least Cost Integrated Resource Plans, Regional/Sub-regional operational readiness plans, Guidelines for regional/subregional planning and operational studies, DAM market simulations, etc.
- Capacity Building Trainings, Study Tours, etc.
  WORLD BANK GROUP



# **Thank You!**



