CHAIRE EUROPEAN ELECTRICITY MARKETS
Fondation Paris-Dauphine

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Auctioning of long-term contracts for electricity supply: Different approaches and options

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Workshop on LONG-TERM CONTRACTING IN ELECTRICITY MARKETS: HOW TO INSURE INVESTMENTS FOR SUPPLY SECURITY AND CLIMATE POLICY?

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Agenda

- The role of long term contracts in recent European electricity market reforms
- How to reduce / allocate risk for investment in thermal plant ?
- Lessons from other juridictions – the role of long term contracts
  - Case study – Vertically Integrated Electricity Sectors with IPPs
  - Case study – Ontario and the return of the central buyer
  - Case study - Latin America : auctioning long term contracts
- Conclusion: Lessons for European power market reforms

Two decades of liberalized power markets in Europe - Changes in context

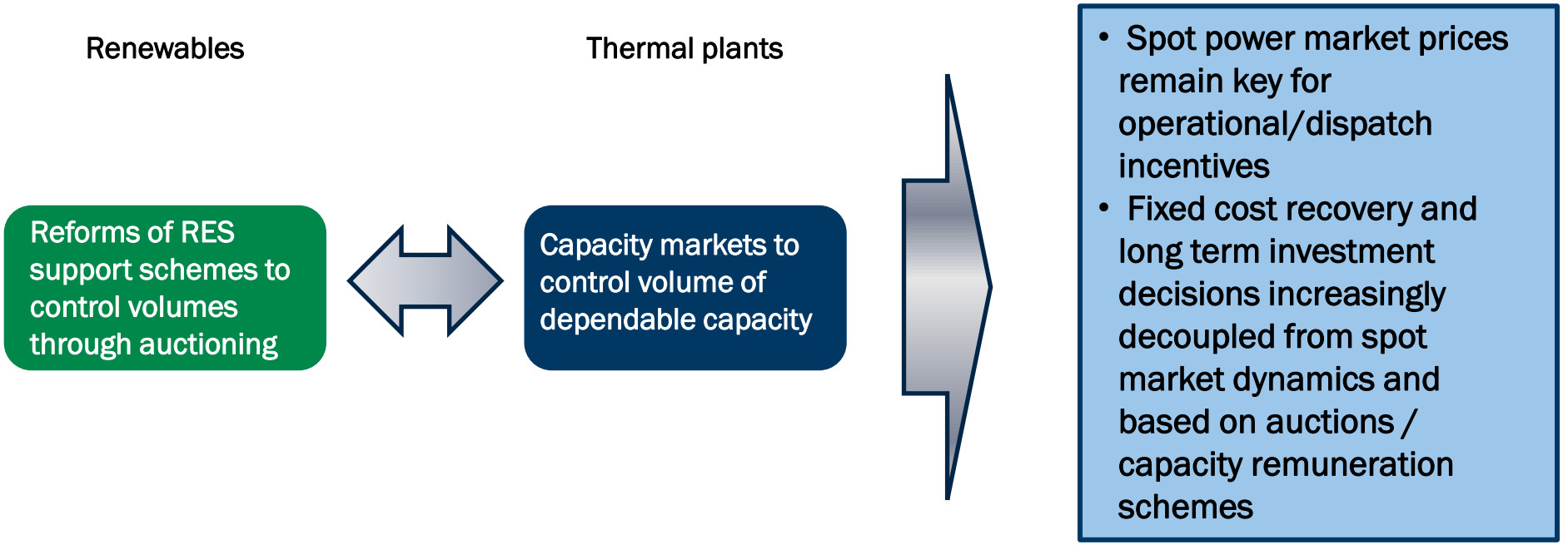
1. From a national to a regional/European scale
2. From surplus capacity to incentivizing new investments
3. From investment in technologies with significant variable cost to capital intensive technologies
4. From a marginal to a dominant share of intermittent generation
5. From a light handed policy and regulatory approach to significant policy involvement
6. From relatively easy financing to increased international competition for capital

- Coordination of investment in infrastructure
- Incentives for investment
- Recovery of fixed costs
- Risk management / hedging products
- Policy and regulatory risks
- Risk /return profile of generation assets compared to other sectors

⇒Need to understand how the *risk and return allocation* between the different stakeholders should be adapted to the new power market context

The role of long term contracts in recent European electricity market reforms

- Recent reforms (e.g. EMR in the UK) suggest that some form of "central planning" as well as long term contracts may be necessary and compatible with the existing market framework



How to reduce risk for investment in thermal plant ?

Key risks of merchant generation

Construction: can the plant be built to time and cost?

Operation: can it be operated with high availability and efficiency?

Market: can the power plant revenues be hedged?

Policy and regulatory risks, including:

- Out of market generation & mandated plant retirements
- Emissions and environmental regulations
- Coordination of infrastructure build up with merchant generation

- Power plant developers / operators should bear the construction & operation risks
- The lack of forward contracting means that hedging of market risks through commodity markets can be challenging
- Key issue is hedging policy and regulatory risks

⇒Can long term contracts help hedge some market risks and overcome governments' commitment problem?

Case Study – Vertically Integrated Electricity Sectors with IPPs

- Many countries have some form of vertical integration combined with IPPs, e.g. India, Indonesia, Mexico, Malaysia, Pakistan, South Africa &Vietnam

- **Most of these jurisdictions have the following features in common:**
  - Planning is run by a central agency—usually the utility—who forecasts demand
  - Procurement of new generation is run by the vertically integrated utility
  - Electricity supply is governed by long term Power Purchase Agreements (PPA)

- **Typical structure of Power Purchase Agreements and allocation of risks**
  - Long term contracts for the life of the asset (25 to >40 years) with a typical allocation of risk:
    - Demand risk: borne by the buyer - makes sense because the private party has no control over dispatch
    - Fuel price risk: borne by the buyer. Changes in fuel costs are passed through to the buyer.
    - Inflation and foreign exchange risk: borne by the buyer through escalation provisions in the PPA
    - Technical generation risks: borne by the seller.
  - PPAs have a typical payment structure that is based on two types of payments:
    - Capacity charges: cover the fixed costs of the plant, including all capital costs and fixed O&M costs.
    - Energy charges: cover the variable costs of the plant including fuel costs and all variable O&M costs.

=> The combination of the risk allocation and the payment structure means that IPP projects are relatively low risk, which allows them to be project financed

Case study: Ontario reintroduced a single buyer

- **A failed liberalization process led to the implementation of a central buyer:**
  - In 2002, the vertically integrated utility was split into 3 companies— G, T, and D - and a system operator.
  - Prices in the wholesale market rose sharply; Residential consumers voiced concerns
  - The wholesale market was closed after only six months, a retail price freeze was imposed—and the current single buyer model was developed and implemented in 2004.
  - The Ontario Liberals committed in 2003 to phase-out coal stations by 2007… this will finally happen in 2014.

- **The single buyer—the Ontario Power Authority (OPA)—is responsible for all forecasting and planning**
  - Develops integrated electricity plans that look forward several years
  - Uses different procurement methods depending on the type of generation that is being procured.
    - Existing generation owned by state owned OPG is contracted at regulated prices.
    - Existing generation owned by private parties is contracted through long term PPAs.

- **The OPA procures new capacity through three basic mechanisms, depending on the type of capacity being procured:**
  - For small scale renewable and cogeneration projects, OPA relies on technology specific Feed In Tariffs (FIT).
  - For specific situations (e.g. OPG's large nuclear power stations), OPA conducts negotiations; and
  - For large-scale new capacity, OPA runs a competitive tender process starting with a Request for Proposal (RFP).

- **Dispatch is determined through a spot market run by the Independent Electricity System Operator (IESO):**
  - Spot market revenue is deducted from the monthly net revenue requirement stemming from the long term contract and the balance is paid to the generator.
  - The main goal of this payment structure is to incentivise the generators to be available for dispatch.

Case study:
Latin America : auctioning long term contracts

- **Partial liberalization of power industries in Latin America since mid 1980s:**
  - Centralized cost-based dispatch; pricec for small consumers remain regulated
  - Important share of hydro production, strong need for new investments (5 to 8% y. demand growth)

- **In the past decade, dissatisfaction with price regulation triggered a new reform wave that relies on auctioning of long term contracts to attract new investment**
  - Long-term contracts as a way to conciliate the risk reduction for new investors with efficiency in energy procurement for regulated users.

- **The core of the new scheme lies on three main rules:**
  - All consumers, both regulated and free, should be 100% contracted at any time
  - All contracts should be covered by “firm energy” or “firm capacity” certificates.
  - Regulated users must acquire their energy supply contracts through auction. Free users can contract energy as they please, provided they are 100% contracted

- **In practice there are differences in implementation across countries:**
  - Brazil: centralized scheme with a single auction to contract distribution company’s needs.
  - Chile: only energy contracts are auctioned.
  - Peru: similar to Chile until 2008, centralized auction since then.
  - Colombia: auction of an energy call option is auctioned with a fixed strike price.

Latin America – key contract characteristics

Country	Brazil	Colombia	Chile	Peru
Capacity mix	Hydro 75%, thermal 125%	Hydro 65%, Thermal 33%	Hydro 40%,Thermal 60%	Hydro 60%, Thermal 40%
Degree of centralisation	Joint auctions by distribution companies organised by the government	Joint auction to ensure reliability, closing gap between supply and demand organised by a government agency	Distribution companies organise and manage their auctions, possibility of joint auctions	Distribution companies organise and manage their auctions, possibility of joint auctions
Buyers	Regulated users	All consumers	Regulated users	Regulated users, but free consumers can be included
Sellers	Separate auctions for existing and new capacity	New energy	All existing and new generation (in the same auction)	All existing and new generation (in the same auction)
Load forecast responsibility	Distribution companies are required to inform their load forecasts in each regular auction to supply regulated market	Regulator and planner provide demand, auction bridges the total system gap	Done by distribution companies, auction supplies the regulated market	Done by distribution companies, auction supplies the regulated market
Grace period	1-3-5 years ahead for 1,5,15 year contracts tied to energy certificates	3 to 7 years ahead	3 years ahead for any period up to 15 years	3 years ahead for any period up to 15 years
Auction process	2-phase hybrid auction	Descending clock auction	Sealed-bid combinatorial auction with pay-as-bid rule	
Energy policy decisions	Specific auctions for technologies and projects	All technologies compete together	All technologies compete together	Separate auctions for renewables
How often are auctions organised	Regular auctions to contract new capacity, government can organise additional auctions whenever needed	At planner\s discretion, whenever there is a gap between total system future demand and supply	Disco(s) decide	Disco(s) decide

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Source: Adapted from « Regulating Generation Investment in Latin America: Future Challenges", Rodrigo Moreno, Luiz. Barroso, Hugh Rudnick, Bruno Flach, Bernardo Bezerra, and Sebastian Mocarquer, IAEE Forum, Second qurter 2011.

The Brazilian experience – long term contracts differentiated by technology and btw. old and new generation

Ontario and Latin American countries models aim to achieve different prices for "old" and "new" energy

- Objective of policy makers to contain end user power prices
- Recurrent debate on marginal cost pricing versus average cost pricing…

Average volume and prices of regulated market contracts in Brazil, 2004 to 2012

Auction type	Average volume (MWh)	Average Price ($US/MWh)	Number of contracts
Existing generation	19,987	$45.46	1,612
New generation	22,478	$61.90	6,728
Renewable generation	900	$74.05	1,146
Reserve generation	2,189	$72.83	176
Total	45,554	$59.17	9,662

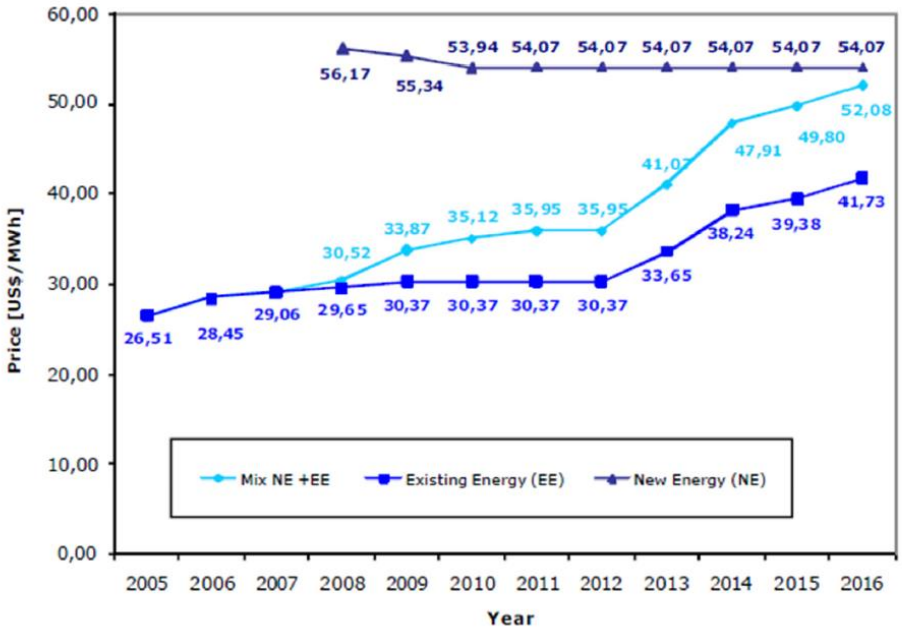
Source: « Evolution of Global Electricity Markets », Fereidoon P. Sioshansi (ed), page 350

Different prices for “old” and “new” energy – the Brazilian experience

Key features of different auction products in Brazil

	Old Capacity	New Capacity	Adjustment Auctions
Desired basis for price from regulator’s point of view	SRMC (assumes assets fully depreciated)	LRMC	Opportunity cost of using energy
Contract term	5-8 years	15 years	1-2 years
Delivery date	One year ahead	3 – 5 years ahead	4 months ahead

Evolution of prices for new and exisiing energy in Brazil



Maintaining different prices for old and new energy proved challenging in Brazil

- Recent evolution suggests that prices will converge toward LRMC for all capacity (arbitrage with free market)
- Regulatory intervention necessary to keep price down to SRMC

Source: « A perspective of the Brazilian Electricity Sector Restructuring: From Privatization to the New Model Framework », Melo, de Almeida Neves, Da Costa, Correia

Lessons from international experiences

- **The jury is still out in terms of the effectiveness of the auction mechanisms to attract least cost green-field generation (or demand resources) and price it efficiently; key issues include:**
  - the type product to be auctioned — energy, capacity or some hybrid product,
  - how far in advance of delivery to run the auction,
  - how much volume to auction and how frequently to run the auctions,
  - auction design: how to efficiently allocate and clear prices
- **A key component of the single buyer model is the non-competitive retail market**
  - creates incentives for distributors to forecast load accurately
  - Note that the single buyer model is not used for large customers in Brazil who are free to contract
  - Application to Europe?
- **Most important issue is the mandate and regulation of the central agency which would decide what and when to build…**
  - Incentives to minimize costs, etc.
  - Independence and risk of policy interference / regulatory capture

Conclusion: beyond short term reforms, Europe needs to start thinking about a sustainable electricity market design in the long term…

- **In parallel to the ongoing reforms, a discussion needs to be initiated on the possible alternative market models for the medium to long term given:**
  - The evolution of the generation mix toward capital intensive technologies,
  - combined with the intermittent nature of some renewables,
  - imply that electricity markets rooted in the principle of short term marginal cost pricing will need to evolve in the long term.

- **Alternative models of competition in the electricity sector will likely comprise a greater role for long term contracts:**
  - To facilitate investment and financing of low carbon as well as thermal technologies;
  - Long term contracts can be tendered to encourage ***competition "for the market"*** and create a level playing field for low carbon and thermal plants;
  - Whilst liquid spot and intraday markets would ensure ***competition "in the market".***

- **Experience on other continents (Latin America, Ontario, etc.) provides food for thought on how to combine competitive electricity markets with long term contracts to support investment.**

Thank you for your attention

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