Tractebel Energia
GDF SUEZ



Future Price Scenarios for Energy

November/2010

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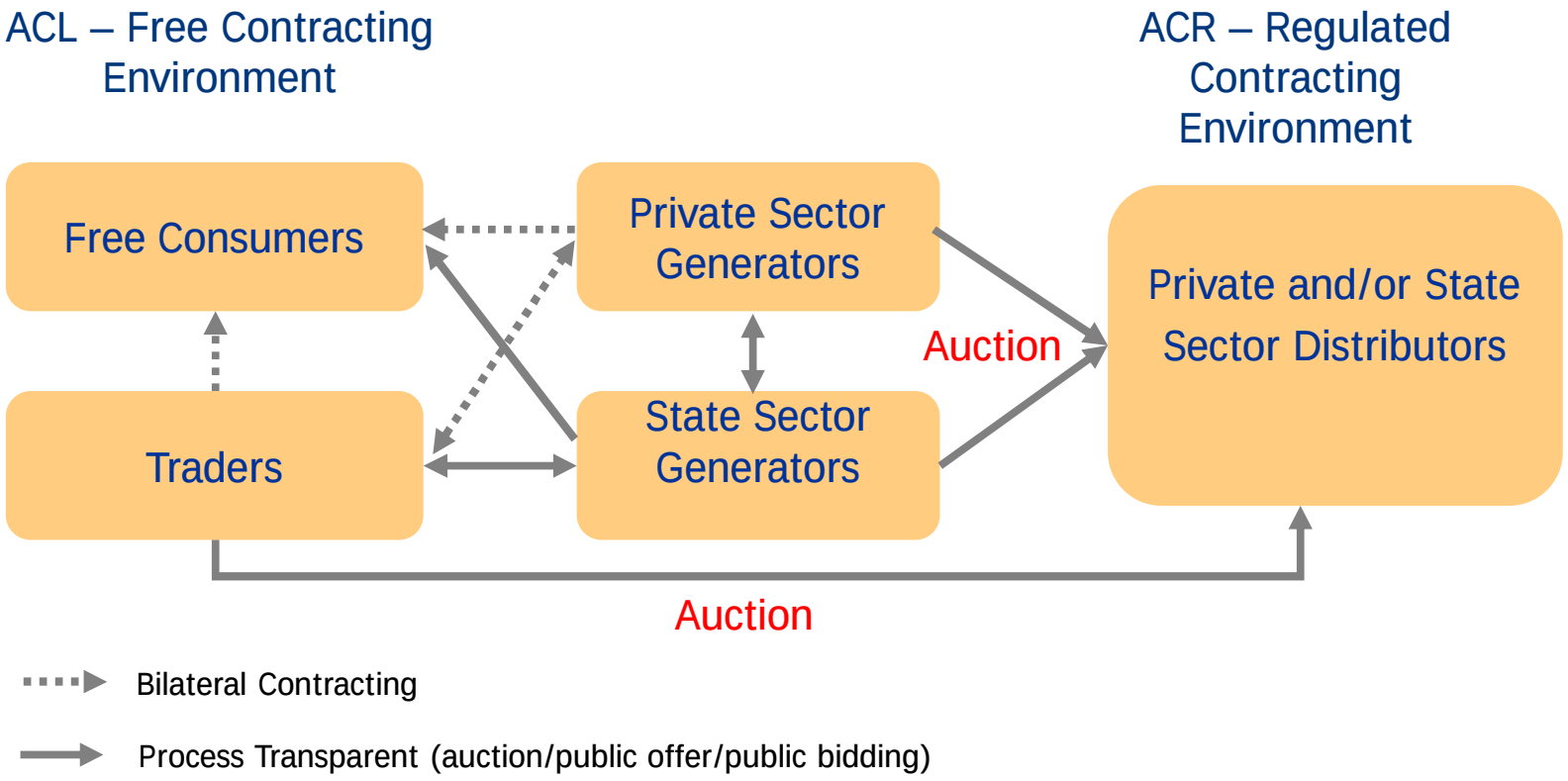
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Agenda

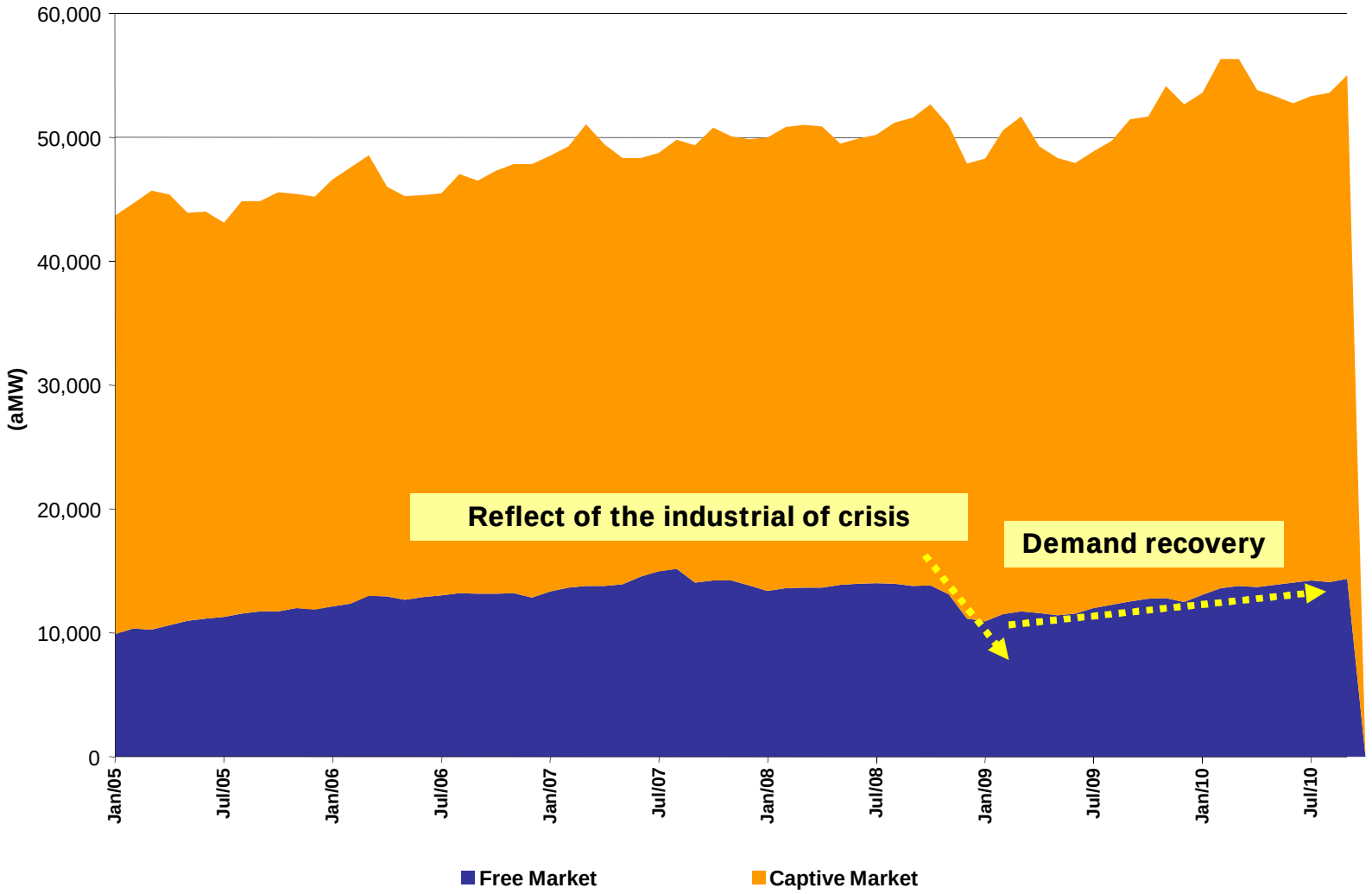
- Energy Contracting Environments
  - Background

- Main variables which impact the price
  - Balance between supply and demand
    - Drivers: supply expansion and growth in demand
  - Cost (price) of supply
    - Drivers: combination of supply in expansion and administration of existing energy (concessions)
  - Spot Price
    - Represents a reference price for short and medium term prices and impacts regulated tariffs (availability auctions)

Channels for Energy Contracting

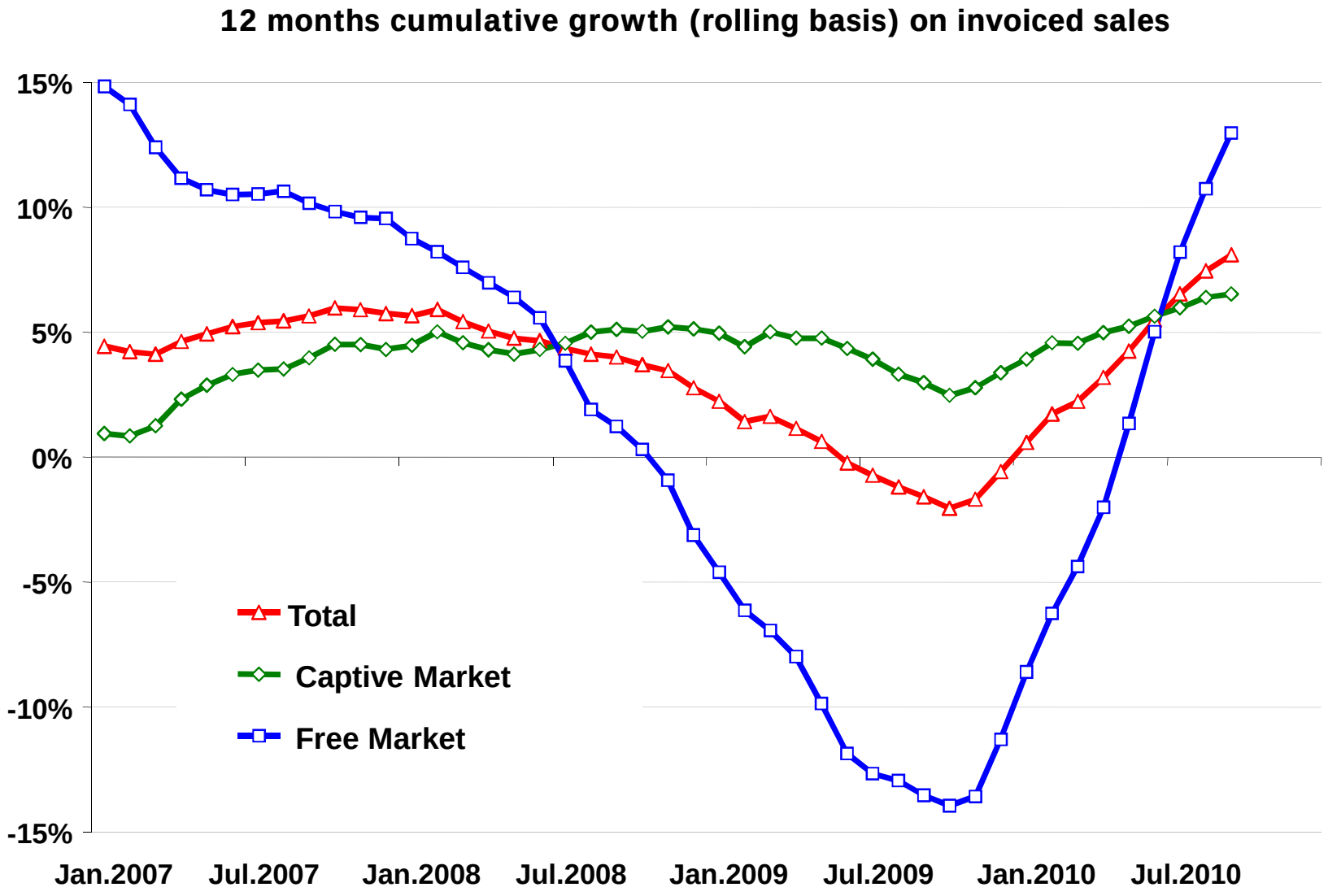


Breakdown



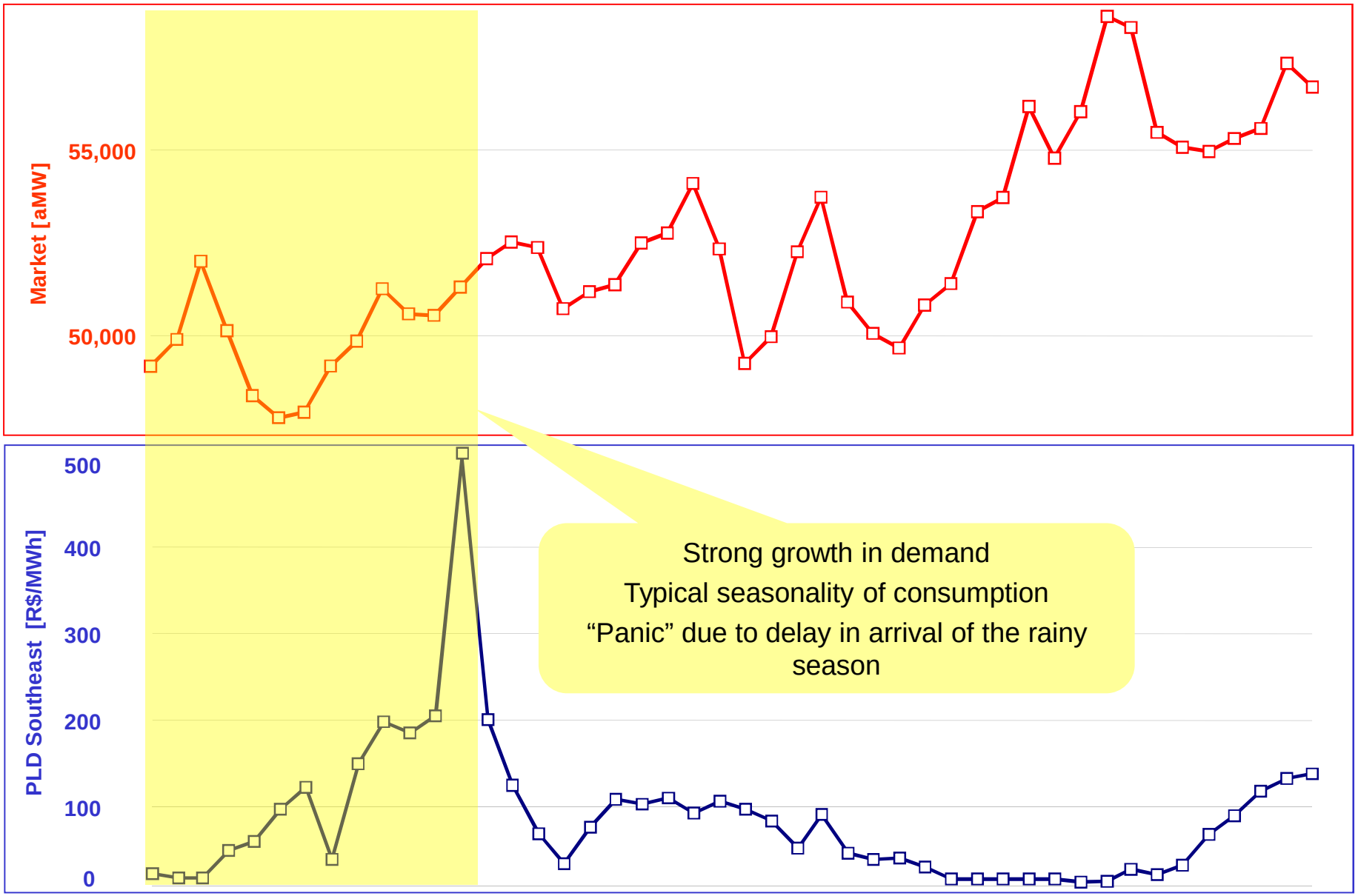
Source: CCEE

Evolution in Demand



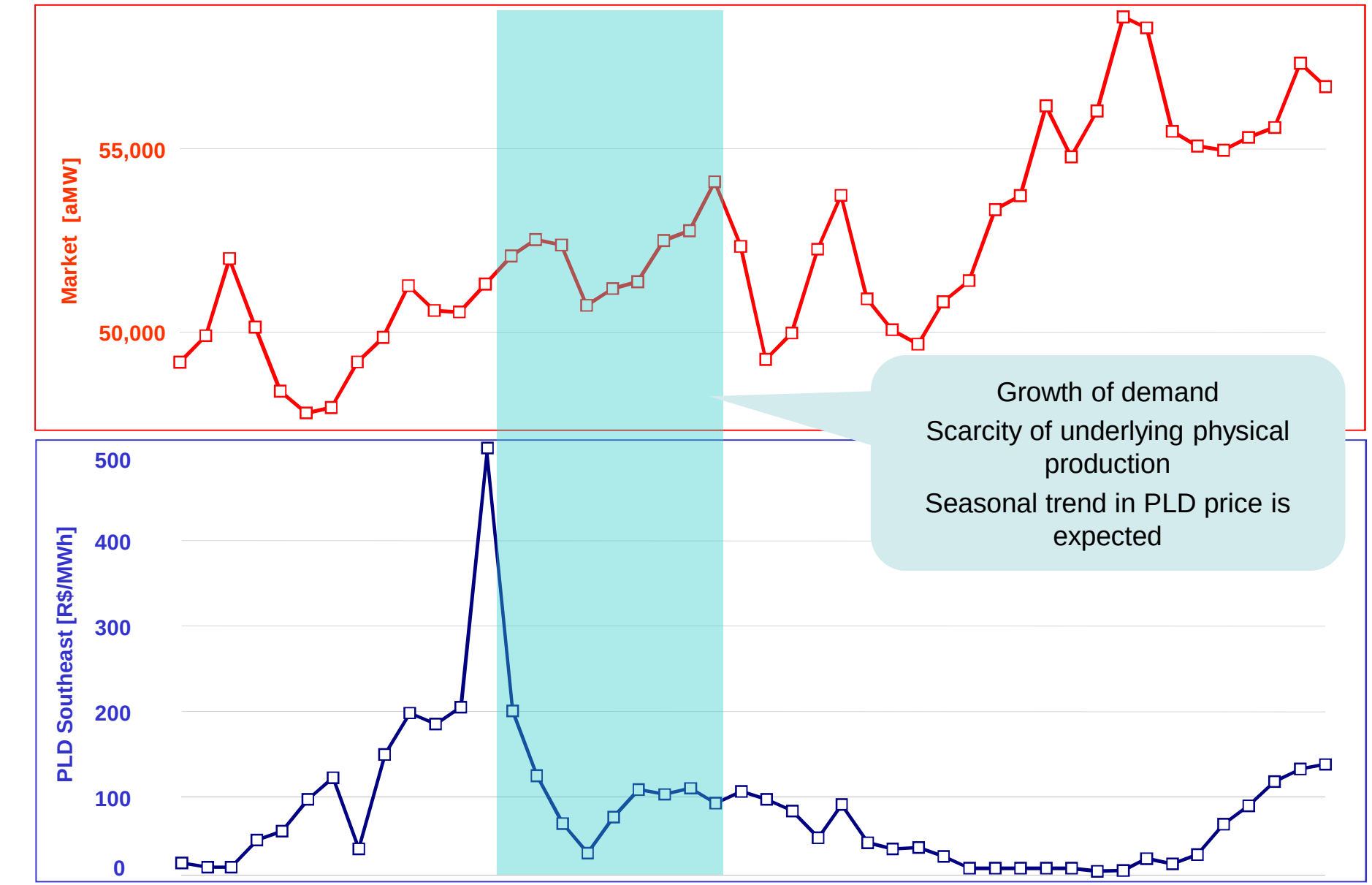
Source: CCEE

Evolution in PLD Spot Market Prices



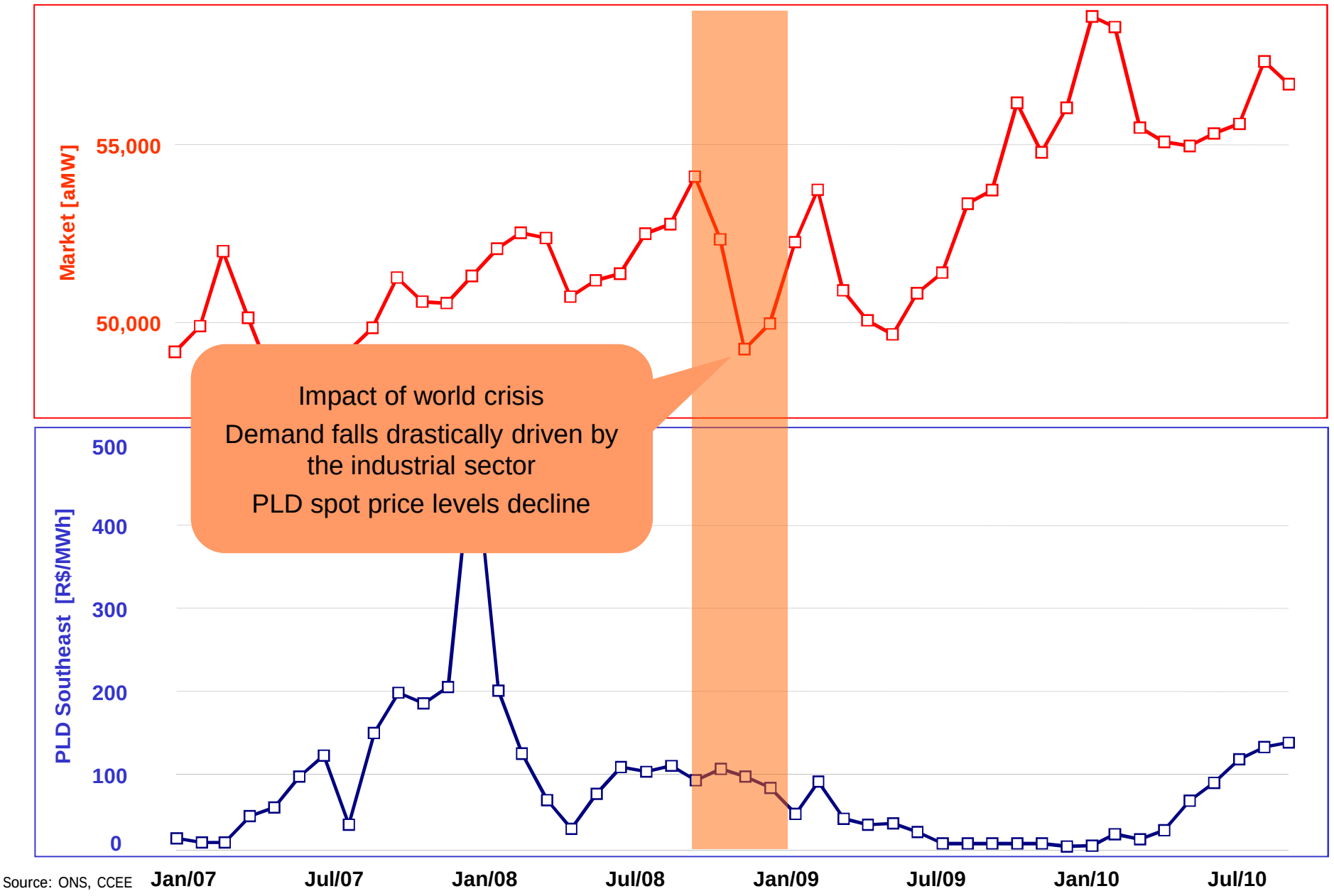
Source: ONS, CCEE

Evolution in the PLD Spot Market Prices



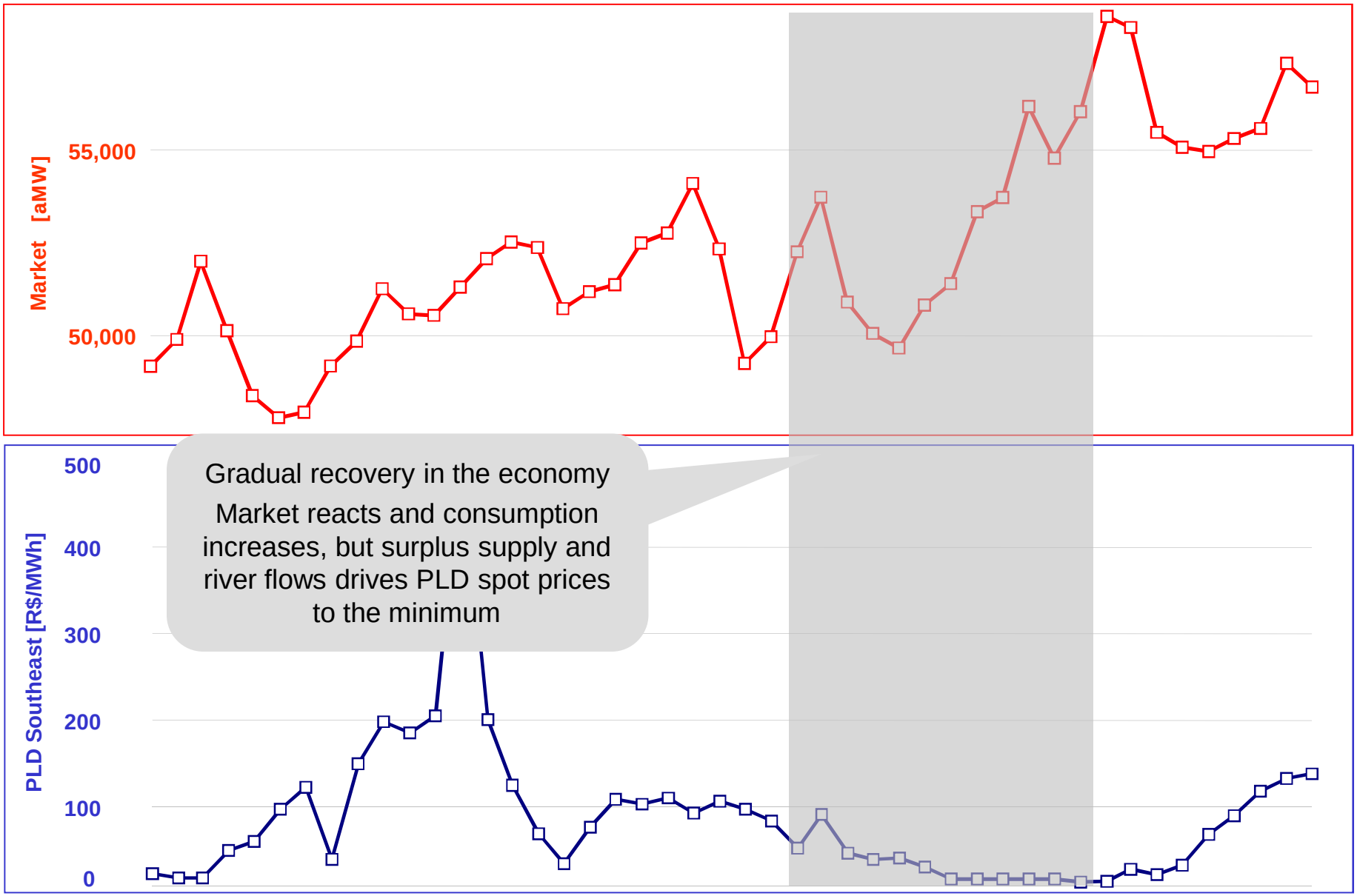
Source: ONS, CCEE

Evolution in PLD Spot Market Prices



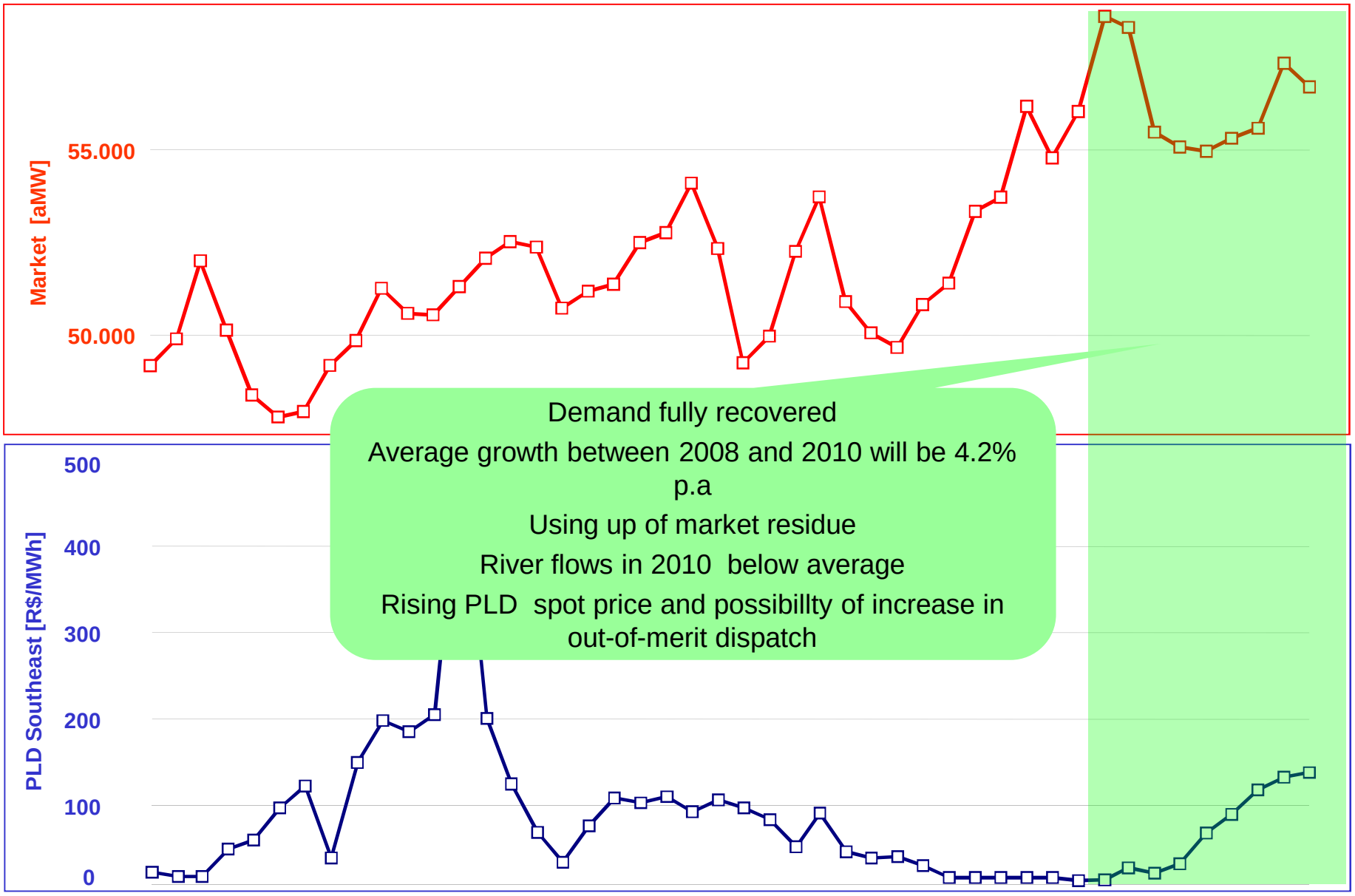
Source: ONS, CCEE

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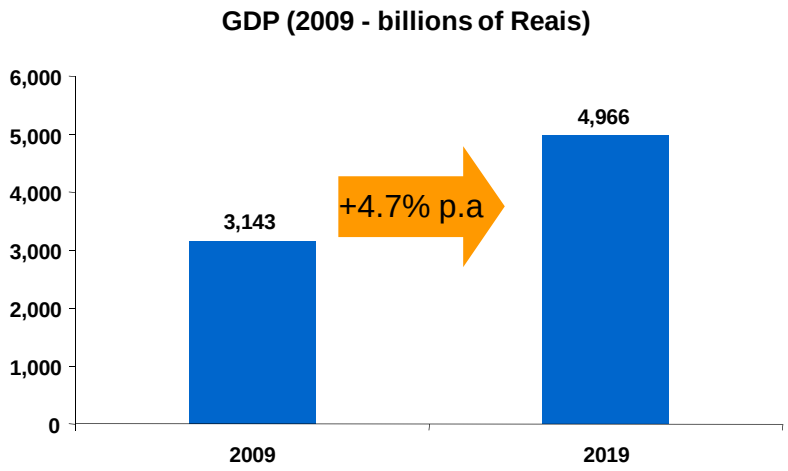
- **Balance between supply and demand**

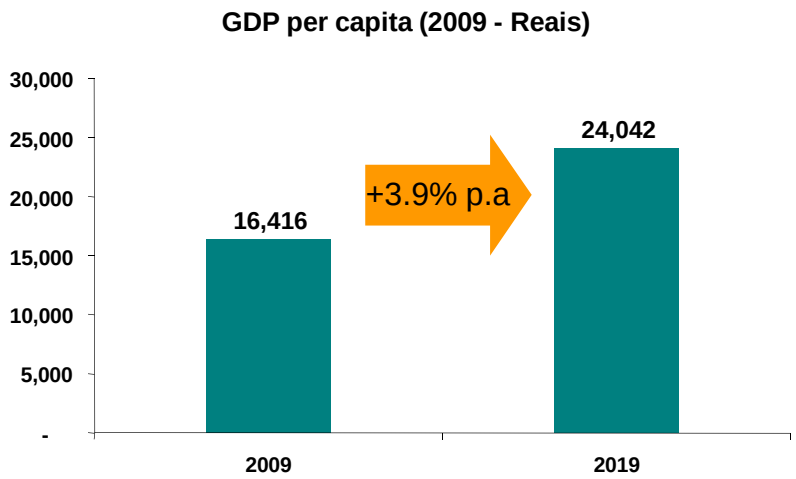
- Cost (price) of supply

- Spot Price

Forecasted Electricity Demand*

Base Economic Scenario:





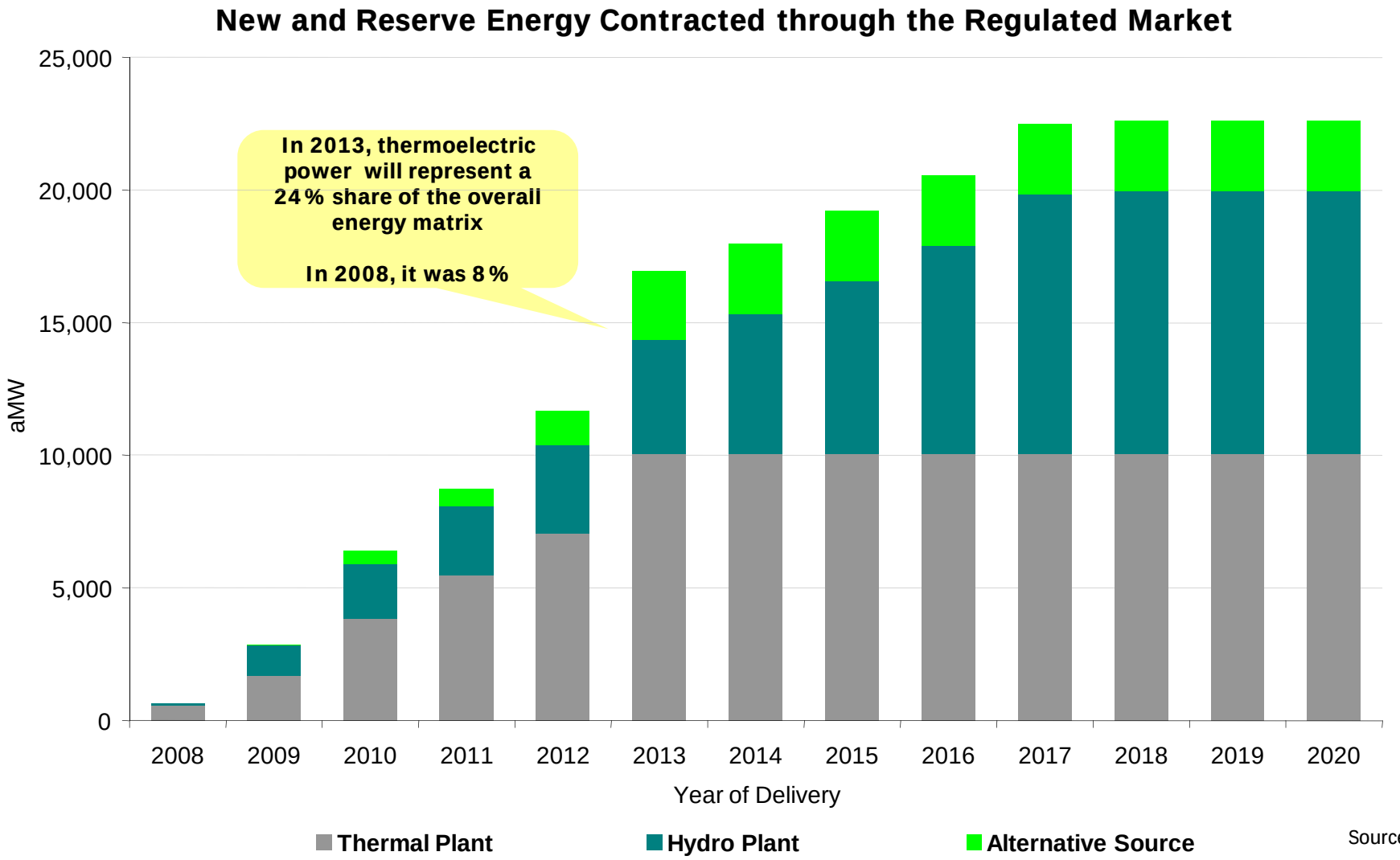
Electricity Demand:

- Expected **4.8% p.a.** growth up to 2019

- Annual growth in demand is **3,000 average MW**, equivalent to having to build:
  - **one Itaipu plant every two years, or**
  - **five plants the size of the Jorge Lacerda Complex every year!**

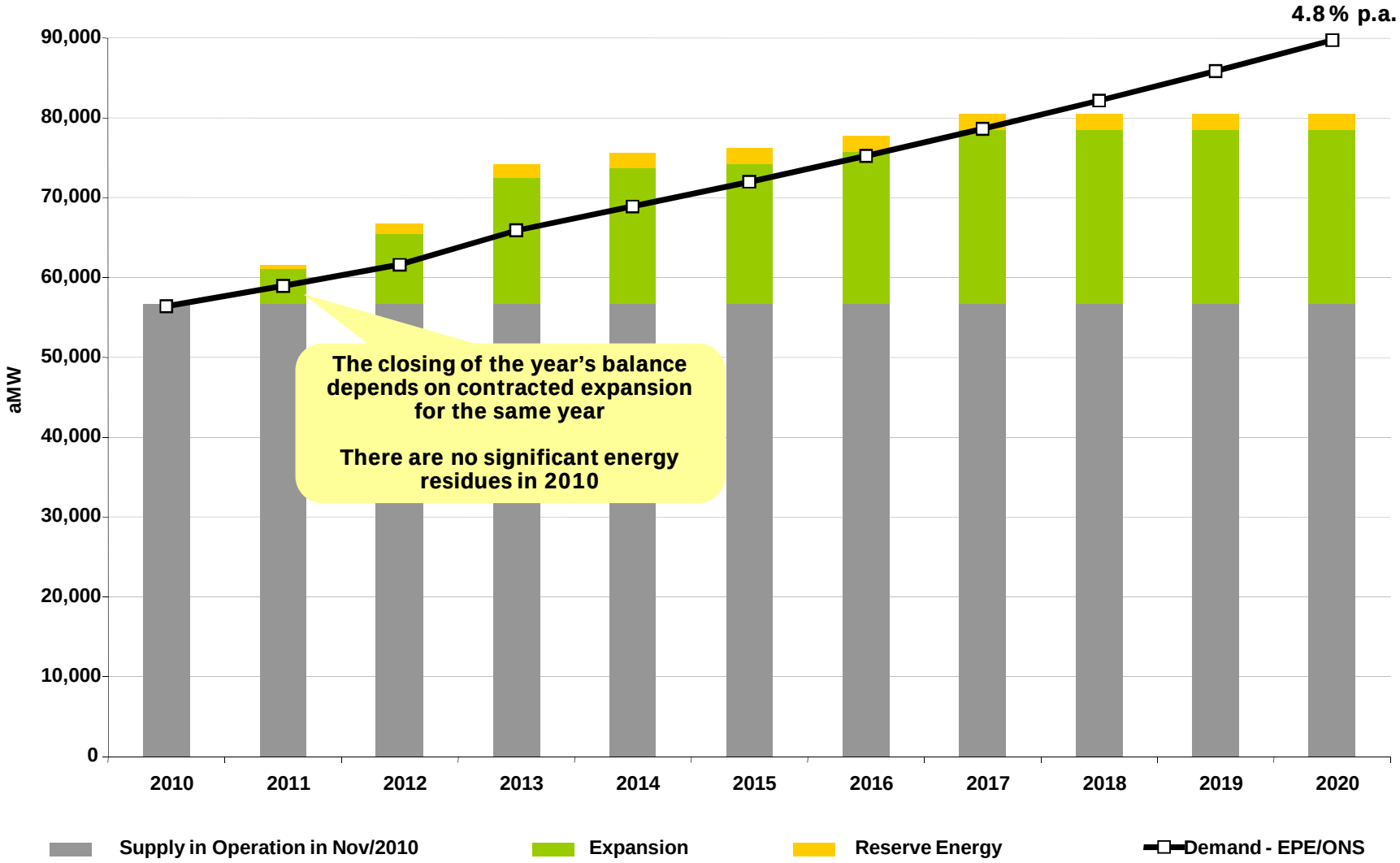
* Ten Year Plan 2019 / EPE

Contracted Supply



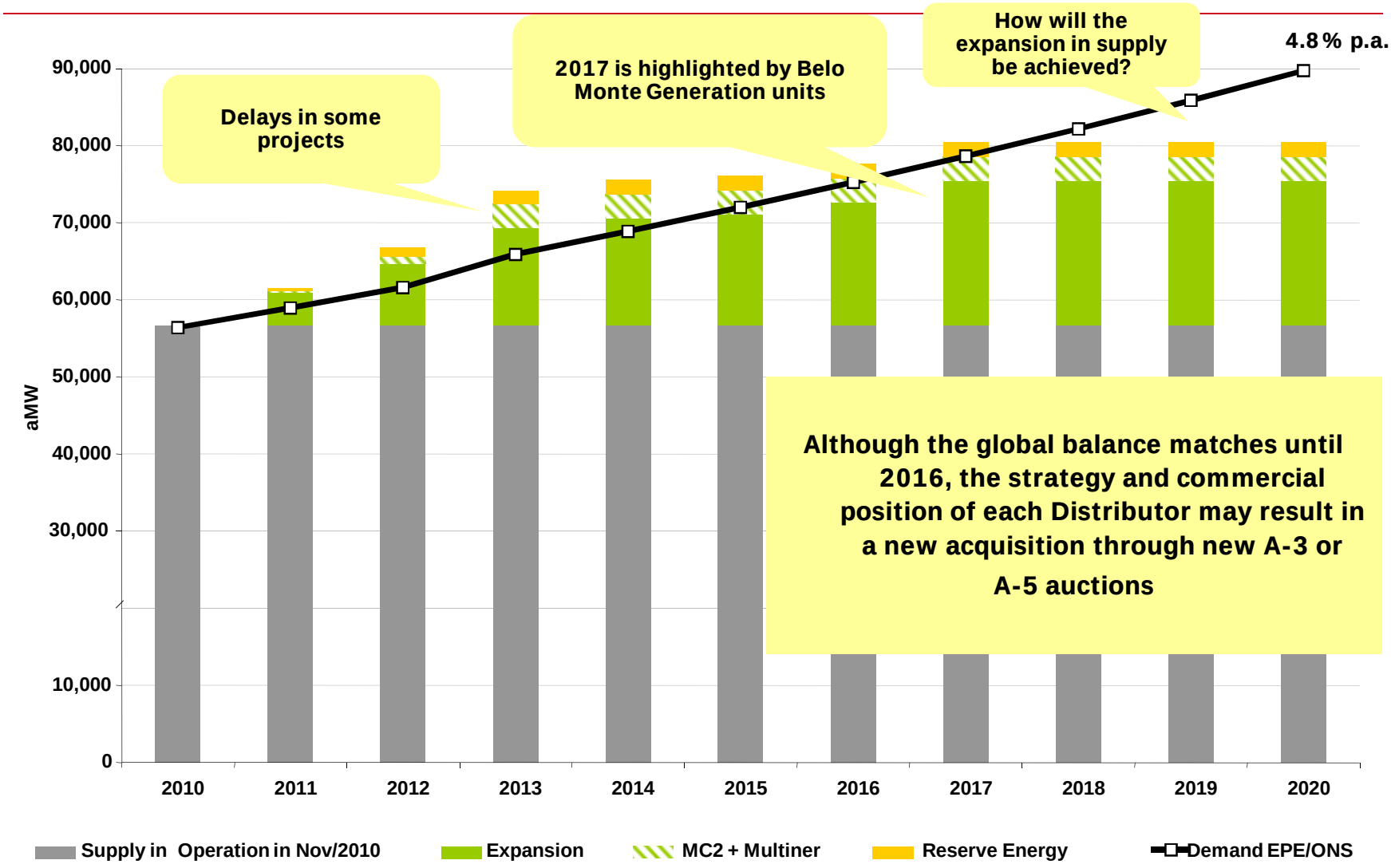
Source: TBLE

Balance between Contracted Supply and Forecasted Demand



Source: ONS, EPE

Balance between Contracted Offer and Forecasted Demand



Source: ONS, EPE

How is the Government planning to meet this demand ?*

- Expansion in hydroelectric plants, mainly in the Amazon region
- One nuclear power plant already decided (Angra 3) to be contracted as reserve energy (MME Ordinance 586/2010)
  - does not constitute underlying physical production and is paid by all consumers - R$ 148.65/MWh
- Complemented with renewable sources
  - SHPs
  - Biomass
  - Wind
- Currently, the plan does not include the contracting of thermoelectric plants using fossil fuels
  - the effectiveness of this plan will depend on the viability and competitiveness of renewable sources

The way in which the matrix is expanded will affect future energy prices

Hydro plants to be auctioned up to 2019:

- Água Limpa (320 MW)
- Barra do Pomba (80 MW)
- Cachoeira (63 MW)
- Cachoeira do Caí (802 MW)
- Cachoeira dos Patos (528 MW)
- Cachoeirinha (45 MW)
- Castelhano (64 MW)
- Davinópolis (107 MW)
- Foz do Apiacás (275 MW)
- Itapiranga (725 MW)
- Jamanxim (881 MW)
- Jardim do Ouro (227 MW)
- Jatobá (2.336 MW)
- Marabá (2.160 MW)
- Mirador (80 MW)
- Ribeiro Gonçalves (113 MW)
- Salto Grande Chopim (53 MW)
- São Luiz do Tapajós (6.133 MW)
- São Manoel (746 MW)
- São Miguel (65 MW)
- São Roque (214 MW)
- Serra Quebrada (1.328 MW)
- Sinop (461 MW)
- Telêmaco Borba (120 MW)
- Teles Pires (1.820 MW)
- Toricoejo (76 MW)
- Torixoréu (408 MW)
- Traira II (60 MW)
- Uruçui (134 MW)

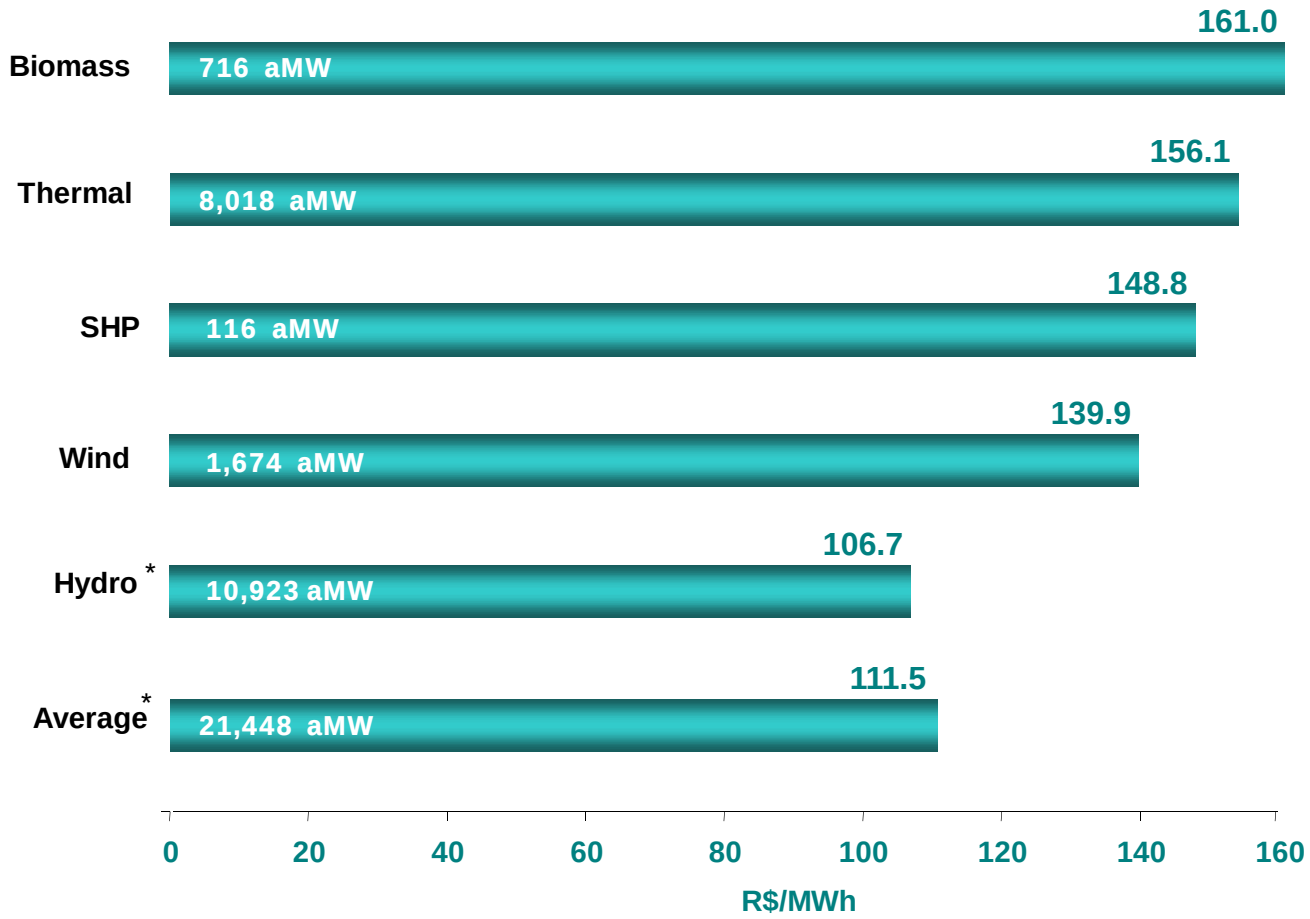
* Ten Year Plan 2019 / EPE

- Balance between supply and demand

- **Cost (price) of supply**

- Spot Price

Competitiveness of sources in held through auctions in the ACR environment

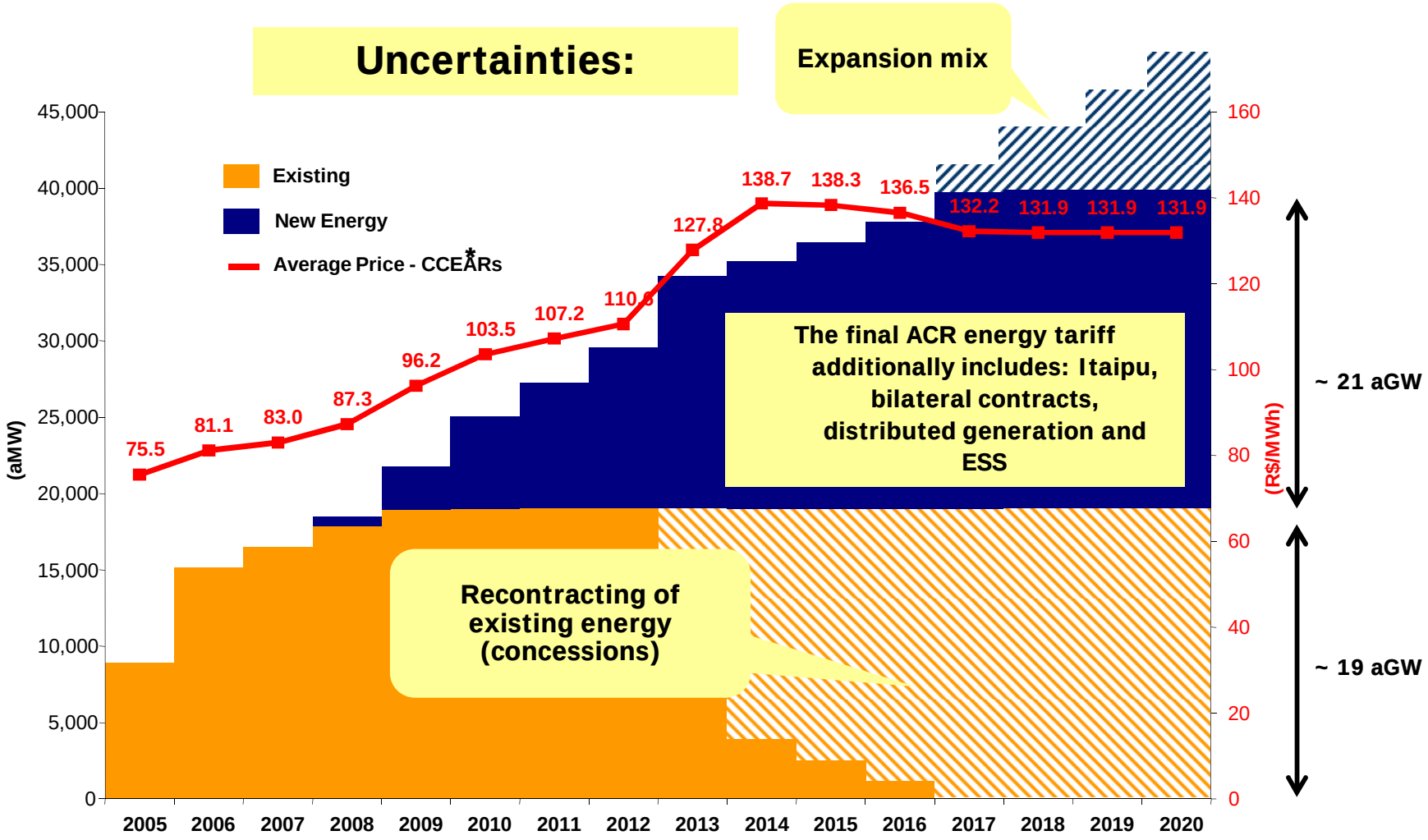


- Average price of the contracted mix of R$ 111.5/MWh
- Hydro plants at prices lower than the mix
- Maximum A-5 prices for 2010
  - Ribeiro Gonçalves (113 MW): R$ 86.42/MWh
  - Teles Pires (1,819 MW): R$ 87.00/MWh
  - Cachoeira (63 MW) R$ 110.45/MWh
  - Sinop (400 MW):
  - R$ 125.00/MWh
  - Estreito (56 MW): R$ 131.47/MWh
- Wind power plants have become competitive
- Prices of fossil fuel and biomass fuels at prices above the mix
- Angra III with a maximum price of about R$ 150/MWh (reserve energy)

*** Includes reserve energy from large projects for the free market at the price of R$ 130/MWh**
Prices: Oct/2010

Source: CCEE

Average Price of Contracted Energy in the ACR Auctions



*** Average price does not take into account volumes which terminate as from 2013**

Prices: Oct/2010

Source: CCEE

Expired Concessions and Recontracting of Existing Energy

- The way the Government will handle expired concessions will directly affect future energy prices and consequently the value of generation assets

- The problem:
  - Nearly 20% (21,792 MW) of the Brazilian system's installed capacity with generation concessions will expire in 2015 with no legal possibility of renewal or extension
  - Need for re-contracting existing energy within the ACR as from 2013
    - 9,000 Av. MW in 2013
    - 6,800 Av. MW in 2014
    - 1,300 Av. MW in 2015

- Current legal framework explicitly provides for the existence of ACL and ACR (Law 9,074/95)
  - The definition of two contracting environments implies that elements and conditions will be in place so that these environments may co-exist
  - The solution necessarily must ensure the continuity of the ACL environment, fundamental to the sustainability of independent producers and free consumers

- Balance between supply and demand
- Cost (price) of supply
- **Spot Price**

Spot Price

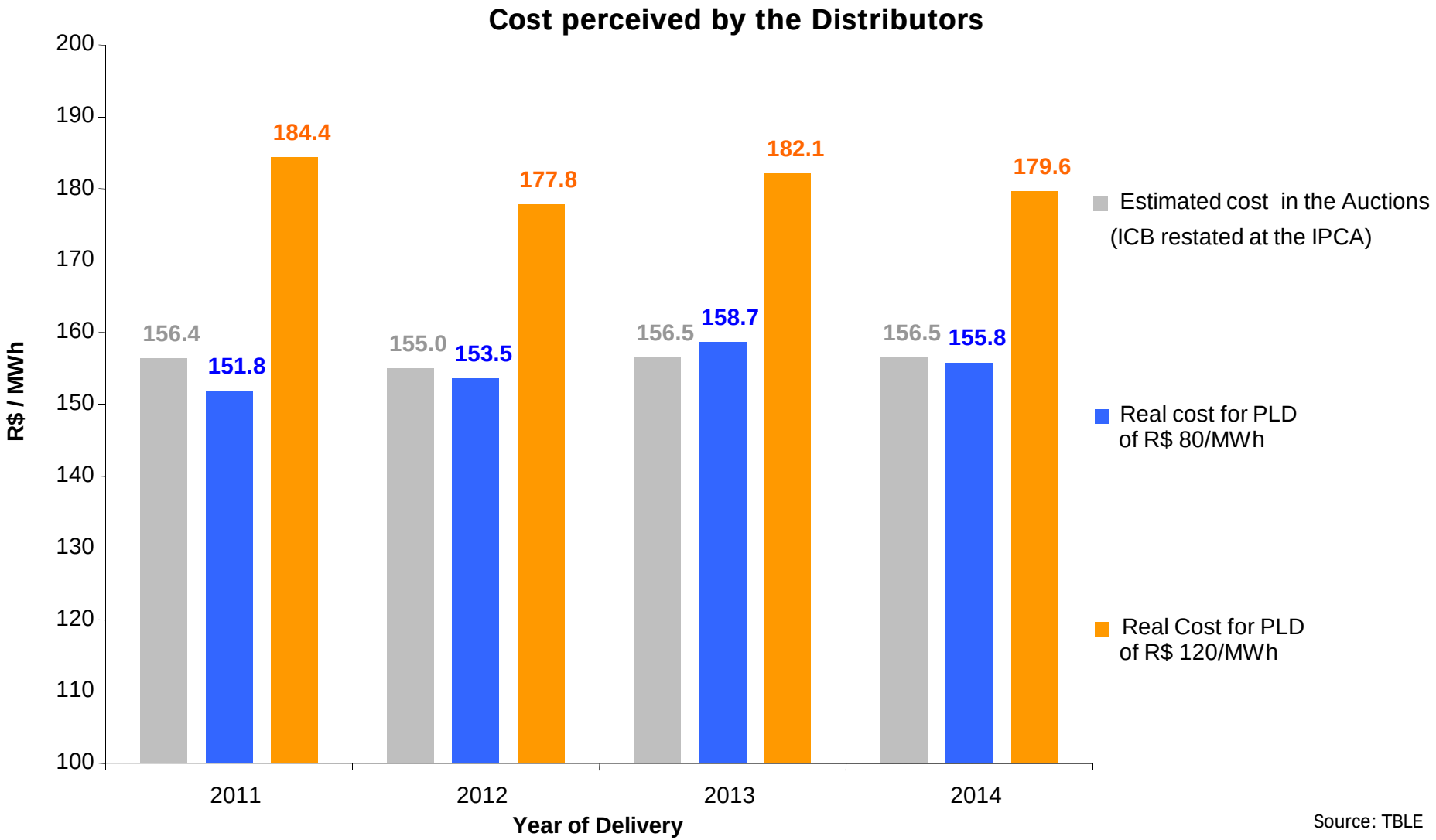
- The spot price is a reference price for the short and medium terms
  - It is the purchase price of last resort for a generator
  - It has a significant impact on short term negotiations (PLD + Margin)

- It directly impacts the cost of electric energy of the distributors which purchase existing thermal energy
  - Cost of fuel of the dispatched thermoelectric power plants and the cost of exposure to the PLD spot price of the non-dispatched plants
  - The distributors taking largest share in the thermal energy auctions (from 2008) will have their tariffs significantly increased should PLD spot prices remain high on a sustained basis

- The increase in the share of thermal electricity, the construction of hydroelectric power plants without large reservoirs and wind power plants will all contribute to the increase in volatility of the spot price

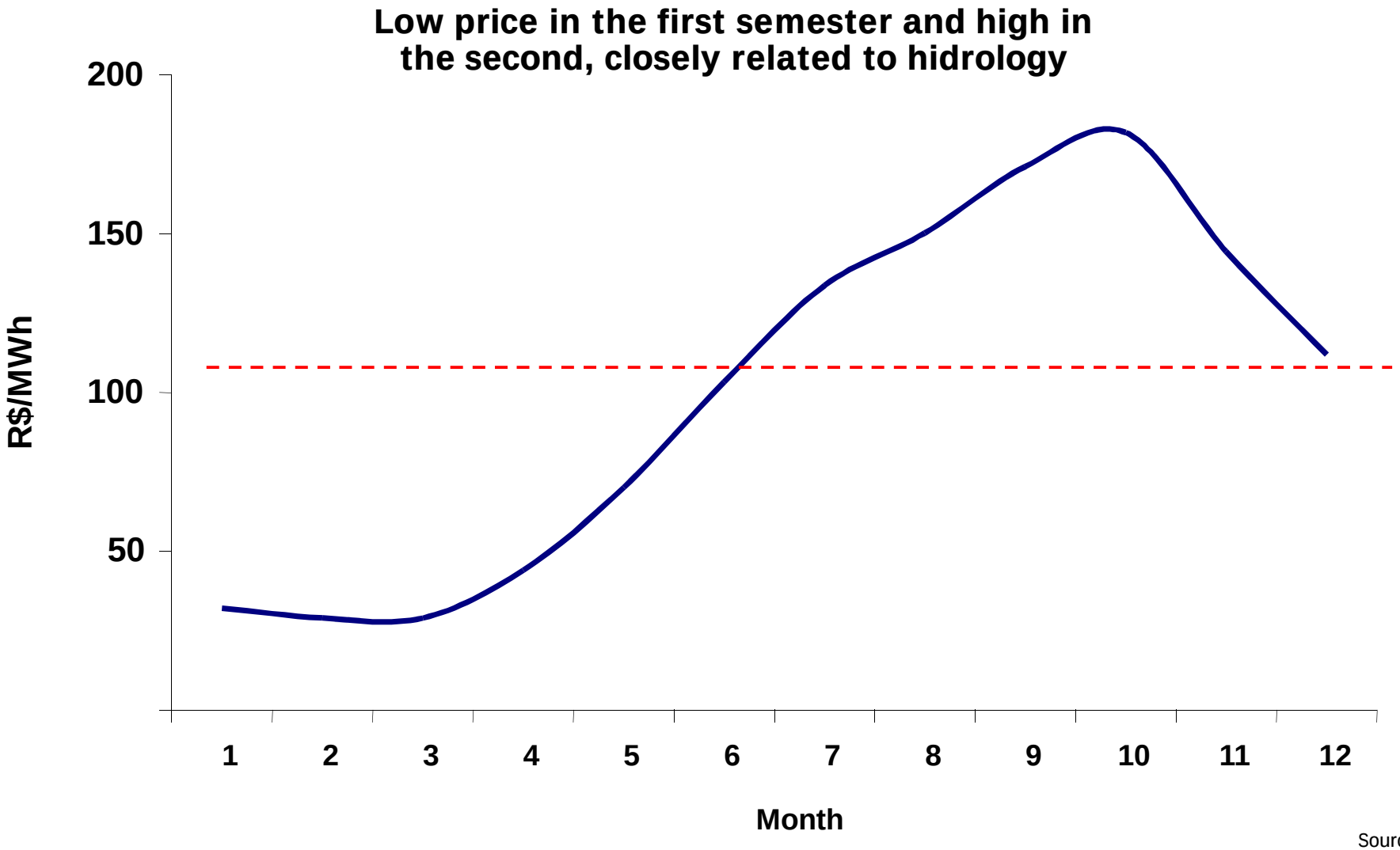
- Out-of-merit dispatch distorts real prices
  - Cost is built in as a charge and not as PLD

Spot Price: impact in the auctions of existing power



Source: TBLE

Typical Spot Price in the New Matrix



Source: CCEE

Conclusions

Conclusions (1)

- **On supply and demand**
  - Recovery in growth of the economy with a consequent increase in demand
    - Impact of the crisis already overcome (from the point of view of consumption)
    - Recovery in the Free Market
  - New energy matrix
    - Increase in thermal generation
    - Increase in generation from renewable sources and distributed generation
    - Reservoirs operated at lower levels
    - Greater PLD volatility
  - Energy Balance
    - Depends on the effective implementation of the plants – there is no more slack to be taken up
    - Both sides of the energy balance are globally matched up to 2015
    - Strategies and individual positions of the distributors may require new contracts

Conclusions (2)

- **On cost of supply**
  - Expansion plan based on hydroelectric plants which have commanded lower average prices in recent auctions
    - Environmental feasibility of the projects is still not defined
  - Renewable energy plants presenting more competitive prices and should continue being contracted for significant volumes
  - The plan indicates the contracting of fossil fuel-fired plants as last resort
  - The main risk factor for free market prices is the renewal of the concessions
    - Tendency of the new administration is to opt for tariff reductions

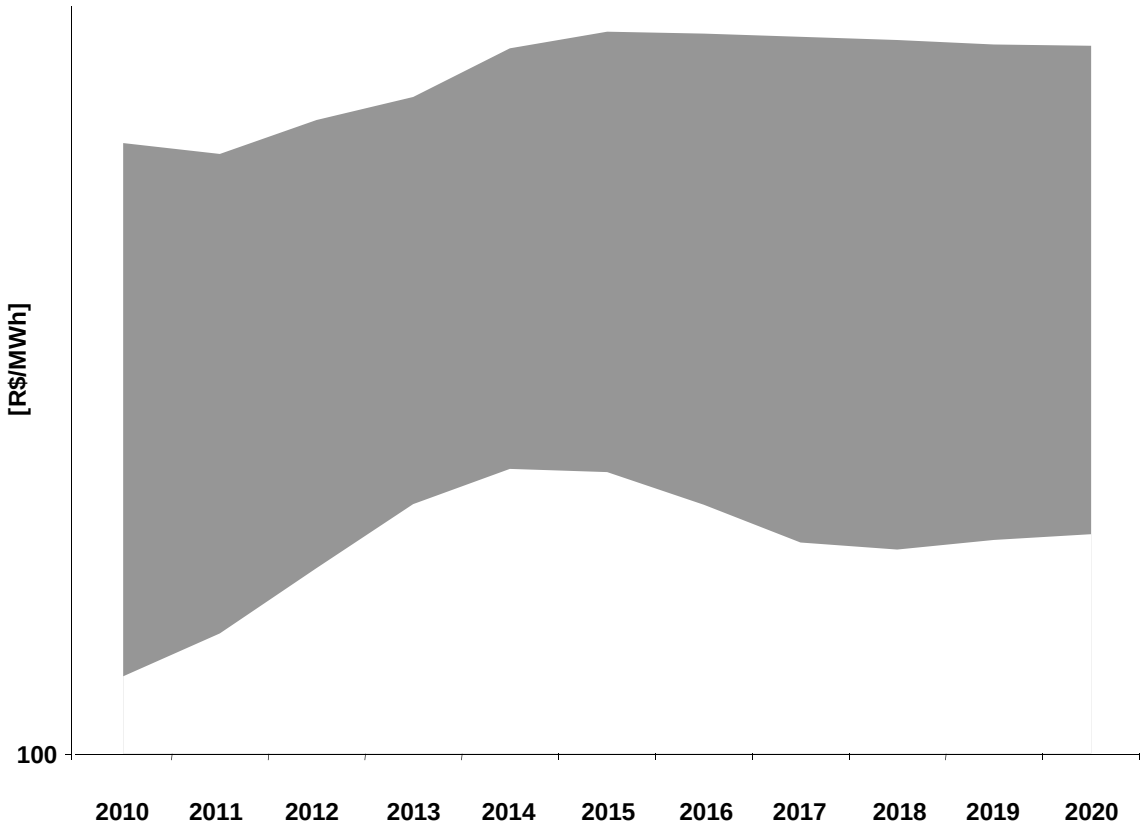
Conclusions (3)

- **On the spot price**
  - Greater volatility due to new energy matrix
  - Direct impact on tariffs of the distributors that have bought existing thermal energy
  - Out-of-merit dispatch distorts real price and increases charges

Conclusions (4)

Outlook for future prices

(forecasted tariff of 18 distributors)



- In addition to the global variables previously described, each distributor's tariff depends on its contracting mix
- Under liquid conditions
  - The distributor's tariff is the price cap for the free market (maximum disposition to pay)
  - The PLD is the price floor (purchase price of last resort for the generator)
- Competition between the sellers (generators and traders) will determine the market price

Source: CCEE