

# Ensuring Security of Supply and Customer Cost Containment in Deregulated Retail Electricity Markets

**National Association of Regulatory Utility Commissioners**

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# Procurement Risks for Retailers

- Consumer uncertainty: a retailer may be unable to accurately predict consumer demand more than a few days or weeks into the future
- Weather forecast uncertainty means that some days the Retailer will be over-procured, some days he will be under-procured

# Additional Procurement Risks

- Energy price volatility caused by unpredictable plant or transmission outages
- Energy price volatility driven by fuel price volatility

# Managing Procurement Risks

- To manage these risks, the Retailer may:
  - Acquire a portfolio of **forward contracts** of different durations, and
  - Complement the contracted energy with **spot transactions** in the **day ahead** and in **real time**
  - Enter into a **stand-by arrangement** with a generator or power marketer for an option to take energy only if he needs it in the day ahead
  - Engage in **tolling agreements**, under which the Retailer pays a generator a fee to reserve some of the generator's capacity

# The Planning Process –

## 1 - Load Forecast

- The Retailer will forecast the load growth based on weather forecast and expected customer volume
- Load forecast is done annually, then monthly. Refinement of the forecast is done 2 days out, then further refinement 1 day out
- Revisions to the forecast continue as real time gets closer

# Planning Process –

## 2 - Price Forecast

- The Retailer will also do a price forecast:
  - Have experts that run power flow models, perform transmission analysis, take into account scheduled generation outages
- Based on price forecast, decide whether to be short or long

# The Planning Process

## 3 – Contract Acquisition

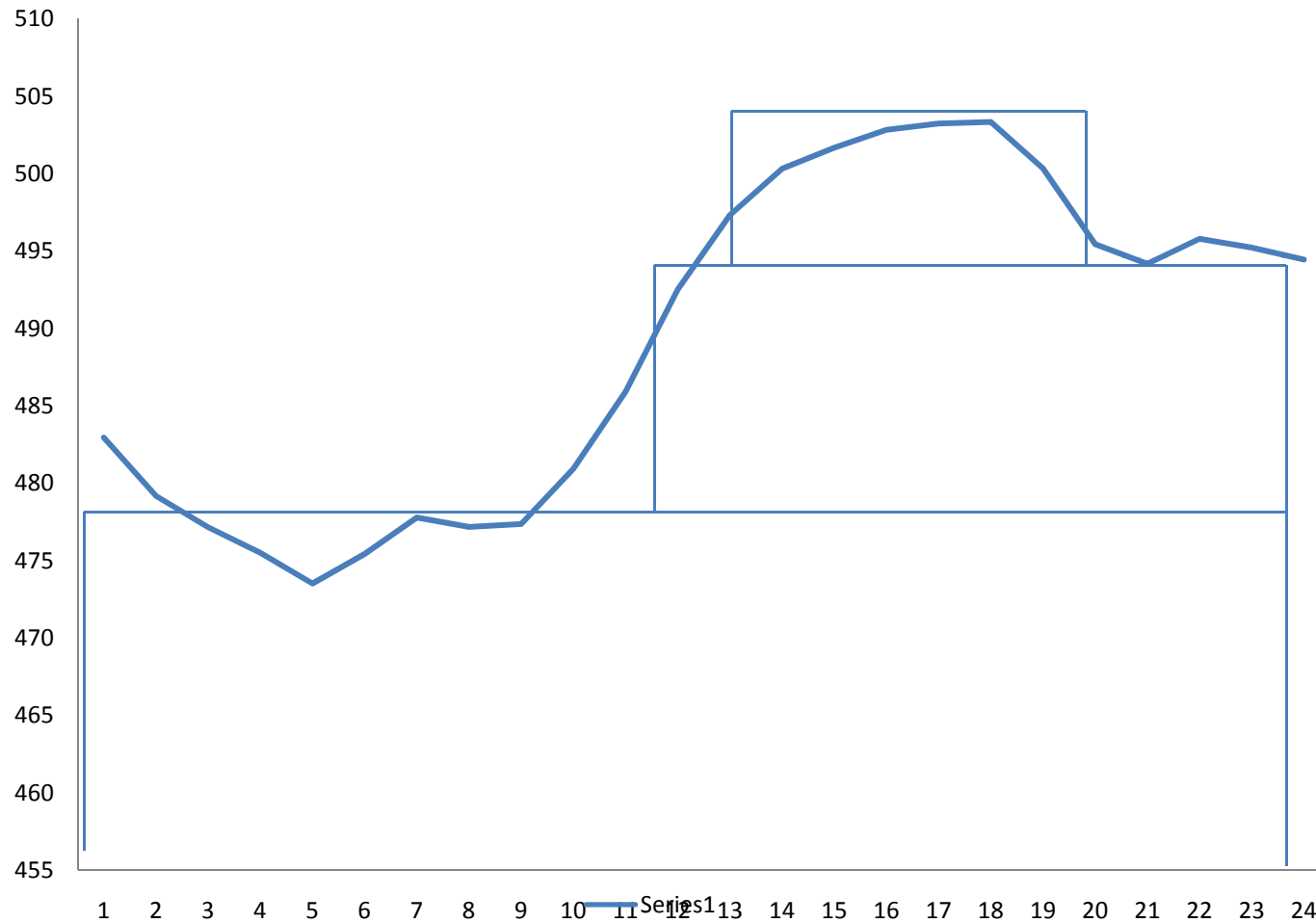
- Based on annual and monthly forecasts, Retailer will buy forward contracts for blocks of energy
- Two days ahead and again one day ahead, Retailer will acquire additional amounts of energy in spot market as required by short term forecast
- If a complement of energy is needed, Retailer will rely on last minute trading or the Real Time Balancing Market
- If excess energy has been procured, it can be sold in the Real Time Balancing Market



# Customer Load Profile

- Competitive retailers (CRs) use load profiles, based on historic load data, to forecast their customers' aggregate usage and acquire corresponding levels of supply

# Business Customer Load Profile Example



# I – Forward Contracts

- A **forward contract** is a contract between two parties to buy or sell energy at a specified future time at a price agreed today (the forward price). This is in contrast to a [spot contract](#), which is an agreement to buy or sell an asset today
- The party agreeing to buy the energy in the future assumes a [long position](#)

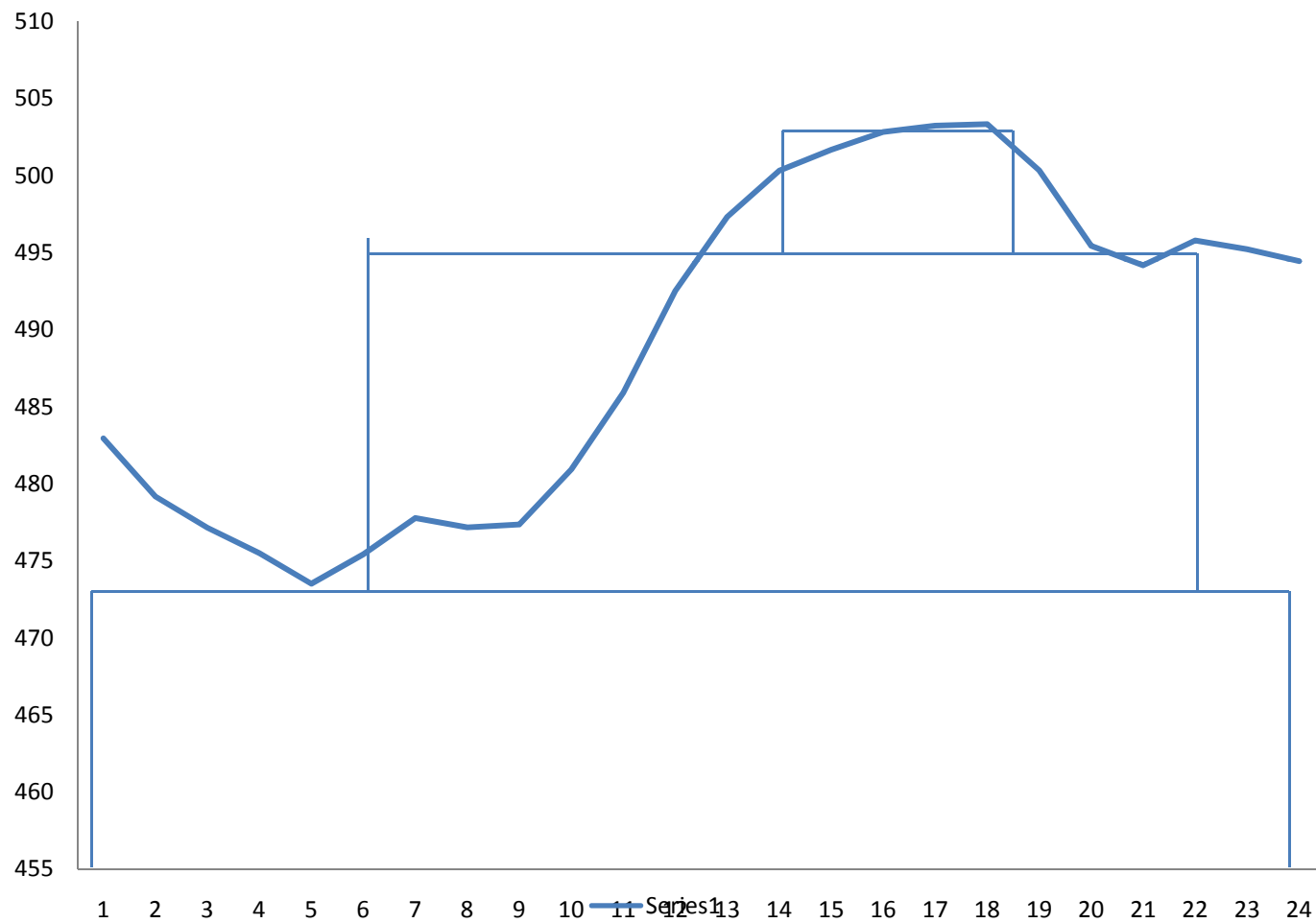
# Acquiring Forward Contracts

- Acquiring forward contracts is a way to hedge the risk associated with energy price volatility
- A Retailer will acquire forward contracts for blocks of energy to meet portions of demand that are more predictable, such as to meet the demand of its minimum customer projection one year out, or one month out;
- The decision to be short or long is based on the Retailer's price forecast

# Flexibility in Contract Portfolios

- The Retailer's portfolio of contracts will include 1-year contracts, 3-month contracts, 1-month contracts, 1-day contracts
- Standard Contracts commonly available in the US are:
  - 5\*16 (5 week days from 6:00 to 22:00 hours),
  - 7\*8, (7 week days from 22:00 to 6:00 the next day)
  - 7\*24, 1\*16, 2\*16. The 2\*16 contracts cover week-end needs.

# Matching Standard Contracts To a Business Customer Load Profile



# Flexibility in Contract Portfolios

- The Retailer may acquire fixed price and indexed price contracts –Retailers who offer indexed products to their customers will acquire indexed price contracts
- The Retailer can have master contracts with a power marketer that establish the general provisions of the contract and the credit allowance of the Retailer (like a credit card that allows you to spend money up to a credit limit.) The Retailer will then engage in transactions as needed under the umbrella of the master contract.

## II – Spot Transactions

- Spot transactions are done to cover the energy consumption that does not fit in the blocks of energy acquired through the forward contracts – to covers changes in volume of customers, weather forecast errors, or other unpredicted need
- More price risk than forward contracts
- Buying energy from the Balancing Market in real time has the most exposure to price volatility



# Managing the Risk of Spot Transactions

- Well financed companies – banks or power traders such as BP or Shell – buy large blocks of energy and sell to individual Retailers
- These companies take the risk of the energy that does not fit in the blocks, and sell at a premium to cover unsold energy
- In many cases, the individual Retailer will find a better deal from such a large volume trader than acquiring contracts directly as an individual

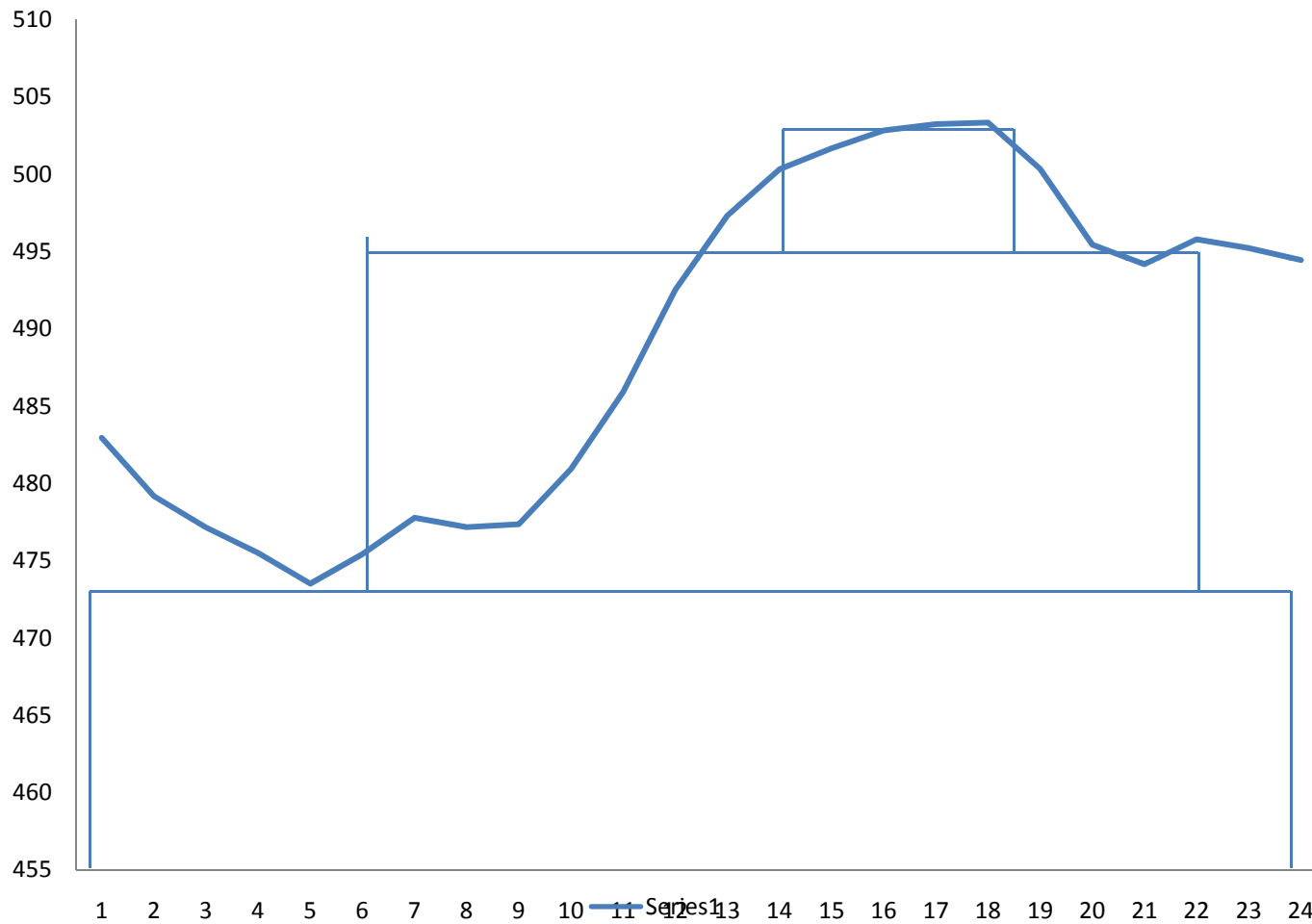
# Stand-by Arrangement with a trader

- A Retailer can have a stand-by arrangement with such a trader, whereby the Retailer can call the trader one day before to say whether he is going to take the energy the next day

# Structured Deals with Large Customers

- A Retailer can offer energy in blocks to its large commercial and industrial customers: flat blocks can be offered at a fixed price, and energy traded outside of the blocks is indexed to the real time market. This works with customers that can cut production when the price in real time goes high.
- The Retailer, in turn, will buy fixed price blocks to serve fixed price contracts, and indexed price blocks to serve indexed price portions of the contracts

# Acquiring Fixed Price and Indexed Price Contracts to match Business Customer Load Profile



# III – Tolling Agreements

- A tolling agreement is an agreement between a buyer and the owner of a generation plant. The buyer reserves a slice of the plant's production (for example, 50 MW) and provides the fuel. The buyer controls the production of its 50 MW and takes all the production risks
- Retailers then contract with the buyer who can serve the needs of several Retailers with the production from the plant
- A tolling agreement can be entered into before the plant is built, or with an existing plant

# Credit Requirements

- Generators and Power Marketers require buyers with credit
- Payment is expected 45 to 60 days after signing a short term contract. Long term transactions requires proof of ability to pay over the time of the transaction

# Summary

- Load forecast, customer volume forecast, price forecast are key elements
- Acquire forward contracts for blocks of energy to hedge price risks
- For energy needs outside the blocks, go to spot market or buy real time
- If too much energy has been bought, excess can be sold in day ahead or real time

## Summary (2)

- A Retailer not backed by generation will most likely buy power from wholesale power traders rather than from a generation plant
- There are standard contracts available, and a Retailer can buy energy in blocks with such contracts to hedge price risks
- The energy that is outside the blocks can be purchased on the spot market or in real time. Real time has the most price risk



## Summary (3)

- Advantages of contracting with a large volume trader :
  - Trader is well financed and has strong credit, will acquire power at lower price and may resell it to Retailer at better price than Retailer can get on his own
  - Trader manages risk of energy outside the blocks
  - Traders' risk is lower than individual Retailers' risk

## In Summary (4)

- Under a master contract with a Power Marketer, the Retailer will have the flexibility to lock in forward contracts and do last minute transactions for the energy outside the blocks – The trader takes the risk of the energy outside the blocks and charges a premium for that risk
- Credit requirements may be difficult to meet for an individual Retailer but easier to meet for a well-financed trader

# Market Considerations

- To ensure low customer prices, the wholesale market must:
  - Be competitive
  - Have low price volatility
  - Have adequate reserve margin
- Market experience is important. In a mature market, real time prices and day ahead prices will converge, and price volatility will be reduced in real time
- Market rules and market prices must be such that they attract power plant investments

# Operational Considerations

- The market operator must use the most accurate forecasting model available
- The market operator must administer the market efficiently. This includes efficient management of transmission constraints and efficient dispatch of generation

# Regulatory Considerations

- All U.S. and Canadian electricity markets have set regulatory safeguards such as a price cap to protect customers from very high prices
- A market monitor must be put in place. His role is to detect and prevent market manipulations and the exercise of market power

# Regulatory Safeguards and Protection

- Additional regulatory protection is provided for very low income customers. In Texas, the “System Benefit Fund” was established to help very low income customers pay their electricity bill
- The System Benefit Fund is funded by a small addition to all electricity customers’ bills

# The Texas Experience (1)

- On February 24-25, 2003, an unexpected cold front affected all of Texas, disrupting the gas supply and causing power plant outages. Real time Balancing Energy prices reached the cap of \$1000/MWh for many hours over two days. One Retailer went bankrupt because it had fixed price customer contracts that were not backed by fixed price forward supply contracts, and had to rely on the real time Balancing Market to serve its customers.

# The Texas Experience (2)

- In August and September 2005, two hurricanes disrupted gas supplies and caused gas prices to soar. The result was very high electricity prices for short term contracts, in the spot market, and in real time. One Retailer had fixed price customer contracts that were not sufficiently backed by long term fixed price forward supply contracts. This Retailer violated its customer fixed contracts when it raised customer prices to cover its un-hedged supply prices. The Commission launched an investigation and the customers filed law suits against the company.



## Texas Experience (3)

- In May 2008, the weather was unexpectedly hot and customer load increased much higher than the forecast had predicted. Local transmission constraints occurred, which the market operator was resolving in a way that was inefficient. This sent prices soaring for many days. Four Retailers went bankrupt, leaving more than 40,000 customers stranded (those customers were served by the Provider of Last Resort at a very high price)

# Conclusion (1)

- In order to ensure security of supply and minimize energy prices in a deregulated market, many conditions have to be met.
- Step One:
  - A well functioning, competitive, and efficient wholesale market must be established
  - Price signals and business climate must be right to attract investments and avoid power shortages

# Conclusion (2)

- Step Two:
  - Retail providers must plan their supply strategy based on sophisticated customer load forecast, and they must understand how to hedge price risks. They must have strong credit and demonstrate their ability to pay. Small Retailers may not survive.
  - Intermediary traders that are well-financed and can acquire large blocks of power that they re-sell to many Retailers make it easier to manage risks and ensure last minute adjustments of the supply

# Conclusion (3)

- The regulator has a role to play:
  - Monitoring the market to ensure operational efficiency and market competitiveness
  - Appointing an Independent Market Monitor charged with detecting and preventing market price manipulations and abuse of market power
  - If necessary, establishing safeguards against very high prices
  - If necessary, establishing a system fund or other method of subsidy for very low income customers that are unable to pay market prices