



Production Cost Modeling Primer and Selection of Modeling Software

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Production Cost Modeling

- **The process of allocating the required load demand between the available generation units such that the cost of operation is minimized**
- **Production costing models are used extensively in the electric power industry to forecast the expected amount of electricity produced by different power generation units and the expected cost of producing that electricity for a given power generation system**
- **Models help in deciding how much generation to add, what type of generation is most economic to add and where will the generation be placed on the system**
- **Primary Input Data Include:**
 - Fuel price forecasts
 - Load forecasts
 - Wind and solar generation profiles
 - Emission rates and costs
 - Transmission constraints
 - Generating unit characteristics
 - Seasonal data variations
 - Capacity expansion details

Production Cost Model Selection Process

- **RFP was issued describing needs ERCOT wants in a new production costing model or system of models**
 - Capacity Expansion and Retirement Planning
 - Intra-hour Analysis
 - Existing ERCOT database

- **Three responses were received and presentations were given by the vendors to ERCOT staff**

Production Cost Model Selection Process

- **ERCOT staff evaluated the vendors based on their proposals and presentations**
- **Scoring was based on:**
 - Vendor responses to ERCOT requirements
 - Software capability
 - Vendor capability
 - Training
 - Completeness and quality of presentation
 - Software contract terms
- **The vendor selected was Ventyx.**

Production Cost Model Selection Process

- **Components we will be using:**
 - PowerBase (Database)
 - Common Database, Consistent User Interface, Scenario and Risk Analysis
 - Feeds MarketPower and PROMOD IV
 - MarketPower (Capacity Expansion)
 - Long Term Energy and Capacity Market Price Forecasting with Automatic Capacity Expansion
 - PROMOD IV (Nodal)
 - Detailed Generation and Transmission Simulation Engine with LMP Price Forecasting
 - PAT (Intra-hour)
 - Interactive Powerflow and Dispatch Analysis with Intra-Hour Capability

Questions?

Selected Input Data for Production Cost Models

- **Static data – Generating unit data**

- Generating units
- Generation capacity
- Heat Rates
- Variable and Fixed O&M
- Start-up and ramp rates for each unit based on hot/cold start
- Minimum up-, minimum down-times
- Start-up costs
- Maintenance and forced outage rates

- **Expansion unit data**

- All the above information
- Capital costs/fixed costs
- Level of Debt and Equity
- Interest rates
- Tax rates

- **Time sensitive/changing data**

- Fuel pricing
- Hourly Loads
- Unit efficiency values
- Wind generation profiles
- Solar generation profiles
- Annual generation capacity profiles