D A Y Z E R

Day-Ahead Market Analyzer

DAYZER is a user-friendly detailed market analysis tool which facilitates the understanding of the complex operation of electricity markets with little training and effort.

Key Features
Open Architecture
Powerful Algorithms
Intuitive Data Visualization

Who should use DAYZER?

Analysts: DAYZER is a powerful tool that can forecast Day-Ahead hourly LMPs (Zonal or Nodal), Shadow Prices and Congestion Costs under "what if" scenarios.

Market Monitors: DAYZER is useful tool that can be used to analyze bidding behavior and different market equilibria (marginal costs, Nash, etc...)
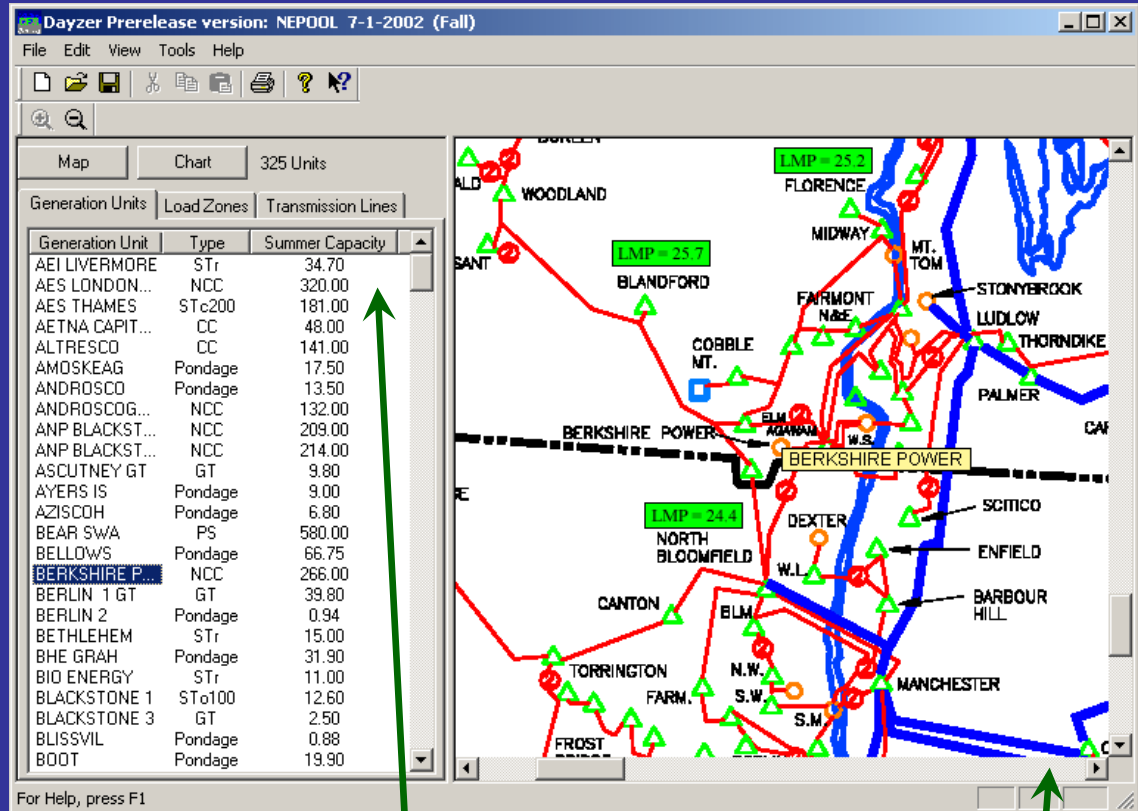
System, Unit, Line, and Load Zone characteristics shown in tabular format.

Mini-GIS Engine showing system components and LMPs

Cambridge Energy Solutions
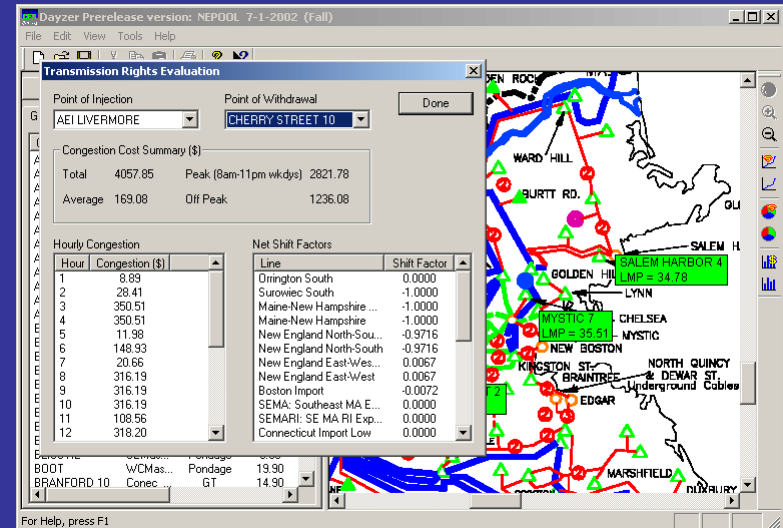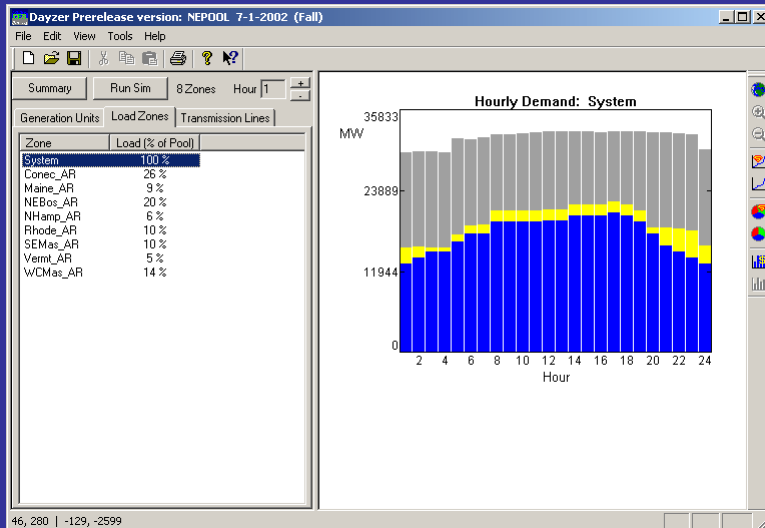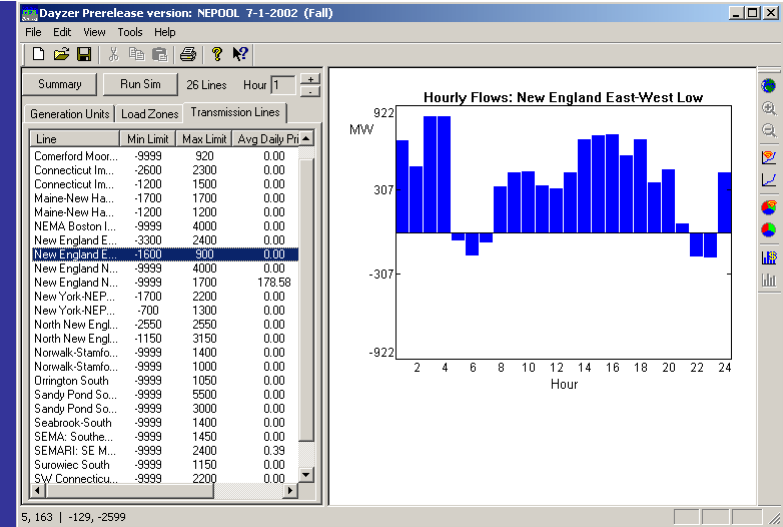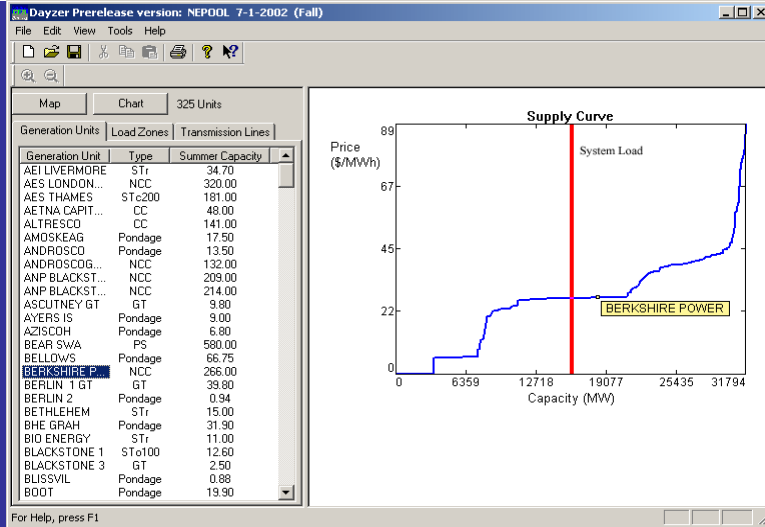*A Provider of Information and Energy Solutions*

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Day-Ahead Market Analyzer

DAYZER Sample Screen shots
1. System Supply/Demand Curve   3. Line Flows and Congestion Costs
2. System Load and Unit Commitment   4. Transmission Rights Evaluation Tool

Cambridge Energy Solutions
A Provider of Information and Energy Solutions

Cambridge Energy Solutions has developed Day-Ahead Locational Market Clearing Prices Analyzer (DAYZER) to assist electric power market participants in analyzing the locational market clearing prices and the associated transmission congestion costs in US electricity markets. This tool simulates the operation of the electricity markets, the dispatch procedures adopted and used by the corresponding independent system operators (ISOs), and replicates the calculations made by the ISOs in solving for the security-constrained, least-cost unit commitment and dispatch in the day-ahead markets. It forecasts the day-ahead hourly locational market-clearing prices and congestion costs, using the most recently available data on fuel prices, demand forecast, unit and transmission line outages, and emission permits costs. DAYZER incorporates all the security, reliability, economic and engineering constraints on generation units and transmission system components. It can be easily modified to emulate the specific operation of any regional market and the dispatch or operating procedures adopted and used by various ISOs. It is tailor-made for each regional market to capture the particularities of that market. DAYZER is currently available for the NYISO, NEPOOL, PJM RTO, MISO, and ERCOT markets, and we are currently working on the WECC.

DAYZER has the following features:
1. Easy to use and user friendly
2. Accurate security-constrained unit commitment and dispatch algorithms that mimic those used by the ISOs in the Day-ahead market
3. Accurate data inputs and assumptions (up-to-date database on thousands of items). Uses NAPD for information on generation and transmission system
4. Accurate modeling of each market with its own particularities (second contingency constraints, locational reserve markets, etc.)
5. Captures marginal transmission losses in dispatch and prices in markets where implemented
6. Graphical user interface plus Access database output, plus many reports that make the model very transparent
7. Captures transmission outages, transmission contingencies, and planned and known transmission upgrades
8. Models accurately phase angle regulators and loop flows
9. Allows users to analyze various scenarios and quantify the impact of various key variables/assumptions
10. Tested against actual market prices and the results are excellent (see DAYZER brochure)
11. In addition to DAYZER as a core, DAYZER long-term uses the following modules:
    a. Long–term load forecast (based on historical load shape and forecasted peak demand)
    b. Fuel prices from NYMEX (Fuel Oil and Natural Gas)
    c. Random Outage using Bernoulli probability model
    d. Maintenance schedule (optimized based on reserves)
   e. Imports/exports

The simulation results shown in the graphs reveal good comparison to actual Day-ahead market clearing prices published by the ISOs, given the following:

1. **Error in zonal load forecast** (uses load forecast rather than actual day-ahead bids for NYPP and assumes no virtual bidding for all markets)
2. **Error in generation unit outages** (assumes uniform de-rating of generation units)
3. **Error in bid estimation** (assumes marginal cost bidding)

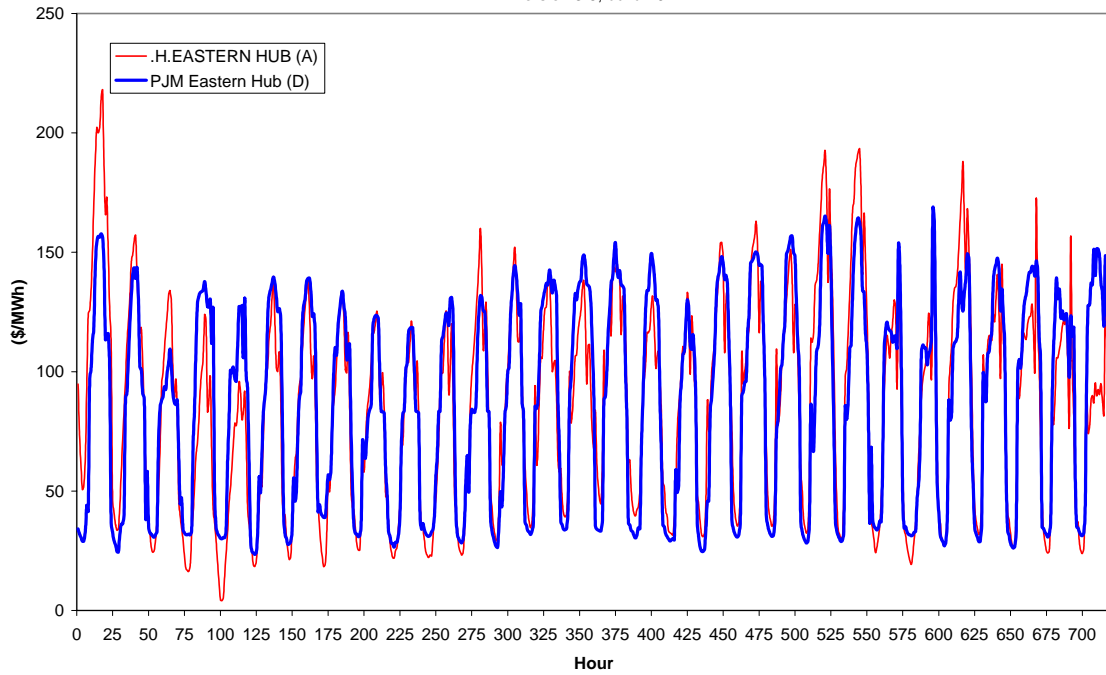The pattern shown in the graphs is consistent over longer periods

PJM RTO Western Hub LMP Comparison for 9/1/2005 to 9/30/2005
Using Standard CES Assumptions (Marginal cost bidding, forecasted zonal load and generation units deratings)
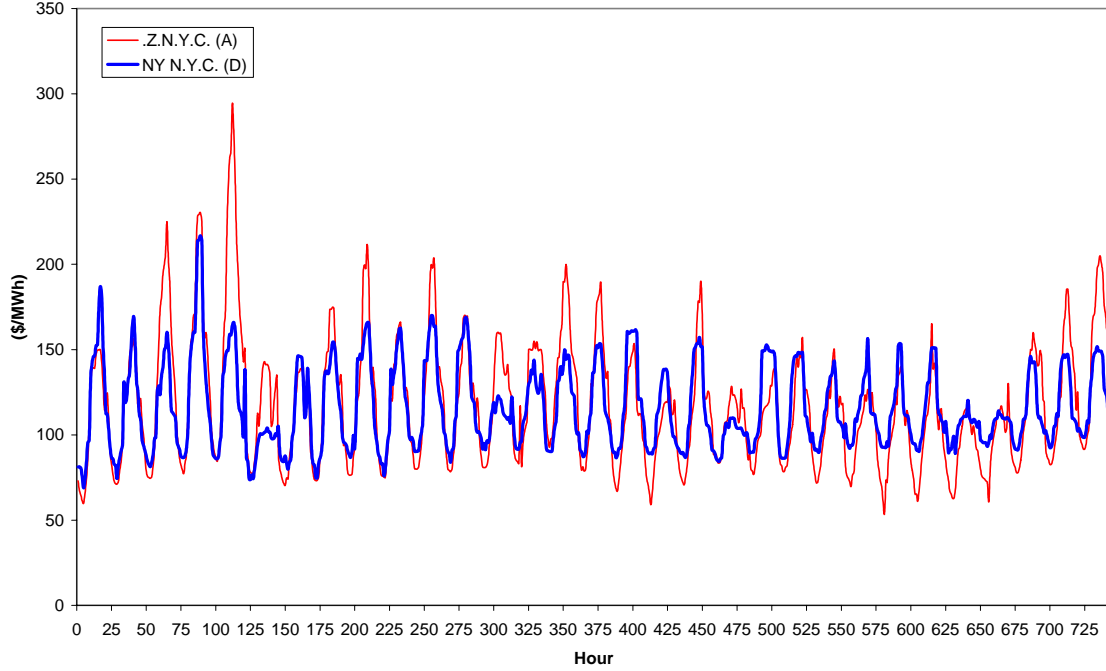DAYZER version 3.5, build 101
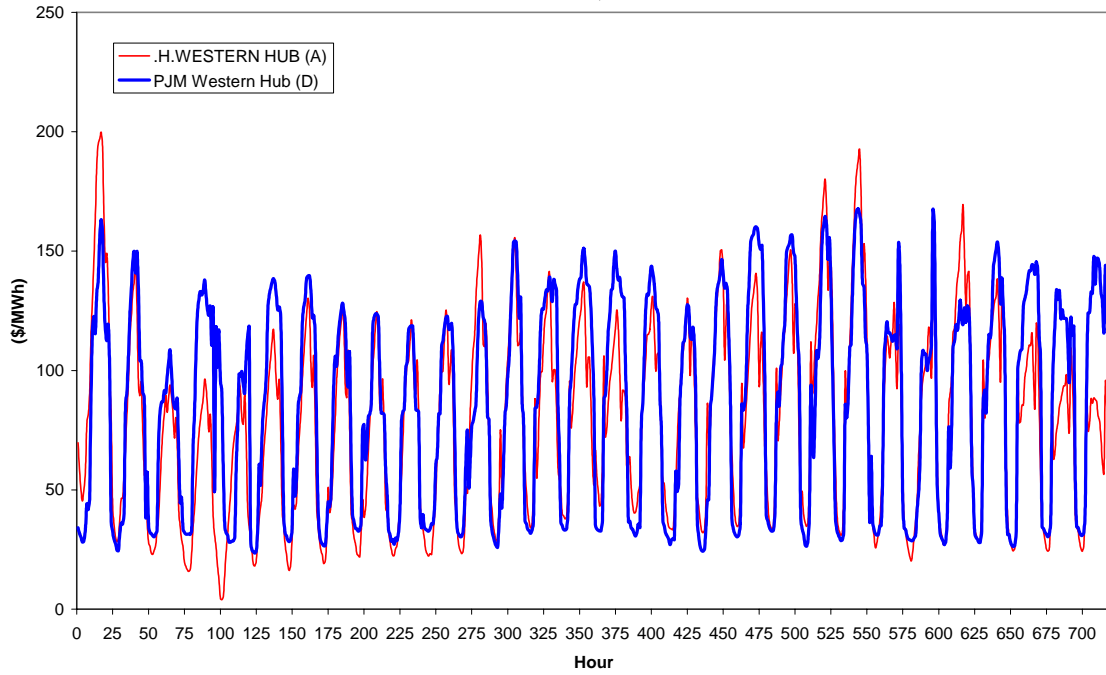
PJM RTO Eastern Hub LMP Comparison for 9/1/2005 to 9/30/2005
Using Standard CES Assumptions (Marginal cost bidding, forecasted zonal load and generation units deratings)
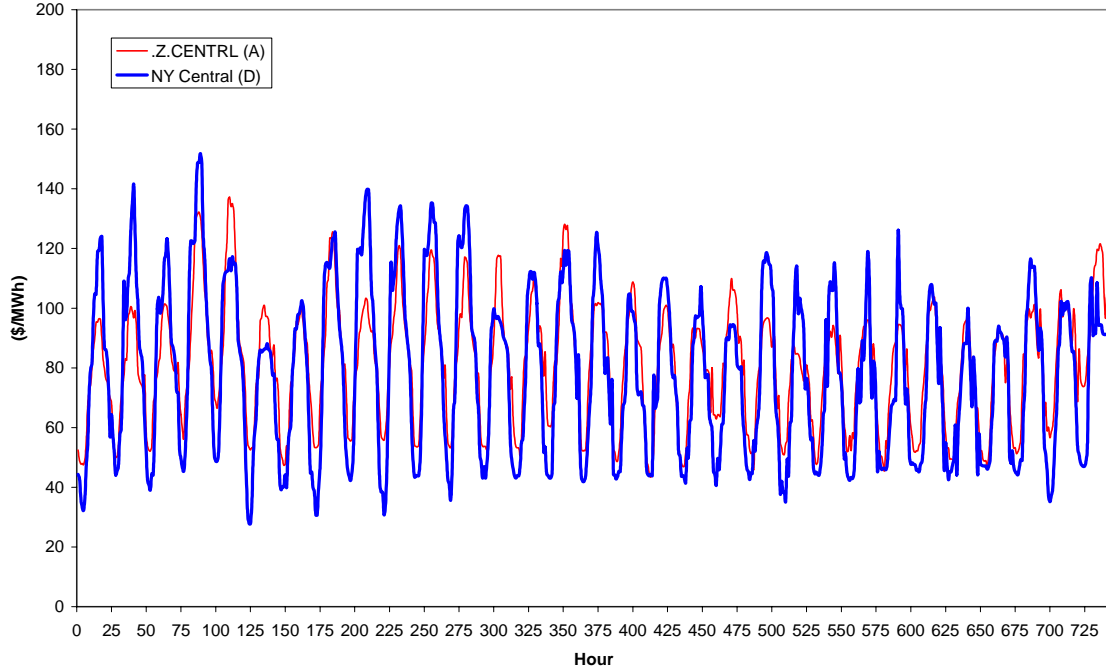DAYZER version 3.5, build 101

New York City LMP Comparison for 8/1/2005 to 8/31/2005

Using Standard CES Assumptions (Marginal cost bidding, forecasted zonal load and generation units deratings)

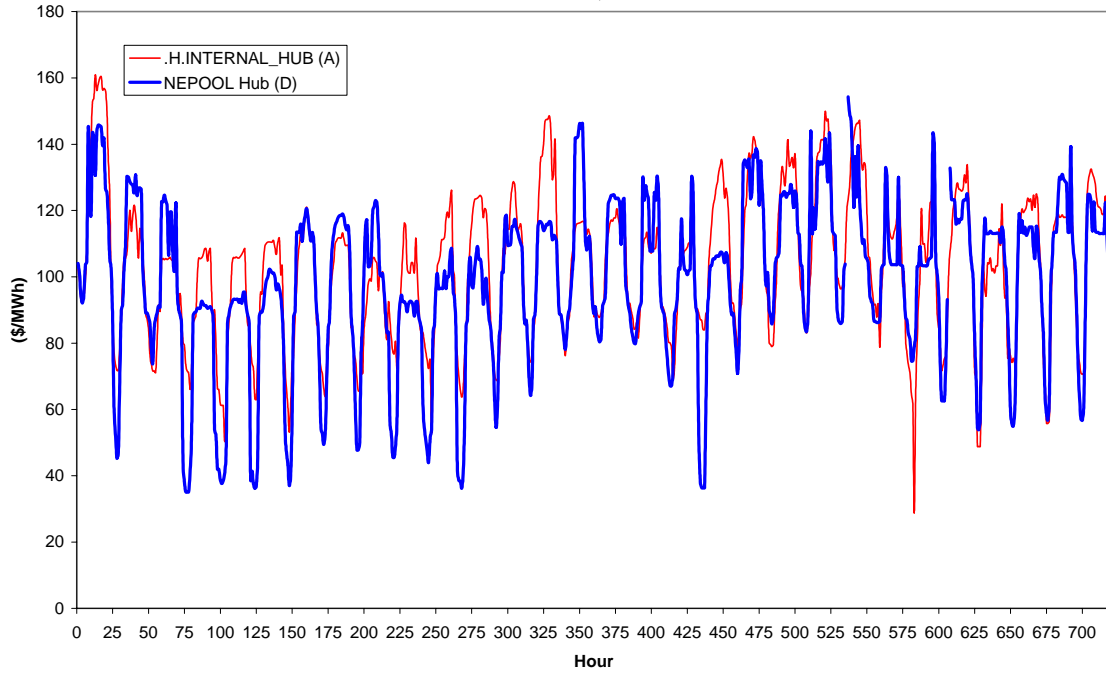DAYZER version 3.5, build 101

NY Central Zone LMP Comparison for 8/1/2005 to 8/31/2005

Using Standard CES Assumptions (Marginal cost bidding, forecasted zonal load and generation units deratings)
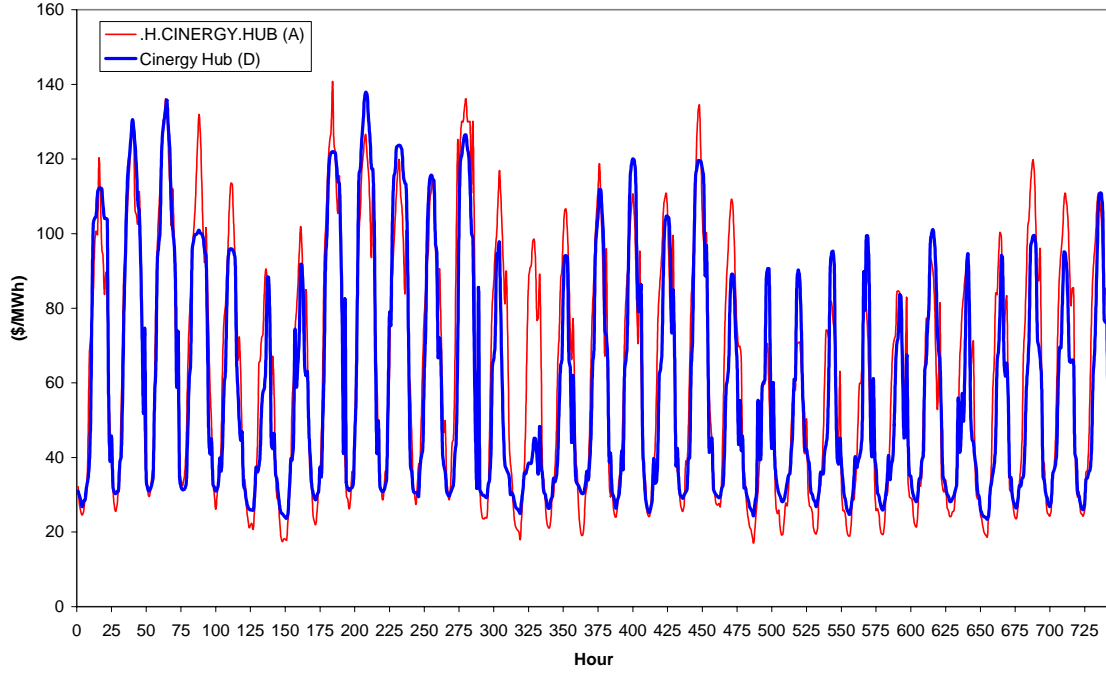
DAYZER version 3.5, build 101

NEPOOL Hub LMP Comparison for 9/1/2005 to 9/30/2005
Using Standard CES Assumptions (Marginal cost bidding, forecasted zonal load and generation units deratings)
DAYZER version 3.5, build 101

Midwest ISO Cinergy Hub LMP Comparison for 8/1/2005 to 8/31/2005
Using Standard CES Assumptions (Marginal cost bidding, forecasted zonal load and generation units deratings)
DAYZER version 3.5, build 101

ERCOT North Zone LMP Comparison for 9/1/2005 to 9/30/2005
Using Standard CES Assumptions (Marginal cost bidding, forecasted zonal load and generation units deratings)
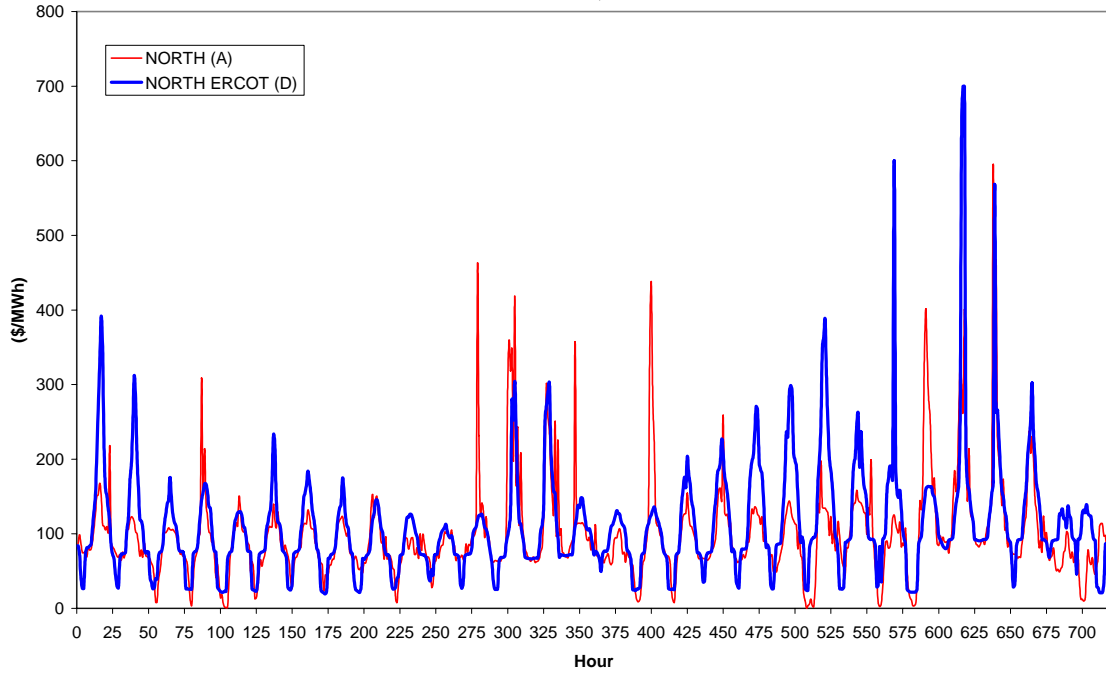DAYZER version 3.5, build 101

ERCOT South Zone LMP Comparison for 9/1/2005 to 9/30/2005
Using Standard CES Assumptions (Marginal cost bidding, forecasted zonal load and generation units deratings)
DAYZER version 3.5, build 101