



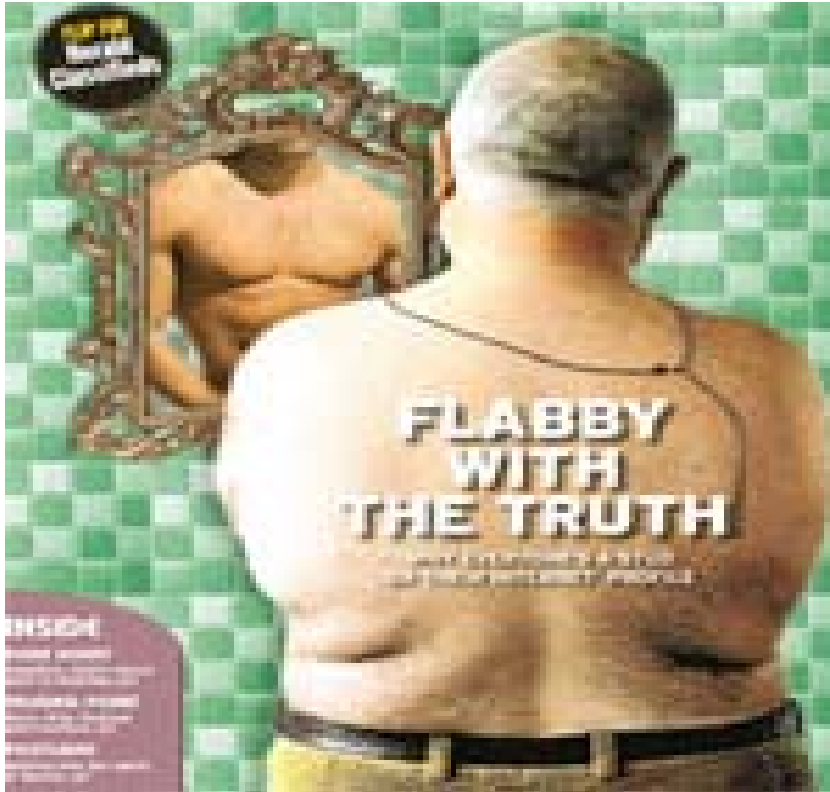
Using Historical Data to Fine-tune Aurora Predictive Capability and Gain Insights into Market Behavior

Chris Handwerk and Derek Salvino

October 16, 2009

# Motivation

- Models are great at giving insights, but are only as good as:
  - ✓ Their capabilities
  - ✓ The data that you feed into them
- AURORA<sup>®</sup> is an excellent power price forecasting tool, with lots of advanced and detailed functionality.
- Like a fine racing car, it needs to be tuned up before it can be used to race competitively
- How do we gain confidence in the model?



<http://blogs.smh.com.au/radar/flabbycover.jpg>

Having reliable and accurate data is essential



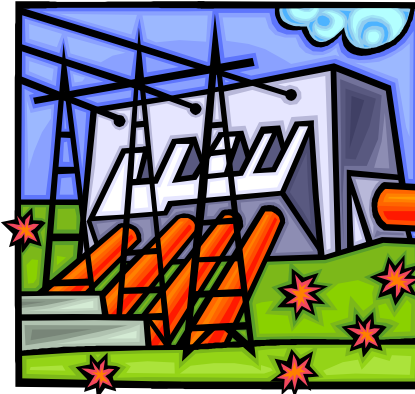
<http://celebrity-babies.com/2007/09/09/tina-fey-and-da/>

Data infrastructure and organization is key

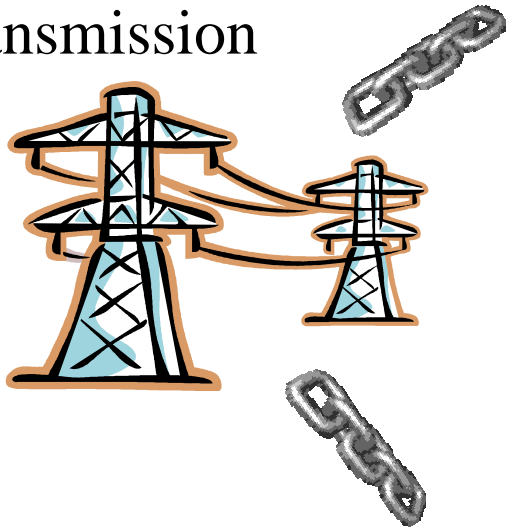
# Key Input Data (SFELT)

## Stack

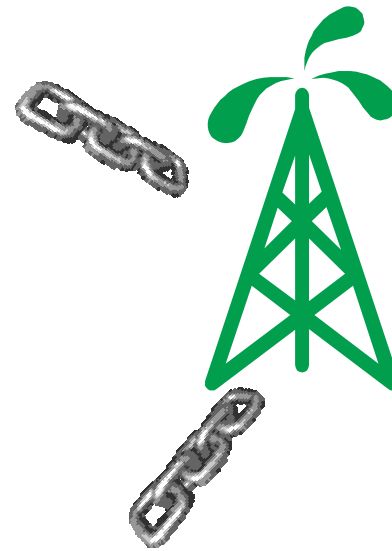
(generation characteristics)



Transmission



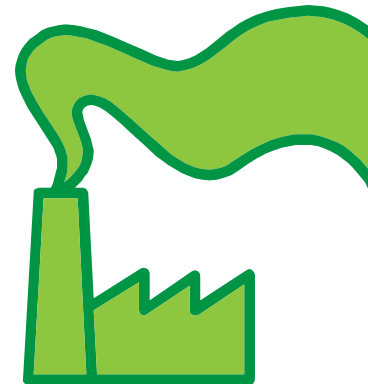
Fuels



Load



Emissions

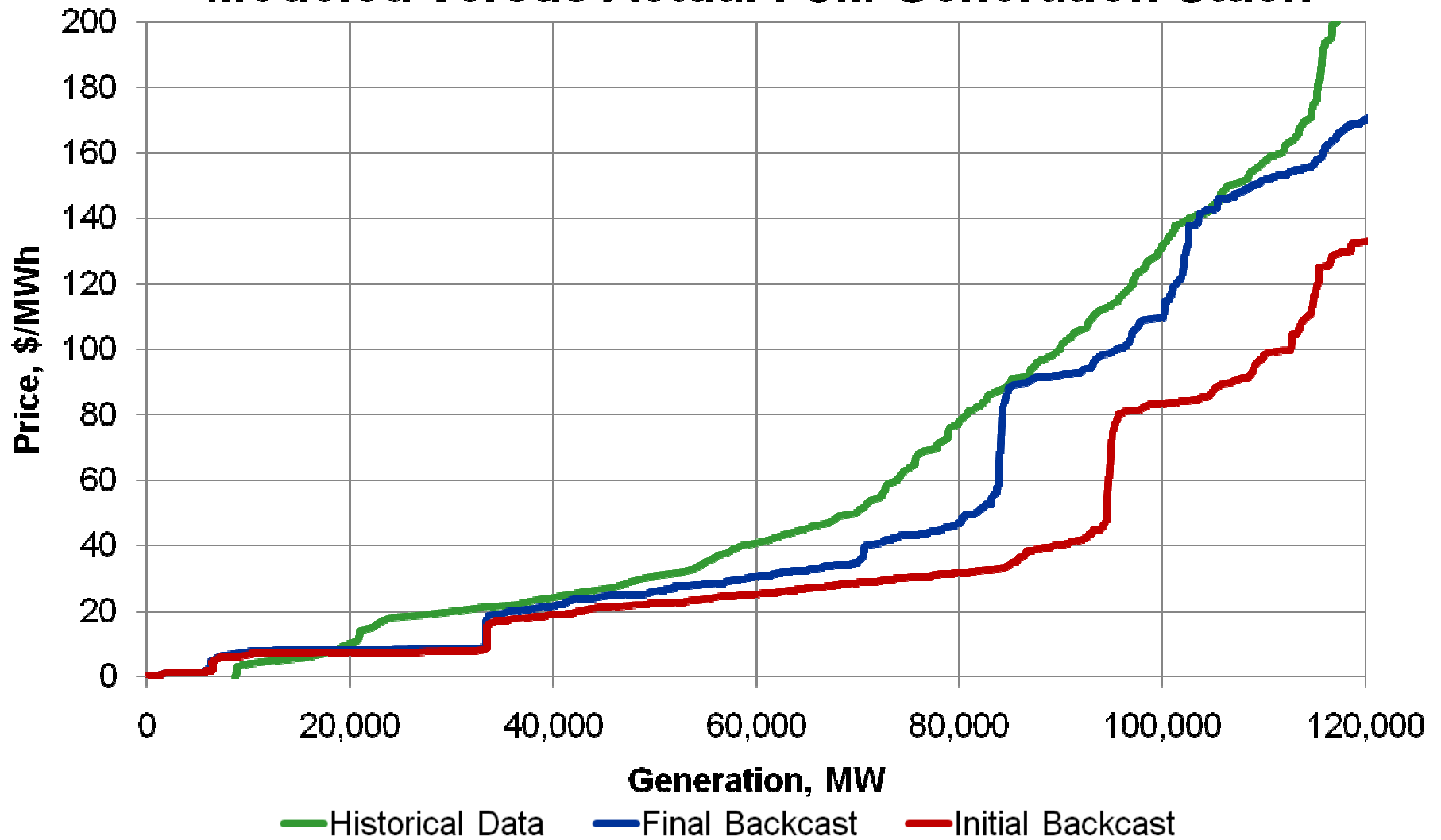


## Data sources

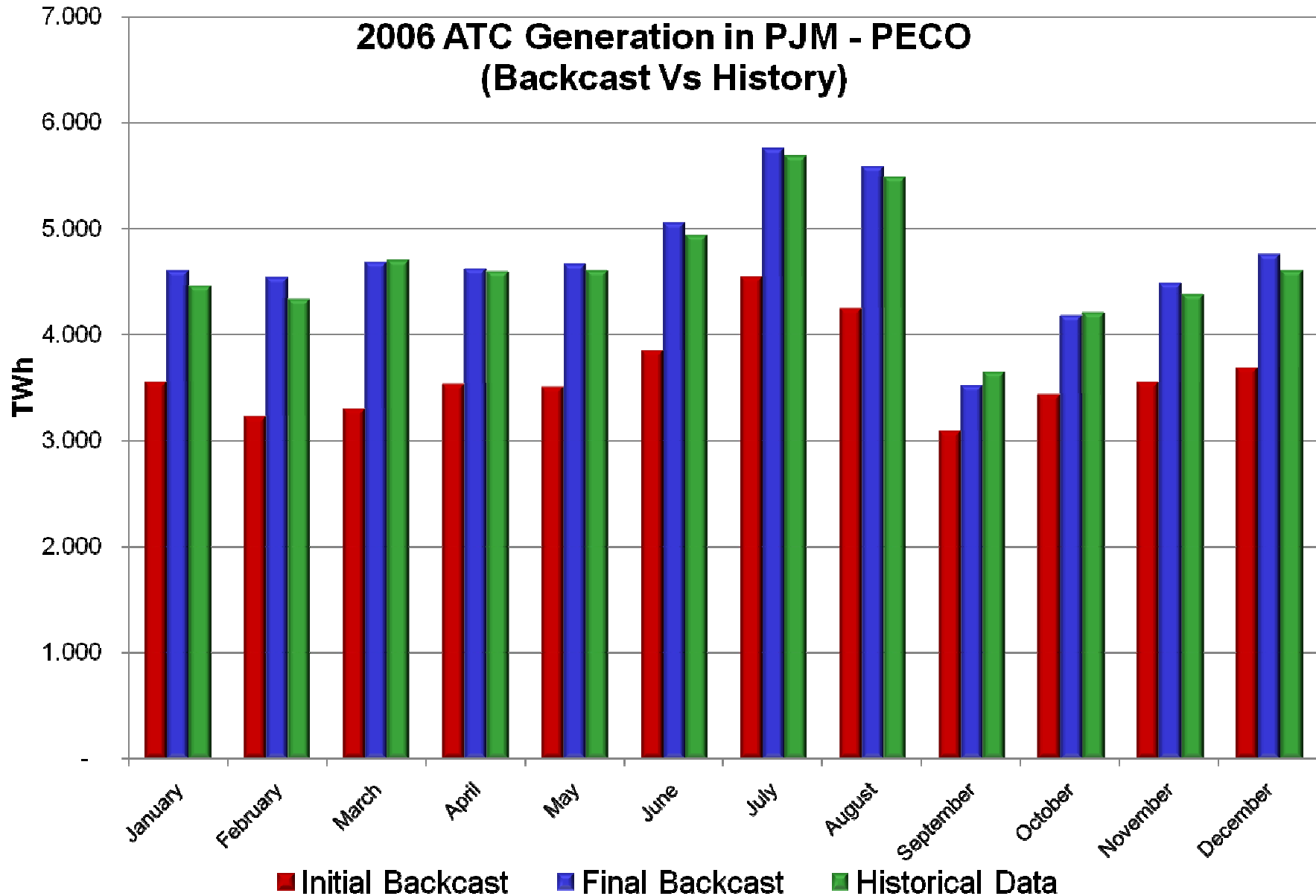
- EPIS database
  - ✓ Excellent for resource constrained organizations
- Publicly available
  - ✓ CEMS (Continuous Emissions Monitoring System - EPA)
  - ✓ FERC Forms
  - ✓ EIA
  - ✓ ISO
- Proprietary sources
  - ✓ Energy Velocity
  - ✓ Platt's
  - ✓ SNL
  - ✓ IIR (Industrial Information Resources)

# Suggested Metrics for Comparison - Stack Matching

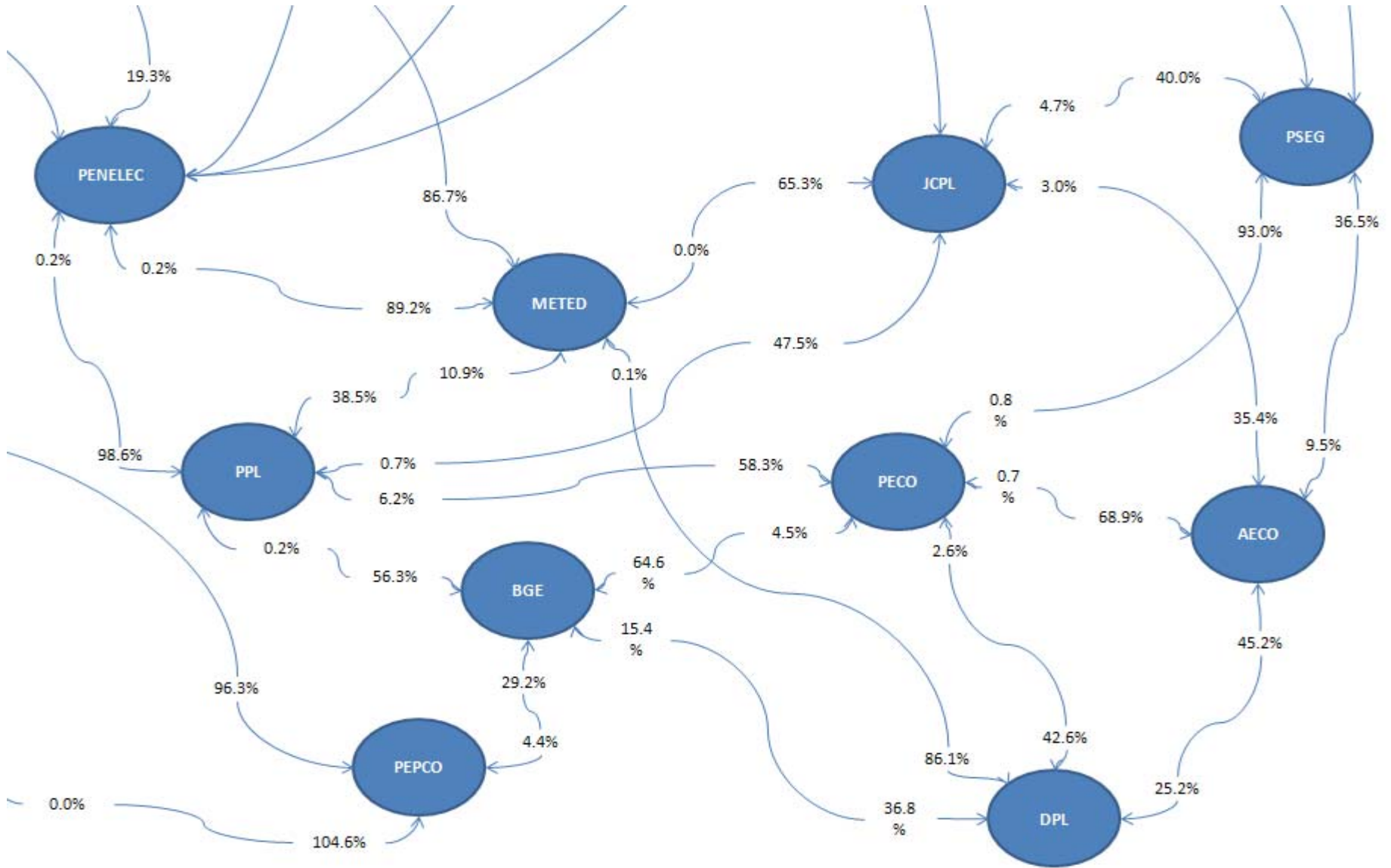
## Modeled Versus Actual PJM Generation Stack



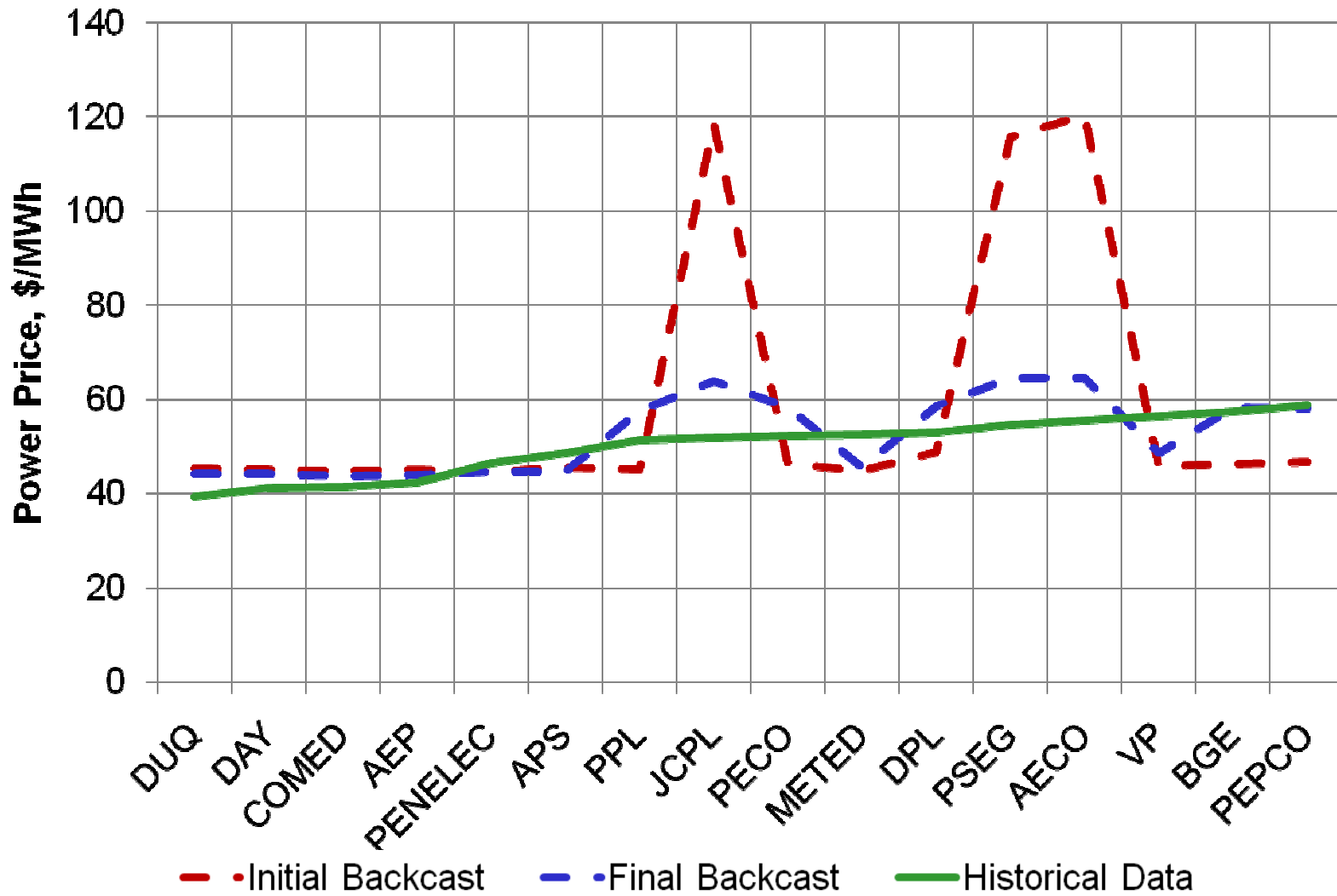
# Suggested Metrics for Comparison - Unit Operation



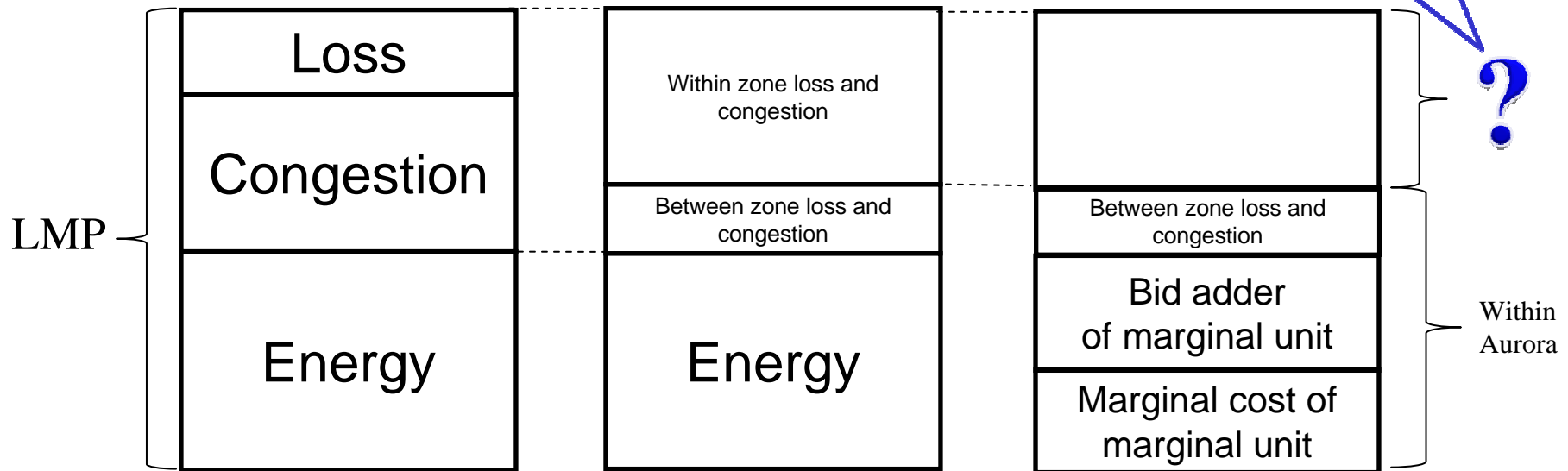
# Suggested Metrics for Comparison - Transmission Flows



# Suggested Metrics for Comparison - Zonal LMP (basis)



- Post process
- Integrated nodal solution



## Things worth investigating

- Generator characteristics
  - ✓ Start-up costs
  - ✓ Ramp rates
  - ✓ # of bidding segments (upper bidding block)
  - ✓ Emissions (seasonality)
  - ✓ Outage behavior
  - ✓ Minimum uptimes/downtimes
  - ✓ Reliability Must Run (RMR)
- Transmission link limits/wheeling charges
- Fuel costs – burner tip v. market price

## Backcasting challenges

- How close is good enough?
- Transmission
- Financial v. physical behavior
- Behavior of border regions
- Incorporating regulatory considerations
- Data management and availability
- Resources



<http://www.autobahnmag.com/wp-content/uploads/2009/05/59b48c3fd7circle.jpg>

Finely tuning your racing car will put you in the winner's circle!