





# SESSION 9

Energy Markets  
*Electric Commodity*  
*Risk Management Programs*

August 6, 2008



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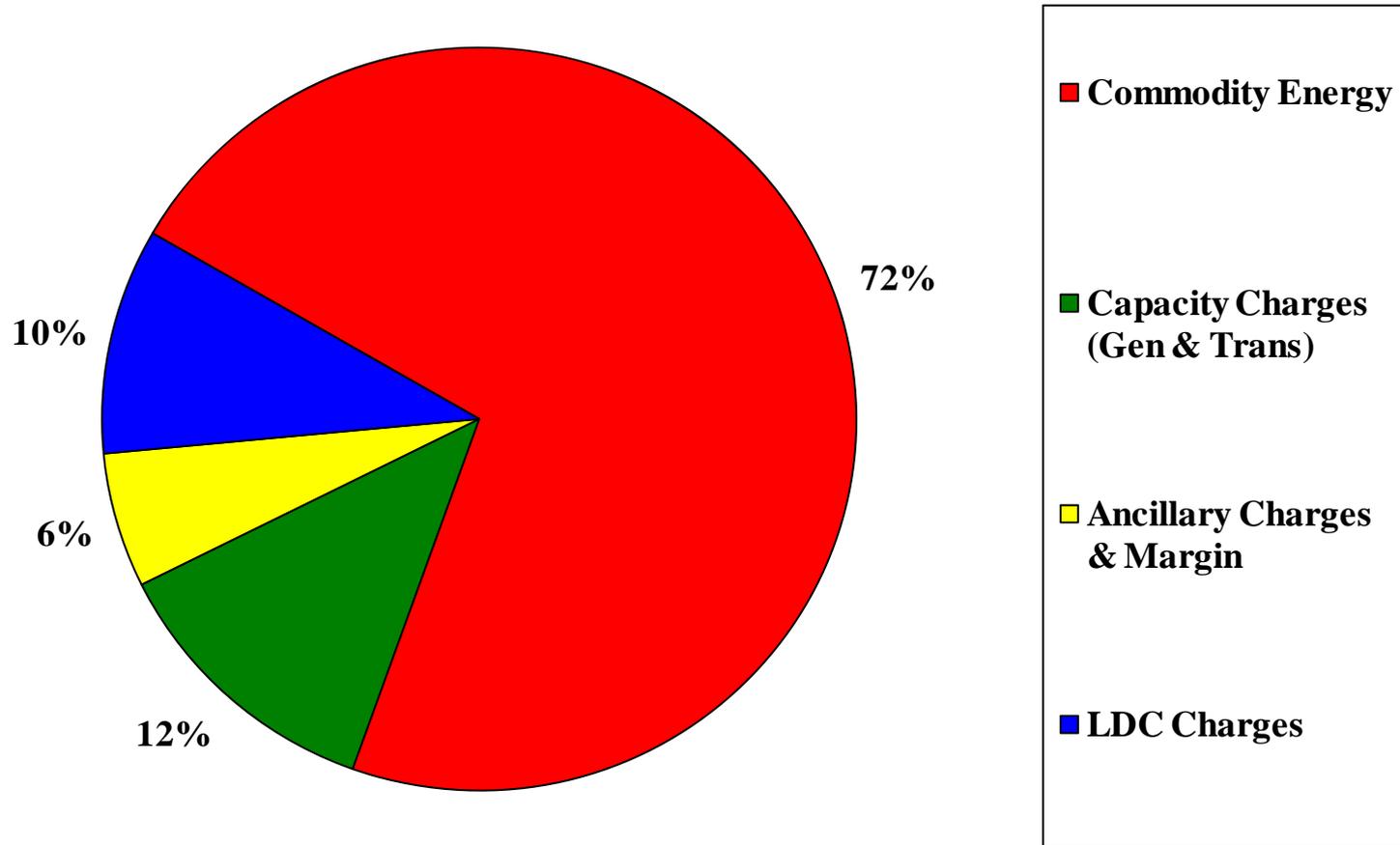


# Overview

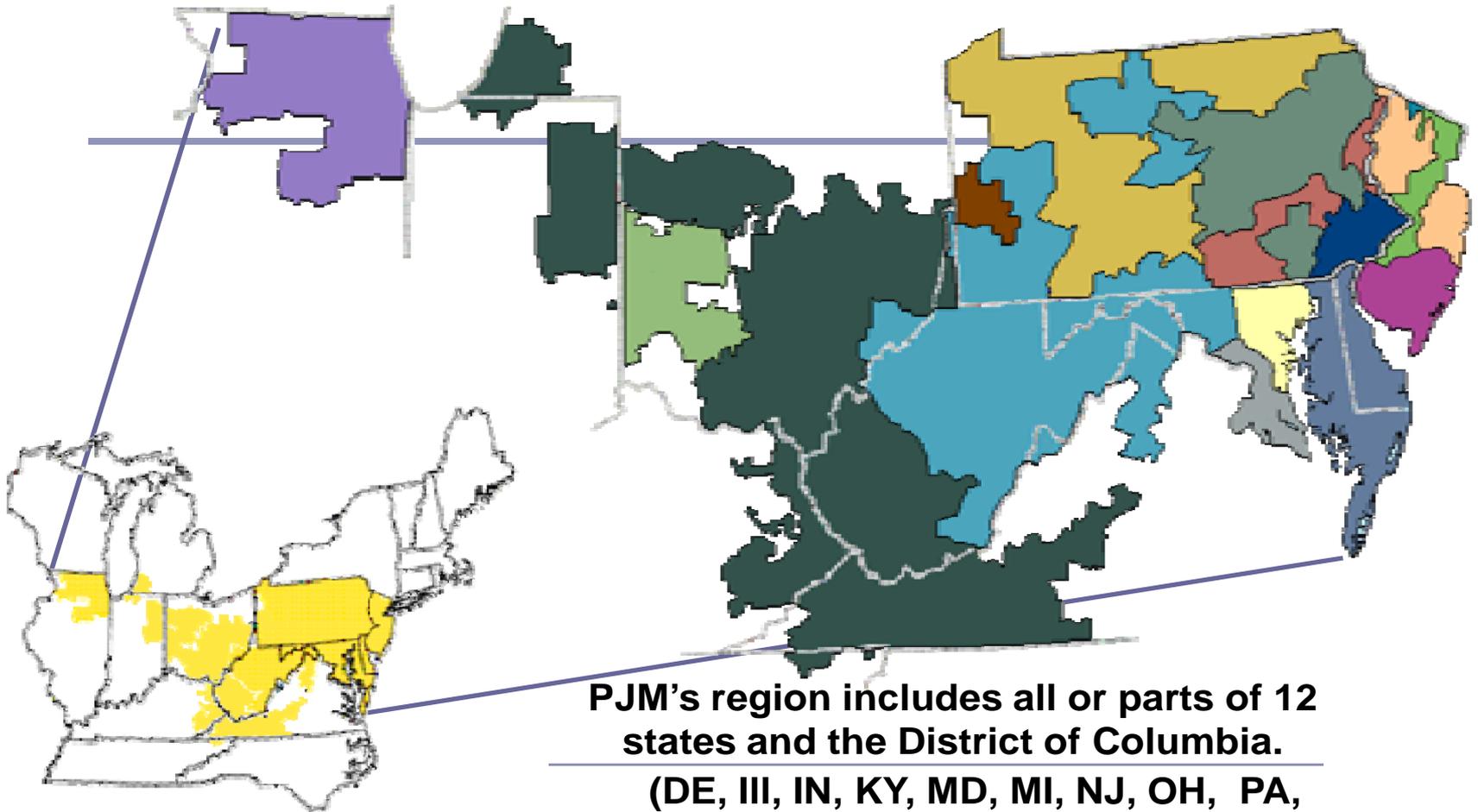
- Electric commodity price risk
- Defining your risk profile
- Risk management approaches
- Portfolio management application
- Q & A

# Electric Cost Components - Typical Eastern PJM C&I Customer

Market Illustration - Proforma 2008/2009



## *PJM Control Area*



**PJM's region includes all or parts of 12 states and the District of Columbia.**

**(DE, IL, IN, KY, MD, MI, NJ, OH, PA, TN, VA, WVA and DC)**

# Electric Forward Market Report

## Front Year On-Peak (5x16) - PJM Western Hub

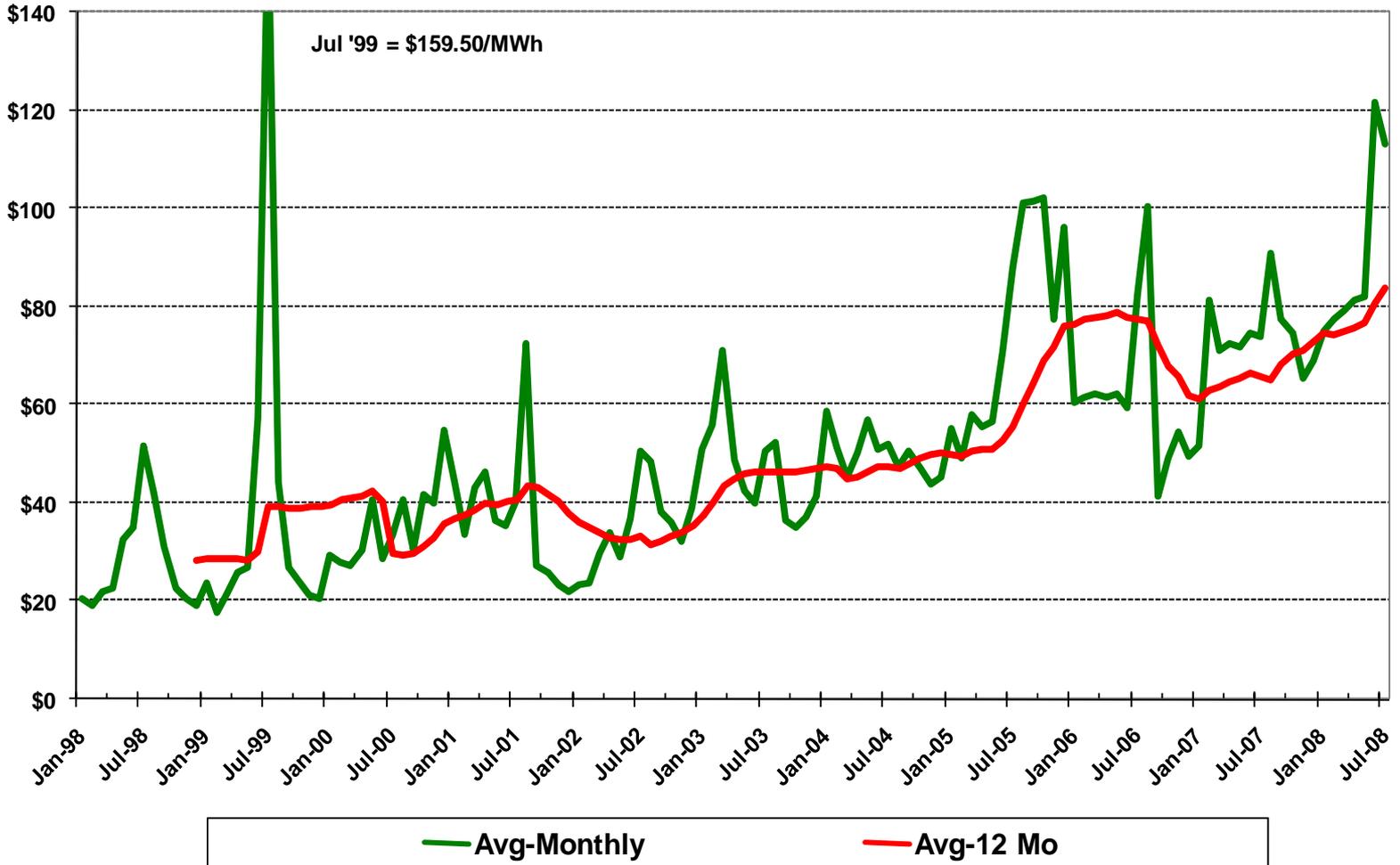
Report Date: 8/1/08

\$/MWh



# Peak Average LMP-RT PJM Western Hub, 1998 - 7/2008

\$/MWh





## PJM Western Hub Forward Electric Market Prices On-Peak Annual Summary, \$/MWh

	<u>Range</u>	<u>Average</u>
Spot - Past year (12 mos. Ending)	\$65 - \$83	\$74
Spot - 4 years (12 mos. Ending)	\$47 - \$83	\$66
Front Yr-4 yr Avg. (Next 12 Months) As of 8/1/08	\$52 - \$119	\$77 Current: \$91



# More Energy Prices

## 3 year change

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- Coal (Appalachian): +130%, \$140/ton
- Crude (NYMEX): +105%, \$125/bbl
- #2 Oil (NYMEX): +105%, \$3.50/gal
- Nat Gas (NYMEX): +20%, \$9.50/MMBtu
- Electric (PJM Peak): +32%, \$91/MWh



# Electric Generation Fuel Sources PJM - Regions change exposure

Coal	55%
Nuclear	34%
Gas	8%
Hydro	2%
Oil	-%
All Other	1%



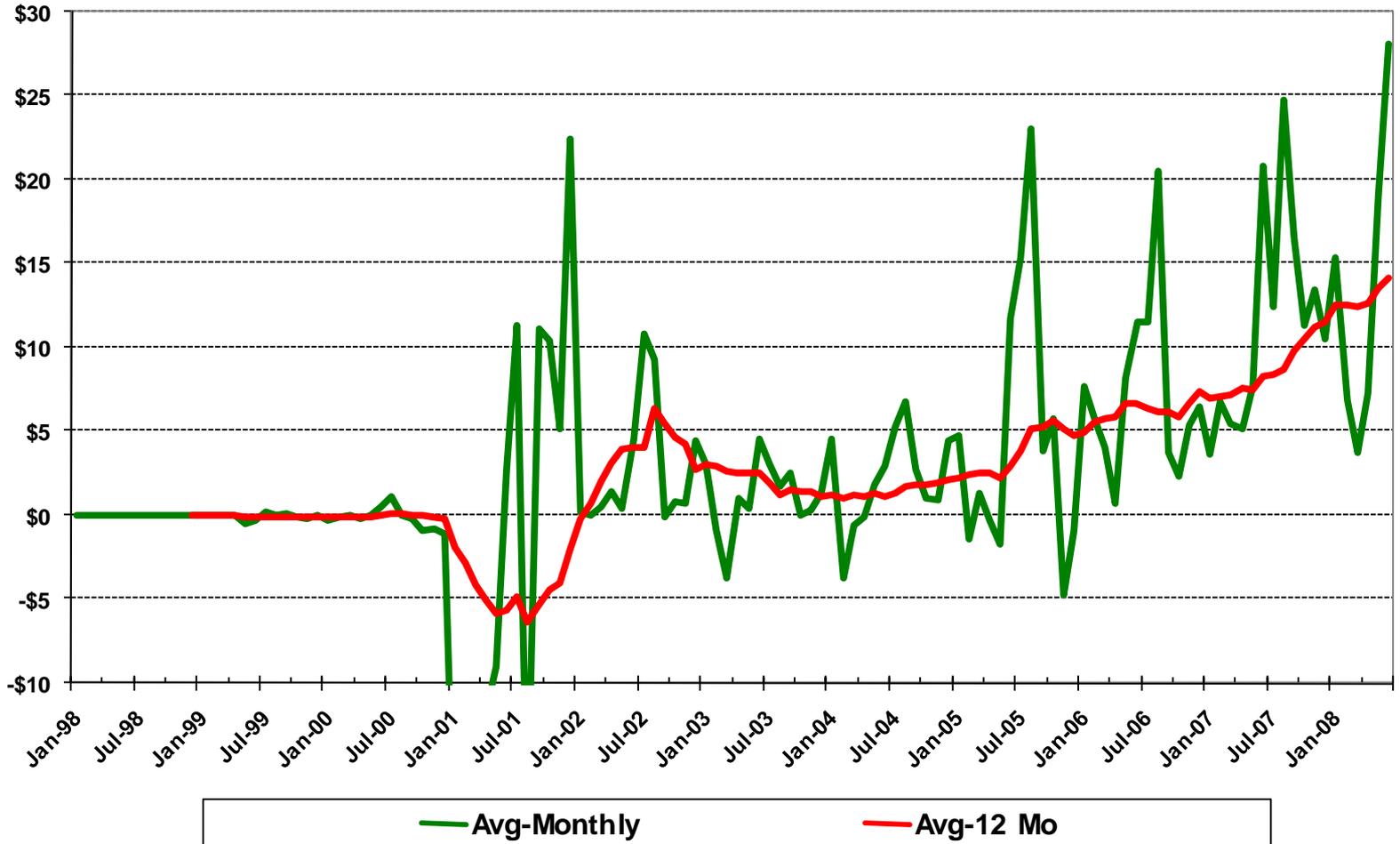
# Other Energy Related Markets

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- Capacity markets – various types
- Ancillary electric markets – transmission
  - Substantial escalation in past 3 years
- Renewables markets
  - Fractured markets / no standards / illiquid
- Basis markets - congestion
  - Degraded transparency and liquidity

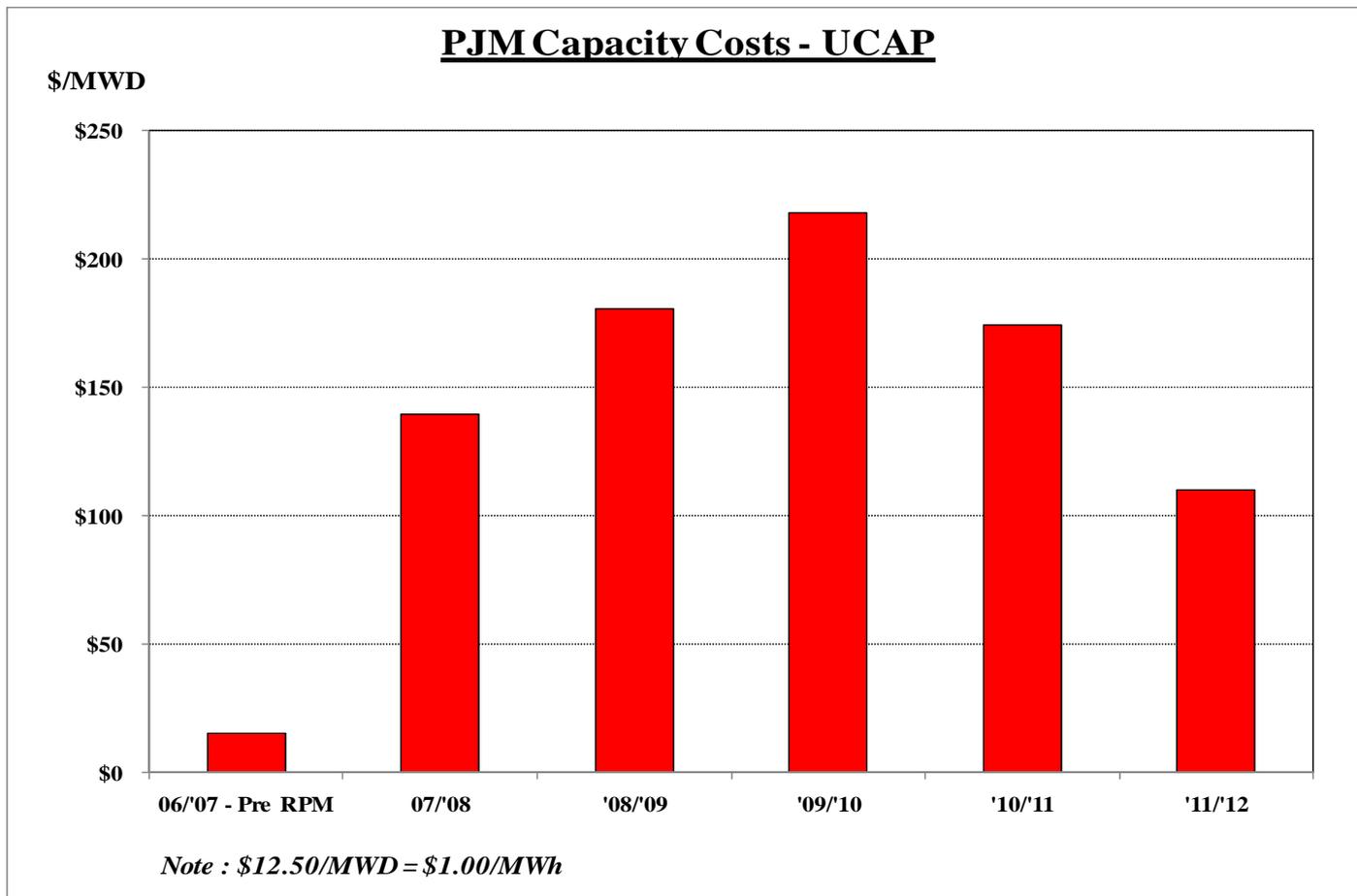
# Peak Average LMP-RT PJM BGE Zone Basis, 1999 - 7/2008

\$/MWh





# Capacity Costs in various markets





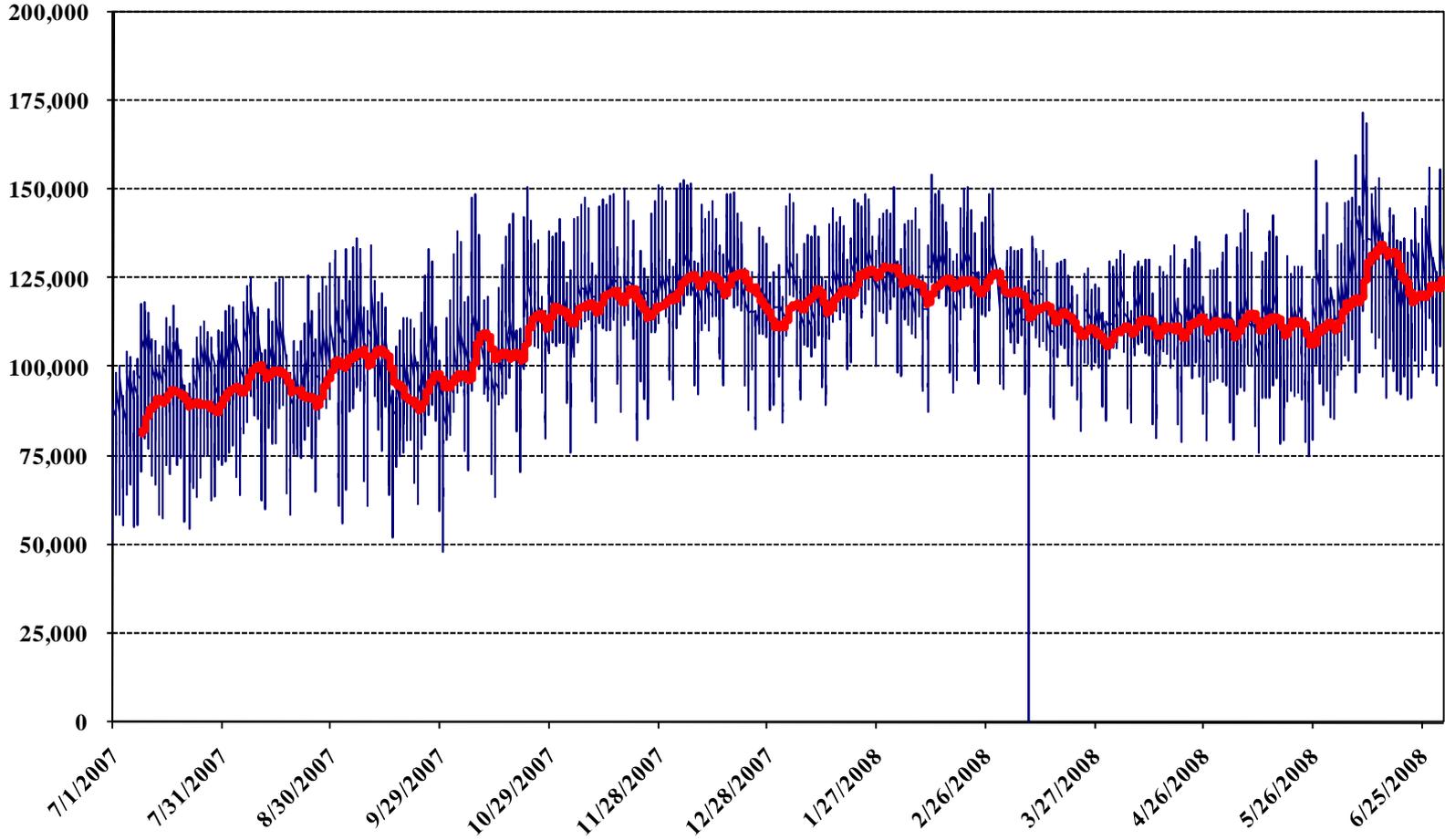
# Volumetric Risks

- Volumes change proportionately
  - Changes exposure to average hourly market
  - Impact based on supplemental purchases or liquidations
- Volumes change disproportionately
  - Changes ratio of purchases in markets
  - Impact based on volume shift in load and supplemental purchases or liquidations
- Weather & process spikes
  - Possibility to change capacity tags



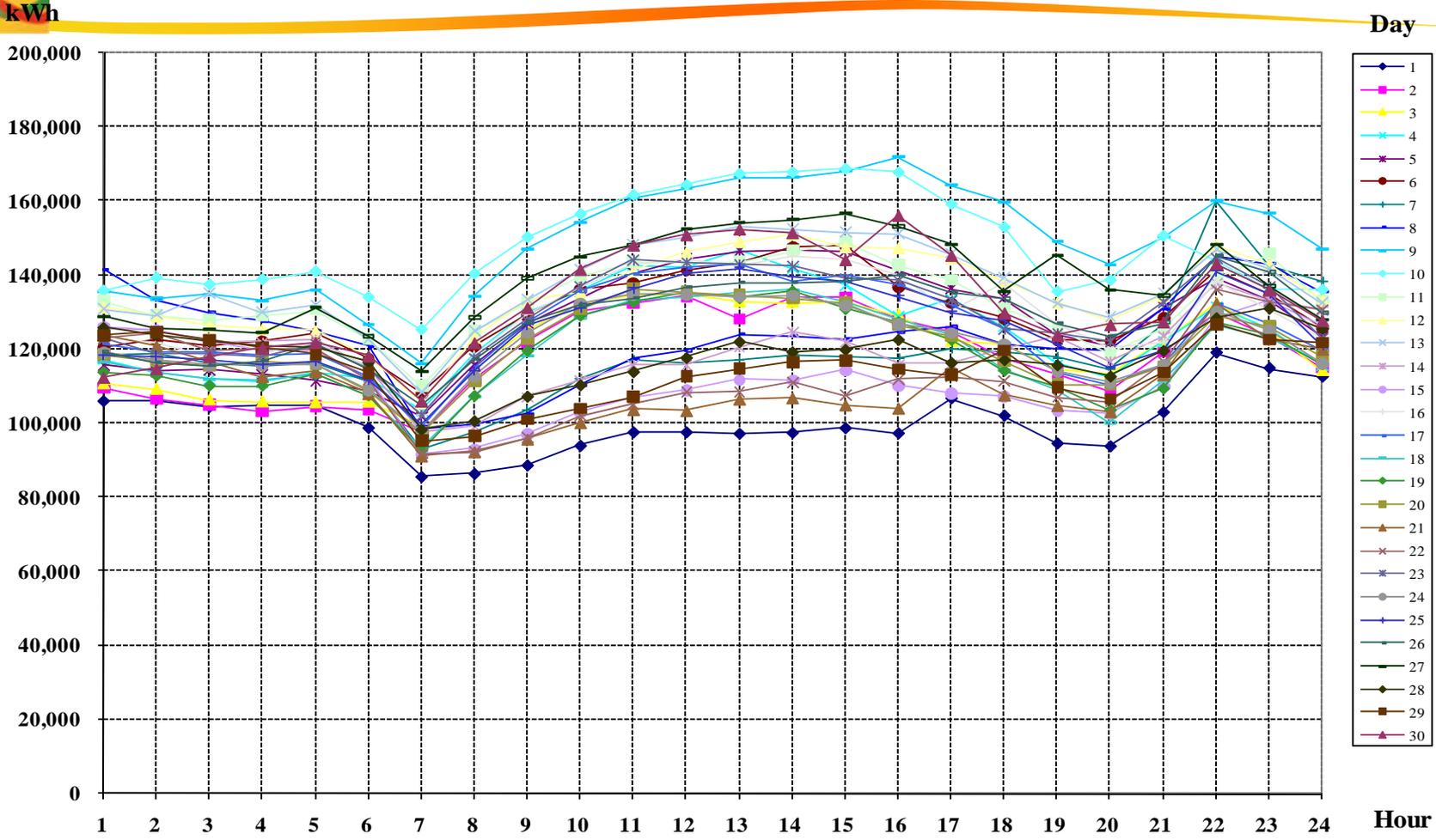
# Sample Portfolio Hourly Load

KW



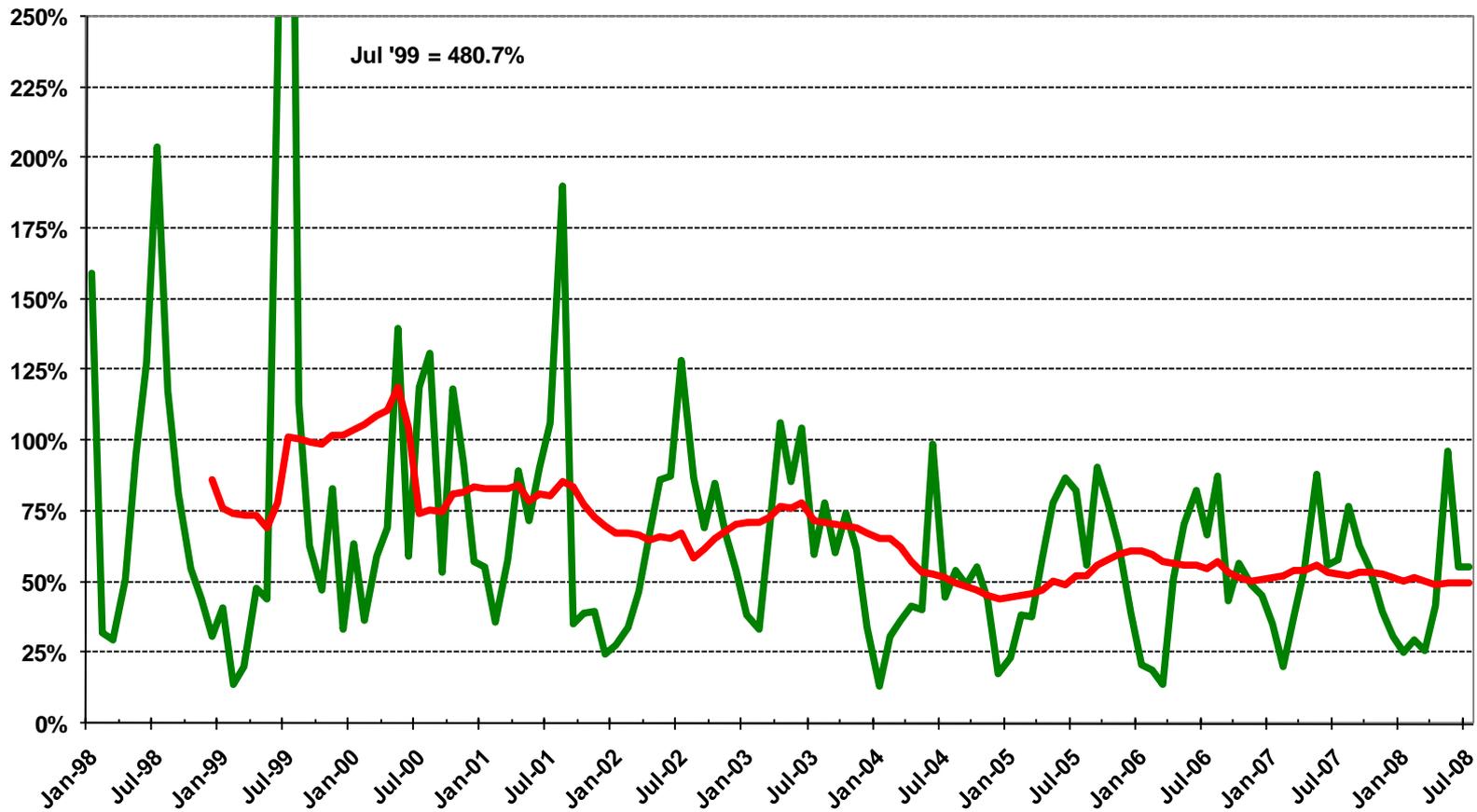


# Sample Portfolio, Hourly Load - Jun 2008



# Peak Premium Ratio, 1998 - 7/2008

\$/MWh



— Avg-Monthly      — Avg-12 Mo



# Buyer Risk Spectrum

*Lower cost  
over time*

*Higher cost  
over time*



Volatility

(Doesn't mean higher cost)

Short contracts in high  
markets to gain long  
contracts in lower markets

Certainty

100% of usage under  
fixed price contract  
prior to budget /  
measurement period



# Electric Risk Profile Considerations

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- Time horizon
  - Electricity used perpetually but manage risk for limited time
- Budget flexibility
  - Tolerance for intra year cost variations / symmetrical?
- Multi-year escalation tolerance
  - Tolerance for multi year cost changes beyond budget period
- Operational flexibility
  - Ability to make short-term usage changes
- Capital availability
  - Funds available to invest in energy assets
- Electric cost impact on organization
- Administrative / management resources



# Elements of Electric Risk

- Core commodity
  - Fixed vs. floating
  - Fixed price timing
- Basis / congestion
  - Fixed vs. floating
  - Fixed price timing
- Capacity
  - Generation
  - Transmission
- Ancillary
- Renewable requirements
- Volumetric changes



# Multi-disciplinary Approach

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- PURCHASING APPROACH/STYLE
  - Traditional fixed price, full requirements purchasing
  - Portfolio approach - block / index approach
- Demand response (short duration / relatively infrequent)
  - Behavior modification
  - Process modification
  - Onsite generation (peaking)
- Conservation (persistent purchase changes)
  - Behavior modification
  - Load shifting
  - Onsite generation / cogeneration



# Purchasing Approach

- Fixed price, full requirements approach
  - All or none / non-standard transactions
  - Capacity can pass through depending on market/supplier
  - Volumetric risk passed to supplier
- Portfolio approach - block & index
  - Retail contract typical application for less than 25 - 30 MW loads
  - Create captive supplier or ISO supply account for large groups
  - Experience and analysis suggests
    - \$5 - 8/MWh advantage over fixed price, full requirements structure
    - Additional \$2 - 4/MWh potential for captive supply structure



# Portfolio Approach - Wholesale

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- Create captive supplier or contract for ISO supply account
- Unbundled pricing process
  - Spreads price risk over time
- Fixed price standard electric blocks limit dominant price risk
  - Core commodity & basis/congestion
- Access wholesale market for transparency and enhanced competition
- Ability to direct contract with generation (traditional or renewable)
- DA scheduling controls ancillary risk
- Manage capacity independently / 100% load response benefit
- Renewable requirements managed independently
- Adapts to volumetric changes objectively / no premiums



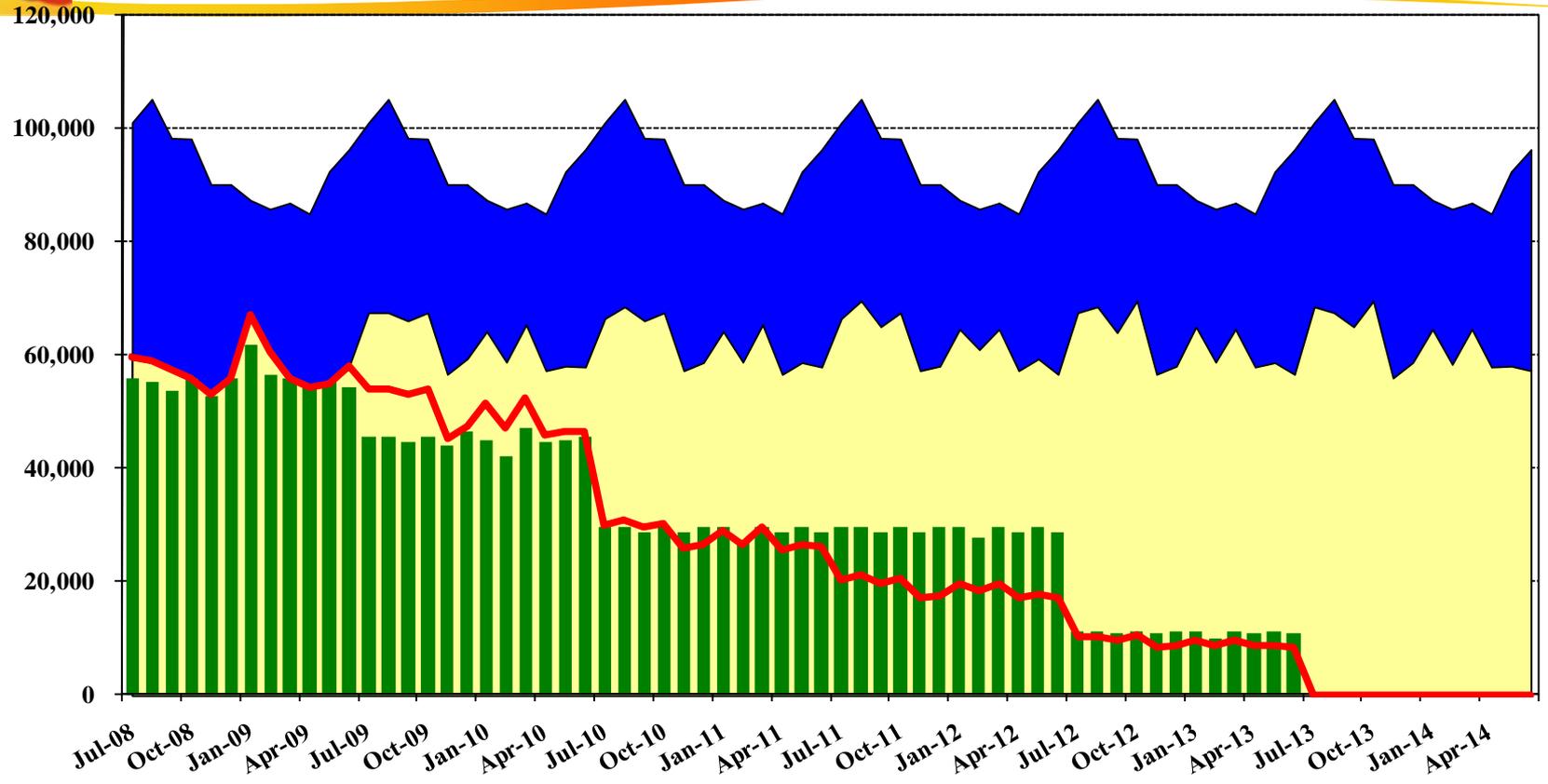
# Sample Policy Elements

- Time horizon: 5 years
- Budget period variance: +/- 8%
- Annual Escalation Limit
  - Years 1 & 2: 10%
  - Years 3+: 15%
- Annual Price Target
  - Years 1 & 2: +5%
  - Years 3+: flat
- Operational
  - 20 - 25% spot market exposure average, off-peak 80% of average
  - Ancillary: DA schedule min 75%, mitigate RT price spikes
  - Capacity: 15% load response, 15 days, 4 hours
  - Conservation: TBD
- Renewable: 20% total, physical assets allowed for 80%



## Sample Portfolio Electricity Purchasing Status, August 2008

MWh



- Amount of electric supply purchased at time of use from the wholesale grid operator (Day Ahead or Real Time)
- Maximum amount of electric supply scheduled to be purchased as block purchases
- Amount of electric supply currently under contract
- Minimum amount of electric supply scheduled to be purchased to maintain compliance with policy



# Sample - Next Year - Market Scenar

As of 8/1/08

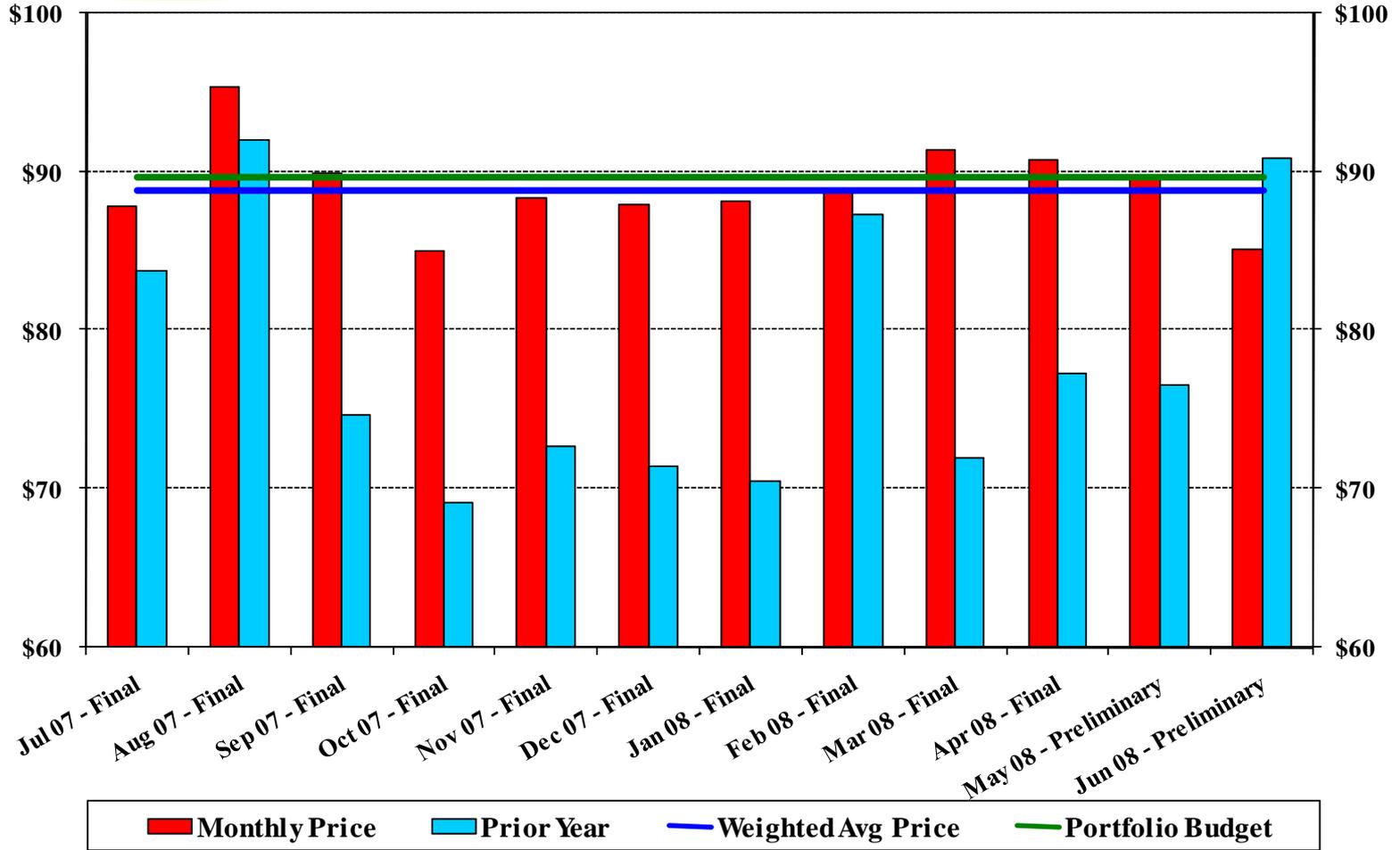
## Commodity Unit Cost, \$/MWh

<u>Spot Scenar</u>	<u>Spot Only</u>	<u>Positions</u>	<u>Market</u>	<u>Comple</u>
Mkt #1	\$86.28	\$90.84	\$96.53	\$91.
Mkt #2	76.82	88.65	94.36	88.
Mkt #3	86.76	89.64	96.04	90.
Mkt #4	62.04	84.78	90.98	85.
Average	77.98	88.48	94.48	89.



## Portfolio Commodity Cost Sample Portfolio - Current Year

\$/MWh





# Conclusions

- Portfolio approach tailored to specific user
- Unbundled pricing allows flexibility to treat cost components differently based on market and user conditions
- Wholesale structure reduces transaction costs and increases transparency
- Portfolio approach flexible and can adapt to changing user needs and market conditions
- Portfolio approach facilitates diversity of financial and physical resources (analogous to mutual fund)
- Load response benefits can be fully captured