

# REGIONAL MARKETS

## Evolution of Rules and Responsibilities



*NARUC Energy Regulatory Partnership Program*

*The Energy Regulatory Commission of the Republic of Macedonia  
and*

*The Vermont Public Service Board*

*by*

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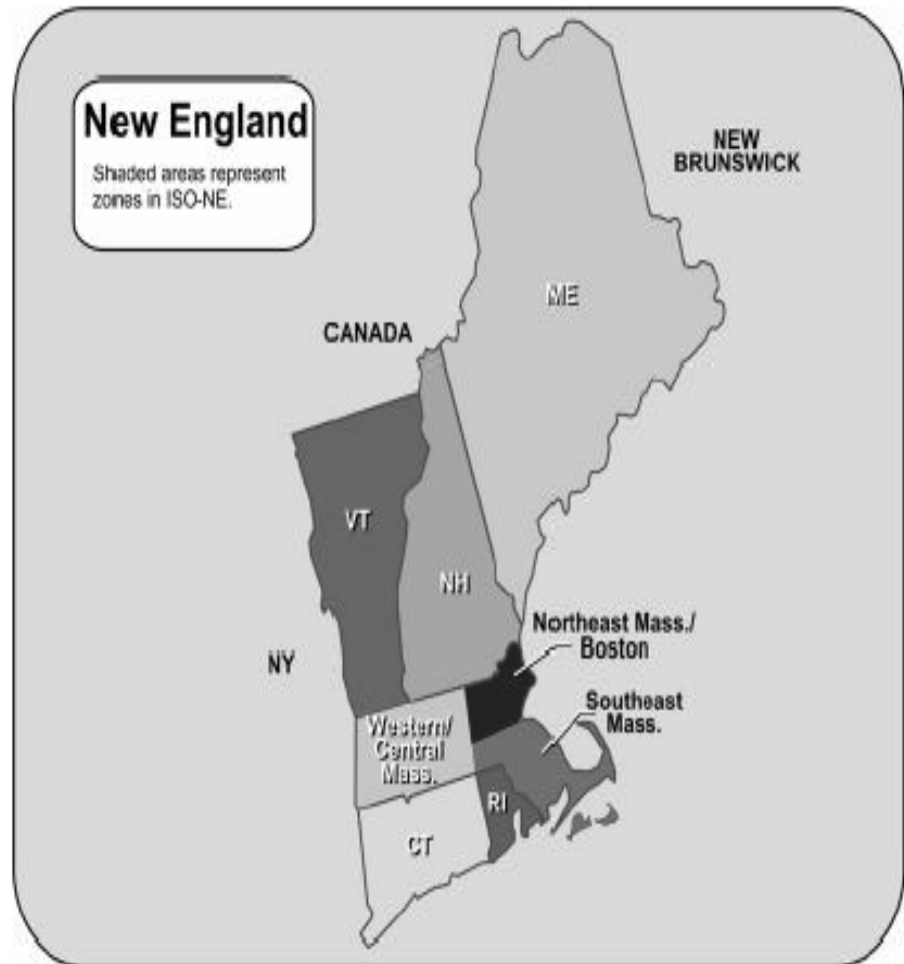


# *Outline*

- ❖ Context and history
- ❖ General rules
- ❖ Roles and obligations of parties
- ❖ Wholesale market results

# *Regional Market Facts (update)*

- ❖ 6.5 million electricity customers
- ❖ 8 Zones
- ❖ 230 market participants
  - 7 transmission owners and 8,000+ miles of high-voltage transmission lines
  - 350 generating units
- ❖ 2002 – highest annual peak load of 25,348 MW
- ❖ Load growth = 2% annually
- ❖ 32,000 MW of installed capacity
  - 35% gas-fired
  - 26% nuclear
  - 35% fossil fuel (coal or oil)
  - Hydro, wood, refuse, wind, imports (4%)
- ❖ 88% of generation is unregulated (Vermont is the only state that still regulates companies that own generation – others are divested)
- ❖ \$7.25 billion annual transactions



# *Evolution of The Regional Electricity Market*

## ❖ Timeline

- 1<sup>st</sup> Year of Wholesale Electricity Market Operations – 1999
- Standard Market Design and Locational Marginal Pricing implemented in March 2003
- Forward Reserve Market reforms introduced 2004
- Capacity Market reform under discussion



## *Rules Prior to 1999*

- ❖ Formal wholesale electric markets did not exist
  - Single, region-wide reliability and economic dispatch since 1971
- ❖ Load serving entities (distribution utilities) were vertically integrated
- ❖ Each state regulated retail electric prices based on cost of service
- ❖ The six states in the region pooled generation resources for reserve purposes
- ❖ Open-Access Transmission Tariff in place: 1997



## *After 1999 But Prior to SMD*

- ❖ An Independent System Operator (ISO) was formed
- ❖ The ISO dispatches generation according to a least-cost security constrained model
- ❖ All load in the region paid one average regional electricity clearing price
- ❖ No Day-Ahead market
- ❖ States (except VT) began requiring divestiture of generation
- ❖ ISO began open access to transmission system

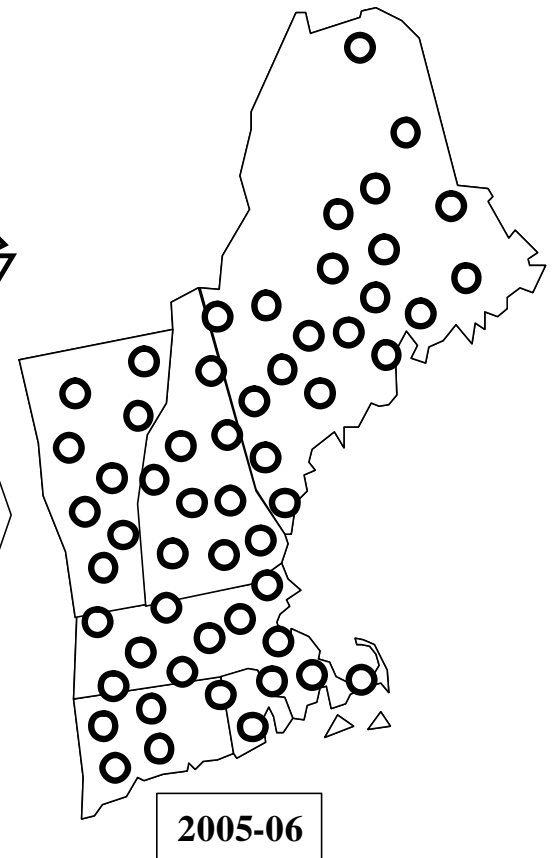
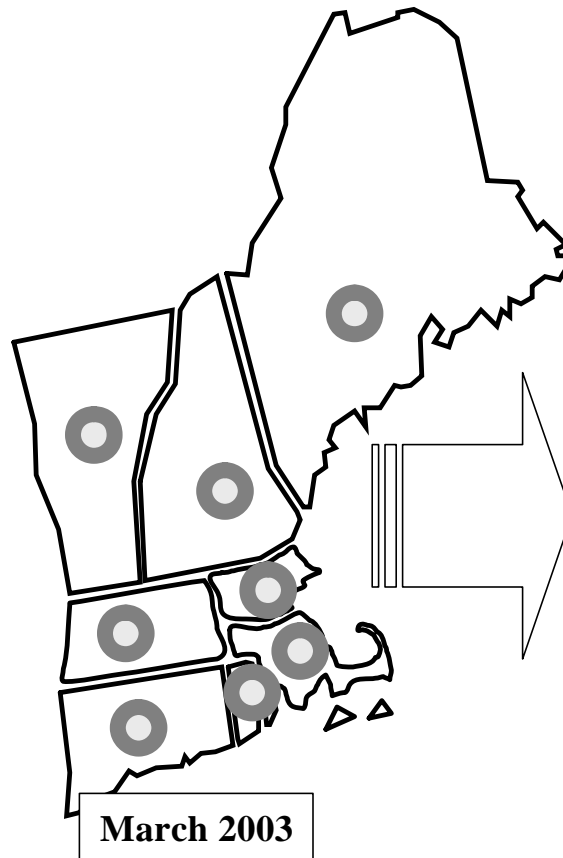
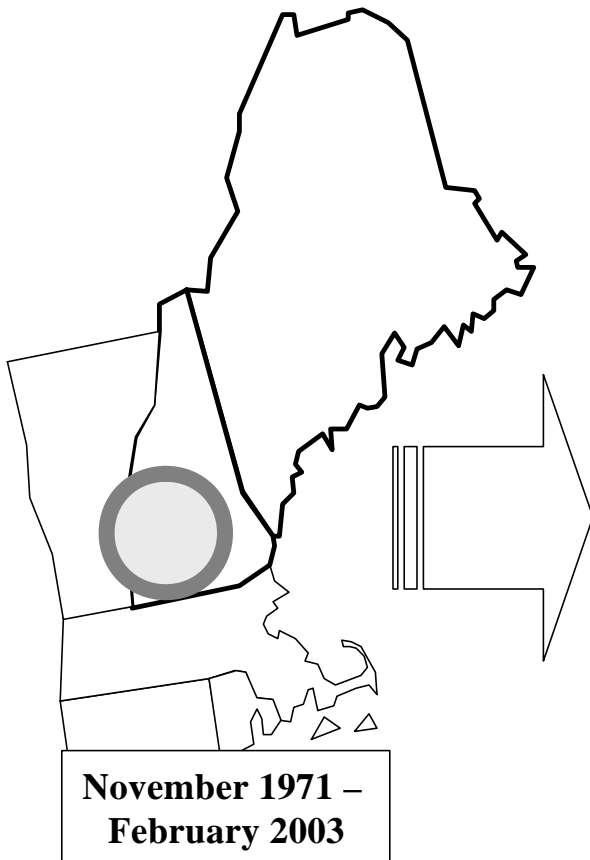


# *Post-SMD (2003 and beyond)*

- ❖ 5 of 6 states fully divested of generation
- ❖ 5 of 6 states have some retail choice
- ❖ Locational marginal pricing and congestion management are the backbone of the market
  - $LMP = \text{Energy} + \text{Congestion} + \text{Losses}$
  - LMPs are calculated at over 900 nodes on the system
- ❖ Enhanced risk management tools
  - Bilateral contracts
  - Day-Ahead Market (DAM)
  - Financial Transmission Rights (FTRs)
  - Auction Revenue Rights (ARRs)



# *Evolution of Rule Changes*



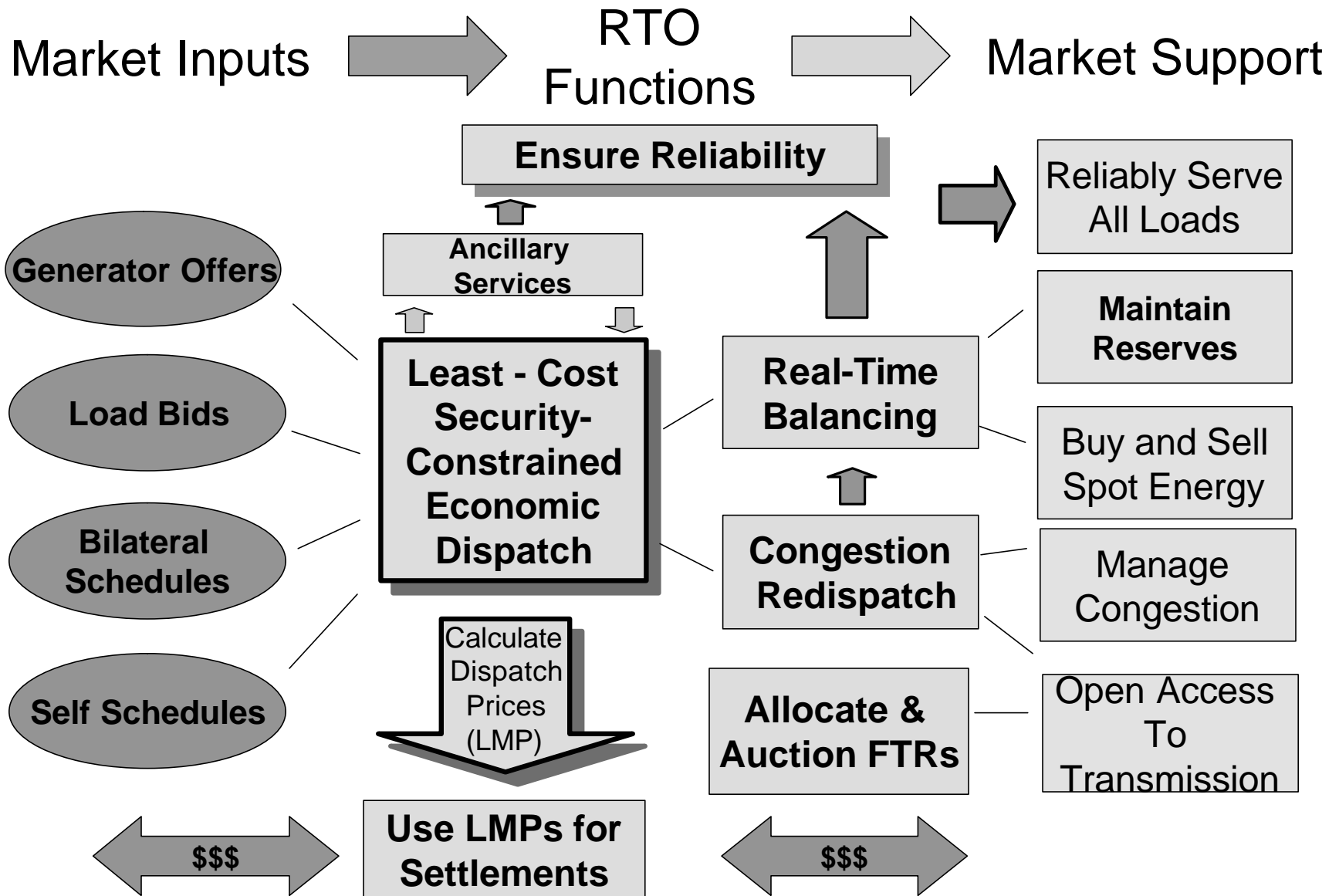




# *New England Wholesale Power Markets - Essential Features*

- ❖ Locational Marginal Pricing (LMP)
  - LMP is designed to reveal the price of producing power in 8 price zones
  - Vermont is one zone
- ❖ Enhanced risk management tools
  - Bilateral contracts
  - Day-Ahead Market (DAM)
  - Financial Transmission Rights (FTRs)
  - Auction Revenue Rights (ARRs)
- ❖ Market Monitoring and Mitigation
- ❖ Regional System Planning
- ❖ Market Structure
  - 75 percent of the electricity trading in New England is covered under bilateral contracts
  - 25 percent is traded in the real-time spot market

# RTO – Standard Core Features





# *Role of ISO-NE*

- ❖ To reliably operate the electric grid
  - ISO has complete authority for reliability
  - Keeps frequency @60Hz
  - Maintains stable voltage
  - Monitors/controls grid flows
  - Manages reserves
  - Handles emergencies
- ❖ To act as the market operator for the New England electric market
  - ISO develops market rules
  - ISO operates the markets
  - ISO is the settlement agent for all transactions
- ❖ ISO also performs regional planning and coordination and works with the states
  - For expansion of the transmission system
  - For ensuring resource adequacy in the region



# *ISO Relationships*

- ❖ The ISO is functionally independent from all market participants including transmission owners and generators
- ❖ The ISO must provide open access over all transmission facilities to all wholesale customers
- ❖ FERC has approved the transition from an ISO to an RTO for New England
  - Increases its independence even more
  - The RTO no longer operates under an agreement with the market participants; market participants role is advisory only
  - The RTO is now funded via its own tariff
  - RTO also improves the ability of the ISO to file market rules

# *Market Participants' Role*

- ❖ Market Participants:
  - Act in an advisory role to the RTO
  - Are consulted prior to RTO proposals being filed at the FERC
  - Process can be time consuming and contentious
- ❖ Can file at FERC if they oppose RTO rule changes
- ❖ Transmission owners, generators, suppliers, marketers, municipal systems, representatives of large and small consumers, and environmental advocates

## Process for Rule Changes:

	Large Projects	Medium Projects
<b>Stakeholder process and Regulatory approval</b>	<b>12-15 months</b>	<b>5-9 months</b>
<b>Project Implementation</b>	<b>15-18 months</b>	<b>9 months</b>
<b>Total Duration</b>	<b>27-33 months</b>	<b>14-18 months</b>



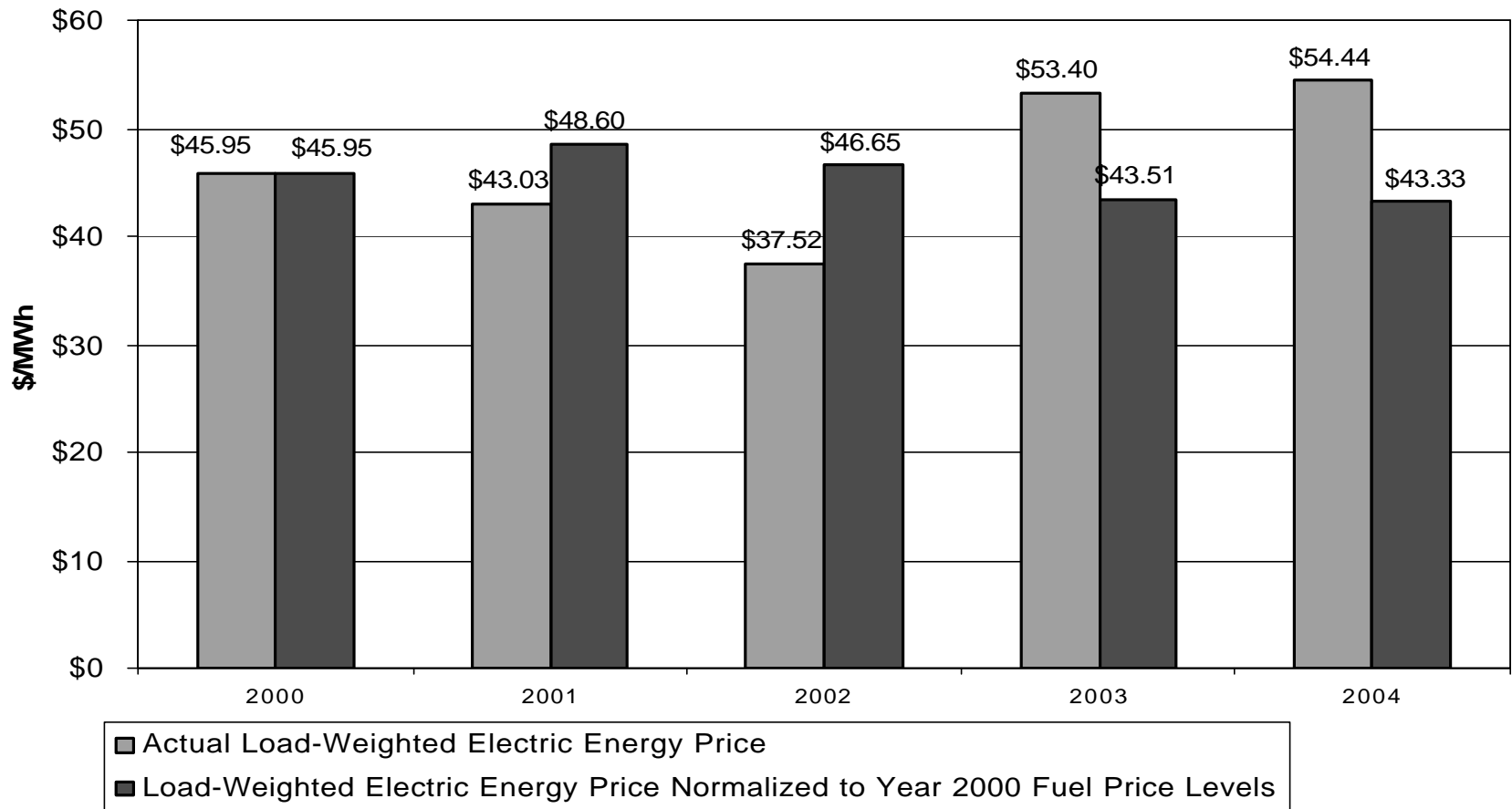
# *RESULTS (2000 to 2004)*

- ❖ Overall Wholesale Market Costs
  - Declined by \$700 million annually (fuel cost-adjusted)
- ❖ Prices
  - Declined 5.7% overall since 2000 and 11% from 2001 to 2004 after adjusting for fuel cost increases
  - Unadjusted prices have increased 18% since 2000
- ❖ Generation
  - \$9 billion invested in new power plants from 2000 to 2004 (a 30% increase)
  - 9,480 MW of new generation
    - Avg. heat rate declined by 5.6%
    - Unit availability increased by 7%
- ❖ Transmission
  - \$4 billion in transmission investment
- ❖ Demand Response is growing slowly
  - 350 MW enrolled in 2004



# *Price Results*

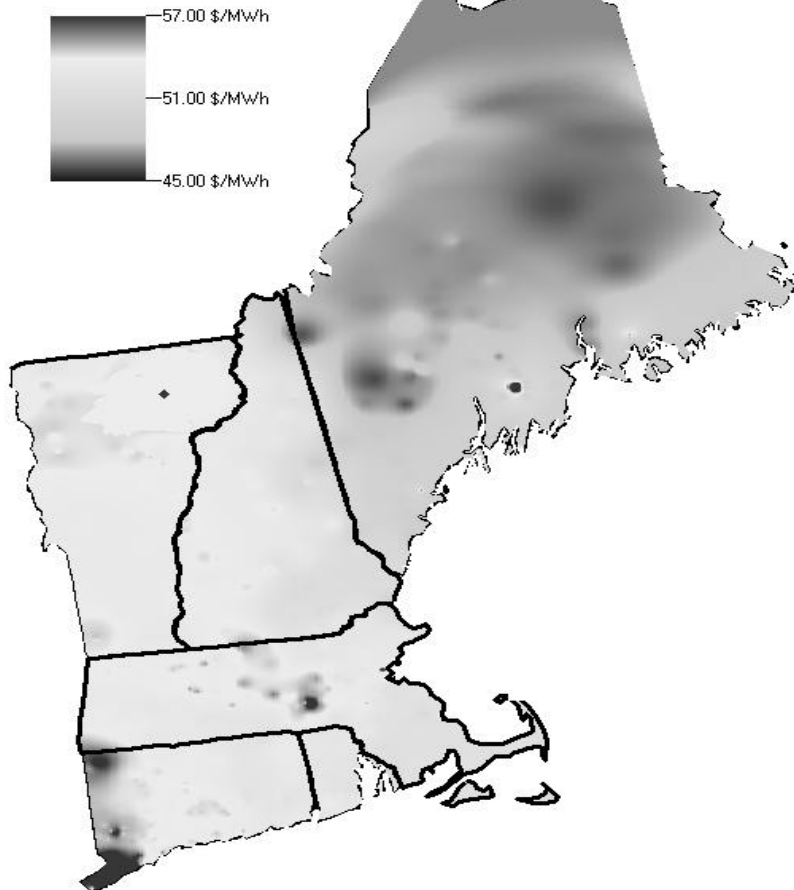
## **Actual and Fuel-Adjusted Average Real-Time Electric Energy Prices, 2000 - 2004**



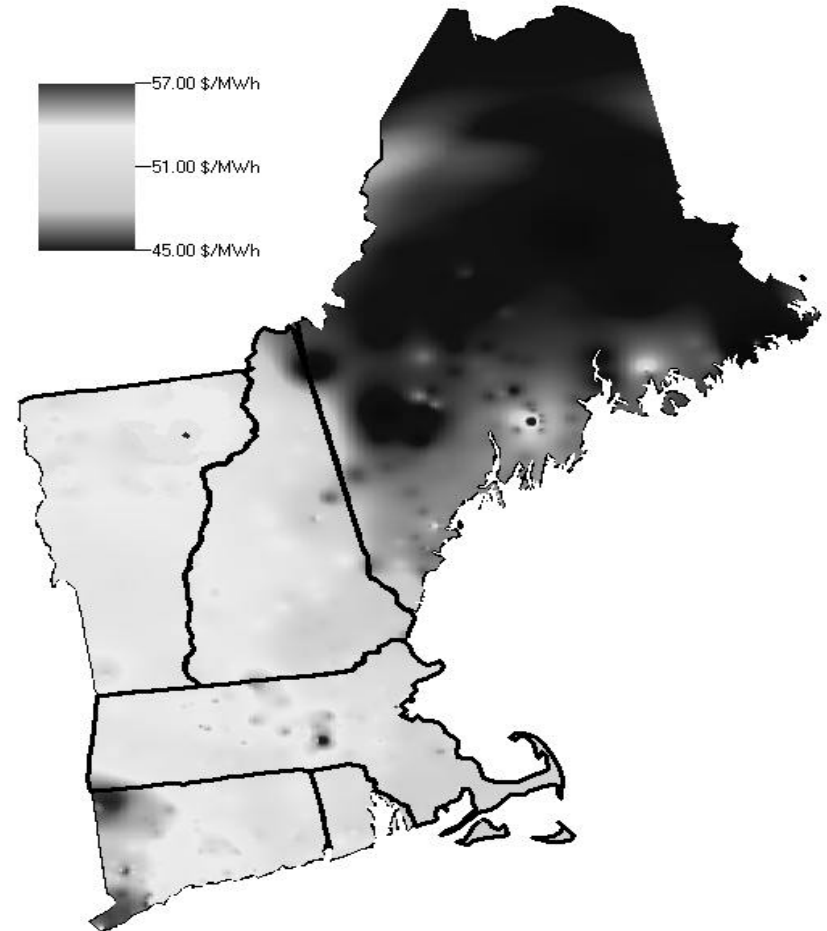


# *2004 Average Nodal Prices, \$/MWh*

**Day-Ahead**



**Real-Time**







# *Additional Benefits*

- ❖ Environmental improvements as a result of new more efficient power plants (2000-2004)
  - Annual carbon dioxide ( $\text{CO}_2$ ) emissions declined by 6%
  - Nitrogen oxide ( $\text{NO}_x$ ) emissions declined by 32%
  - Sulfur dioxide ( $\text{SO}_x$ ) emissions declined by 48%



# QUESTIONS?