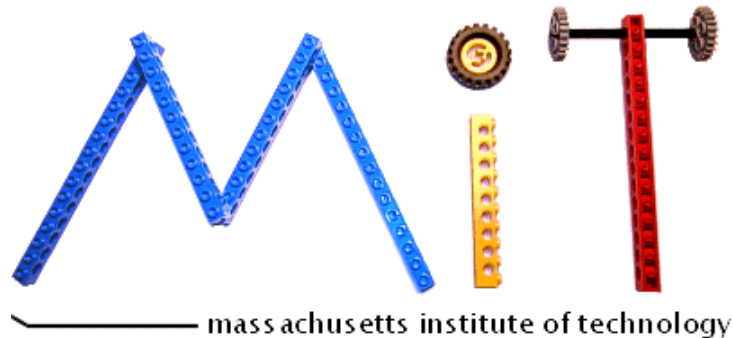


REGULATING MARKETS

Paul L. Joskow

<http://web.mit.edu/pjoskow/www/>



September 22, 2006

REGULATING MARKETS

- All markets operate subject to a variety of regulatory mechanisms
 - Antitrust laws
 - Environmental laws
 - Health and safety regulations
 - Disclosure rules
 - Contract, tort and property laws
 - Labor laws, including minimum wages
- But price and entry regulation is unusual in market economies
- So too is the kind of market design process/structure and reliability rules that characterize wholesale electricity markets

RATIONALES FOR REGULATING MARKETS

- Public Interest Views:
 - Fix or Mitigate consequences of market imperfections
- Private Interest views:
 - Protect incumbents from competition
 - Income and wealth redistribution via cross-subsidization
 - Taxation by regulation
 - Often inconsistent with competition

MITIGATING MARKET IMPERFECTIONS

- Clearly identify the nature and consequences of the market imperfection
- Identify the most efficient mechanism to mitigate the market imperfection
- Allow for adaptation to respond to changes in market attributes that alter the benefits or costs of using the regulatory mechanisms
- Balance the costs of imperfect markets against the costs of imperfect government regulation

WHOLESALE ELECTRICITY MARKETS

- There are several imperfections in the design, behavior and performance of wholesale electricity markets
- These imperfections and their consequences have declined over time with improvements in market design and market structure
- Some of the remaining imperfections can be fixed in theory but face political and institutional barriers in practice
- Some of the remaining market imperfections cannot be easily fixed (e.g. public goods aspects of reliability, voltage reductions as an emergency response)
- Efforts to fix one market imperfection (e.g. market power) may create others (e.g. suboptimal investment incentives)
- Do the regulatory interventions make things better net?
- Do the regulatory interventions accommodate continuing improvement in market design, behavior and performance? (e.g. demand side reforms, relaxation of price caps, better integration of market mechanisms and reliability rules)

CAPACITY OBLIGATIONS AND CAPACITY MARKETS

- There are well articulated market imperfections that motivate these reforms
 - Investment incentives and the “missing money” problem
 - Market power concerns
 - Incompatibility between reliability rules, SO emergency protocols, and market mechanisms (a growing problem)
 - Inadequate opportunities to hedge market, market redesign and market price risks
 - Inadequate demand-side participation
 - Price caps and other forms of market power mitigation

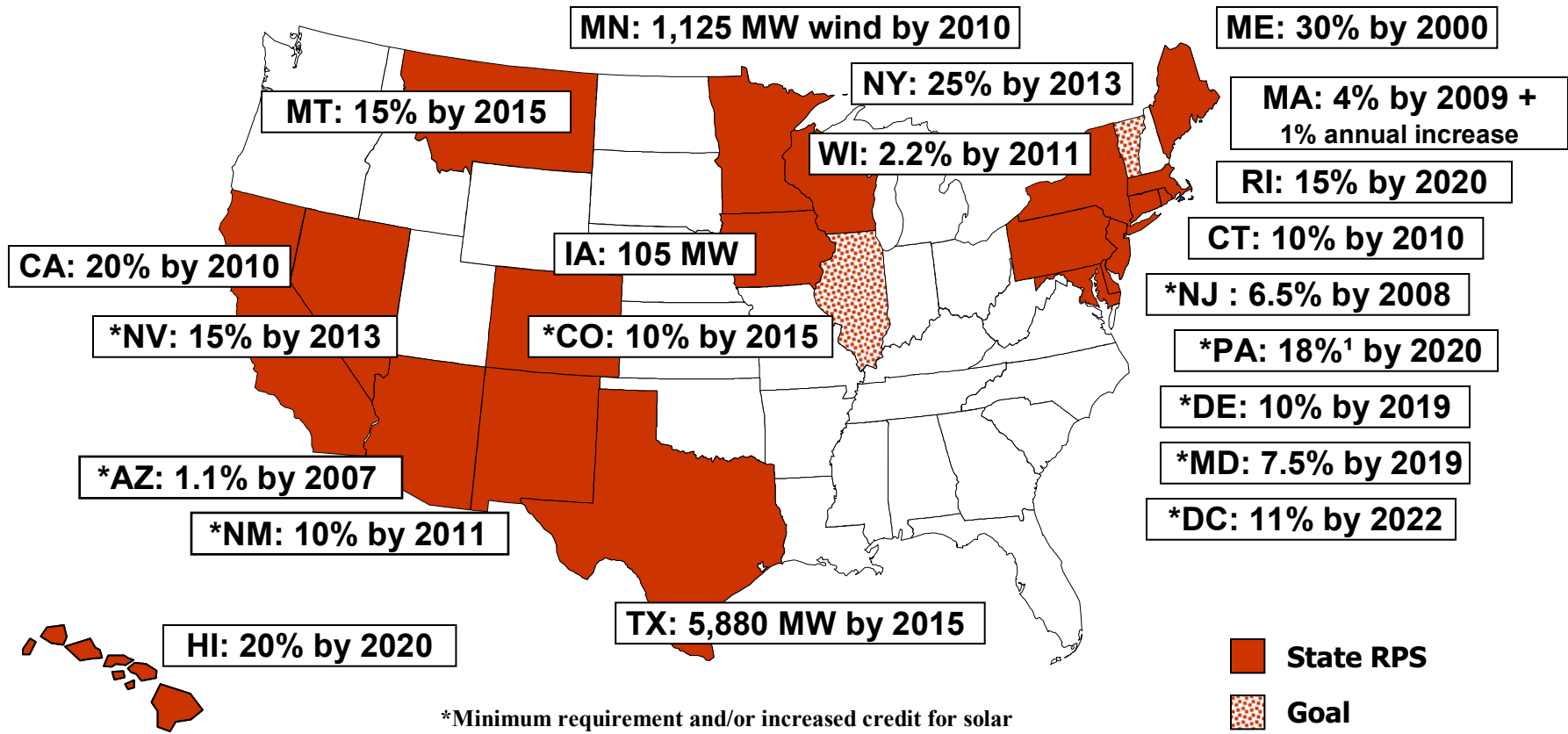
CAPACITY OBLIGATIONS AND CAPACITY MARKETS

- The New England ISO capacity obligation and capacity market reforms have desirable attributes
 - Response to well articulated market imperfections and their consequences for investment
 - Compatible with NPCC reliability rules
 - Easily accommodates further reforms in NE Wholesale markets (scarcity rent credit provisions)
 - Fully compatible with retail competition
 - Should eliminate or reduce the need for costly and inefficient regulatory interventions (e.g. RMR contracts, price caps)
 - Integration with retail prices and load management programs could be better

RENEWABLE ENERGY PORTFOLIO STANDARDS

- If there is a market imperfections rationale it would be related to environmental externalities, perhaps combined with “learning” externalities
- This is not the best way to internalize environmental externalities
- It is not the second-best way to internalize environmental externalities combined with “learning” effects
 - Production tax credits and similar subsidies would be better as second best instruments
- Has a feel of “taxation by regulation” since it hides what are effectively subsidies off of the government’s budget

Renewables Portfolio Standards



RPS DESIGN ISSUES

- If we are to rely on RPS it should be compatible with wholesale markets and not undermine their performance
- Market-friendly RPS programs can be integrated into wholesale markets
 - Renewable supply is fully integrated into wholesale markets
 - ISO tags and tracks RPS supply and purchases
 - Tradeable RPS certificates
 - Backstop price for additional RPS certificates
 - Provide for interstate trading of renewable energy within at least the same ISO
 - Treats all retail LSEs equally

SOME ATTRIBUTES OF STATE PROGRAMS

	<u>Yes</u>	<u>No</u>	<u>NA</u>
Existing Capacity	16	6	3
Out-of-State Supply	18	3	4
Certificate Trading	17	7	2

Source: EIA AEO (2005 and 2006)

MASSACHUSETTS RPS PROGRAM

- Program works very smoothly
 - Tracking and compliance processes work effectively
 - Well integrated with NE Wholesale market and effective use of NE ISO information systems
 - Flexibility for retail suppliers
 - Low transactions costs
- Issues
 - Siting renewable generation facilities
 - Financing absent long-term contracts (Forward capacity market settlement should help)
 - How well will ACP funds be spent?

STIMULATING DEMAND-SIDE INTEGRATION IN WHOLESALE MARKETS

- Absence of active demand side that is well integrated into wholesale markets is a source of market imperfections and costly regulatory interventions
- System operator reliability protocols rely on “controllable” reasonably quick response demand reductions
- Wholesale and retail markets are not delivering adequate demand side actions via the invisible hand
 - Demand side response is paid too little compared to reserve generating capacity (should be eligible for equivalent of capacity payments)
 - Wholesale prices are too low during critical hours
 - Demand side contracts are poorly integrated into wholesale markets
 - System operators will rely on demand side arrangements during operating reserve deficiency only if they meet special criteria
- ISO/regulatory efforts to stimulate programs to fully integrate demand side response into wholesale markets is highly desirable
 - Saturating the world with real-time meters alone is expensive and will not meet system operator needs
- New York ISO has a good demand-side program and continues to build on it. Prices should be higher to be symmetrical with capacity market

TRANSMISSION PLANNING

- Relying on market-based “merchant” transmission is not realistic either in theory or in practice
- Distinctions between “reliability” and “economic” transmission investments are meaningless within control areas (ISO/RTOs)
- There remain serious pricing/incentive problems
 - Failure to fully unbundle transmission service
 - De facto mix of state and federal price regulation
 - State certification of transmission facilities
 - Transmission networks span many states
- Applying well-design regional and inter-regional transmission planning makes sense and will improve wholesale market performance

CONCLUSION

- Regulatory interventions focused on mitigating the effects of market imperfections can improve market performance
- The interventions must be done for the right reasons
- They must meet certain efficiency and adaptation criteria

BACKUP

MASSACHUSETTS RPS PROGRAM

- Minimum renewable generation requirement became effective in 2003
 - 1% of retail sales, increasing by 0.5% per year to 4% in 2009 and then increasing by 1% per year until frozen by DOER (early compliance credits for 2002 and banking provisions)
- Applies to new sources only
 - Wind, solar, geothermal, wave/tidal, landfill gas, advanced biomass, fuel cells using eligible renewable fuels (not natural gas).
 - Off-grid generation counts if it is in MA
 - Includes out-of-state units whose output can be verified through the NE-ISO generation information and market settlement system
- Tagging renewable attributes, certification as MA qualified RECs, and tracking qualifying generation and purchases is managed primarily through New England Generation Information System (GIS) and ISO-NE market settlement system
 - GIS deposits certificates in generator accounts and then transfers purchases of certificates to retail supplier accounts
 - Annual compliance filings by retail electricity suppliers
- Alternative Compliance Payments (ACP) to MA Technology Collaborative (MTC). Current price ~\$53/Mwh
 - These funds are used to develop new renewable generating facilities
 - MTC auctions some of the RECs created by its financial support

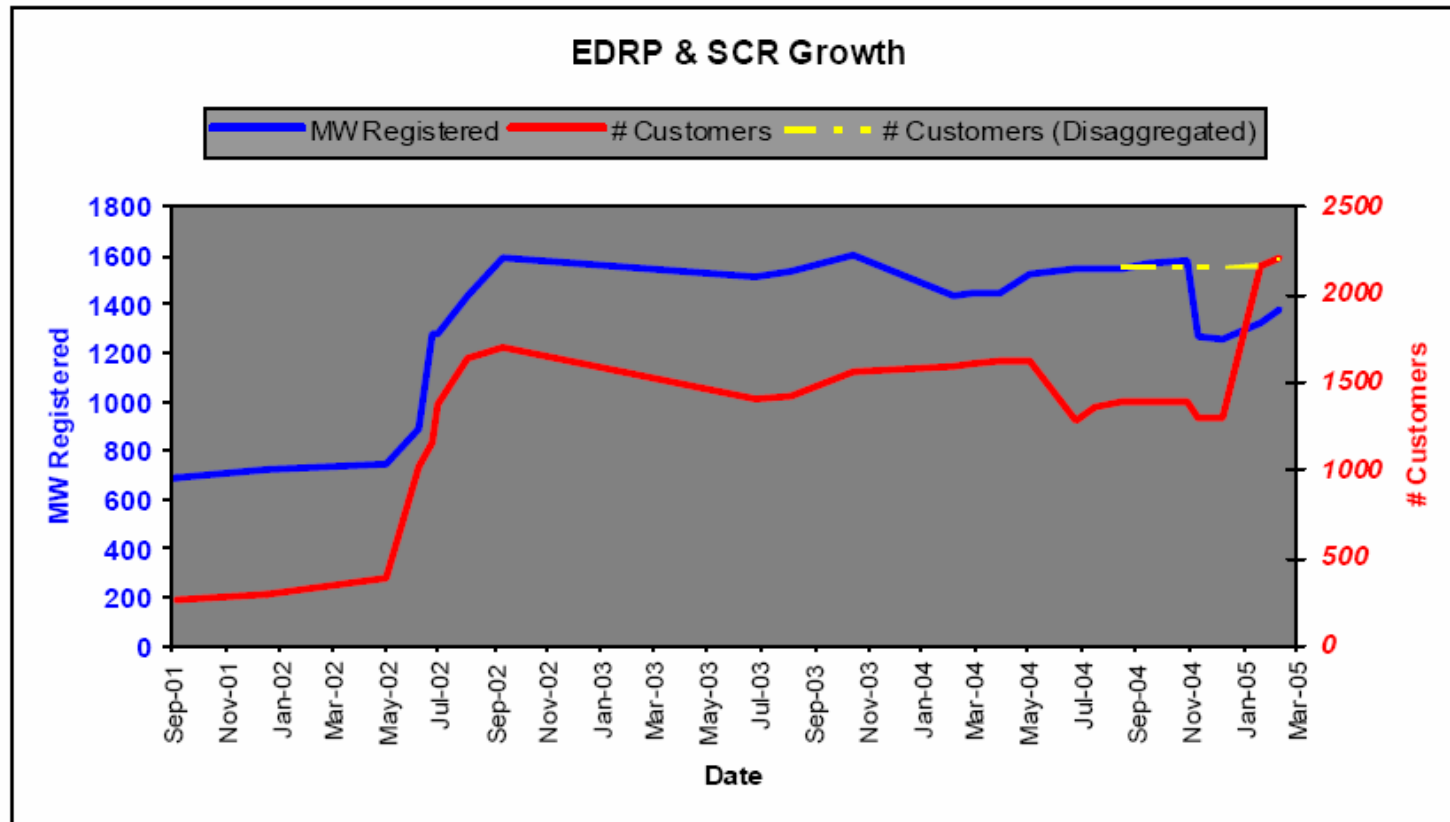
NEW YORK ISO DEMAND RESPONSE PROGRAM

- Integrate pricing incentives with system operator control attributes
 - About 2,500 commercial and industrial customers
- Special Case Resources (“SCR”)
 - Loads must curtail within two hours
 - Payment for committed capacity reduction based on capacity prices
 - Bid a strike price up to \$500/Mwh for energy
 - Paid higher of \$500/Mwh and real-time price for energy with 4-hour minimum
 - Can set real-time price
 - Mandatory response
- Emergency Demand Response Program (EDRP)
 - Loads curtail on two-hour notice
 - Bid strike price for energy up to \$500/Mwh
 - Paid higher of \$500/Mwh and real-time price
 - Can set real-time price
 - Activate after SCR
 - Non-mandatory response

NEW YORK ISO DEMAND RESPONSE PROGRAM

- Day-ahead Demand Response Program (DARP)
 - Schedules physical demand reductions for the following day
 - Demand reduction bids integrated with day-ahead wholesale market
 - Reduction based on day-ahead prices/schedule not system conditions
 - Mandatory reduction (settle deviations at real time prices)
- Small customer “zonal” aggregation options
- Demand reduction programs require baselines against which performance is based
 - Out of last 10 days the 5 highest energy consumption blocks in demand reduction periods
 - Weather adjustment option available
 - Better market alternatives involving purchase to buy and contingent contract to reduce demand should be explored

Historic EDRP/SCR Participation



Note: Prior to January 2005 the number of customers shown on the chart did not reflect SCR resources enrolled or sold as part of aggregations. Recent database changes allow presentation of aggregation members. In other words, there was not a step change in the number of participants in January 2005.

Source: NY ISO (2005)

Current DR Registration Details

EDRP/SCR Breakdown Effective February 9, 2005

<i>RIP/CSP/DRP Type</i>	<i>EDRP/SCR MW</i>	<i>DADRP MW</i>
17 Aggregators	406.3 MW	0.0 MW
11 LSEs	250.5 MW	46.5 MW
8 Direct Customers	126.3 MW	8.0 MW
8 Transmission Owners	594.3 MW	322.4 MW

Source: NY ISO (2005)

SCR Performance Factors by Zone

SCR Performance Averages Applicable to Winter 2004-2005		
Zone	Weighted Average Performance	Locality
A	97.87	97.62
B	92.06	
C	96.47	
D	99.69	
E	96.81	
F	99.96	
G	100	
H	99.99	
I	99.54	
J	99.25	99.25
K	99.42	99.42
	Statewide	98.11

Source: NY ISO