Demand Response: The Other Side of the Market

Assessing the Potential for
Demand Response Programs
Springfield,IL
May 12, 2006

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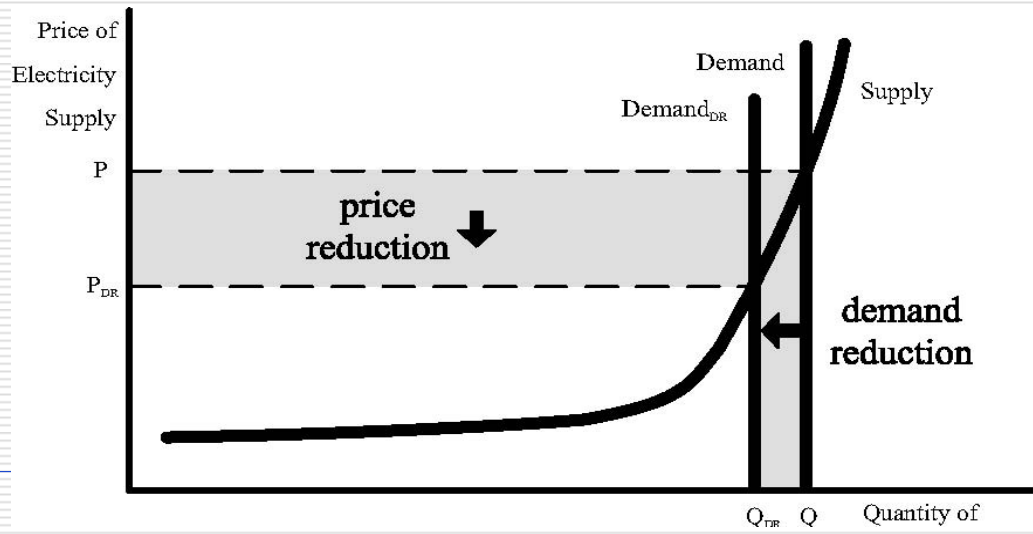
Commissioner
Public Service Commission
of the District of Columbia

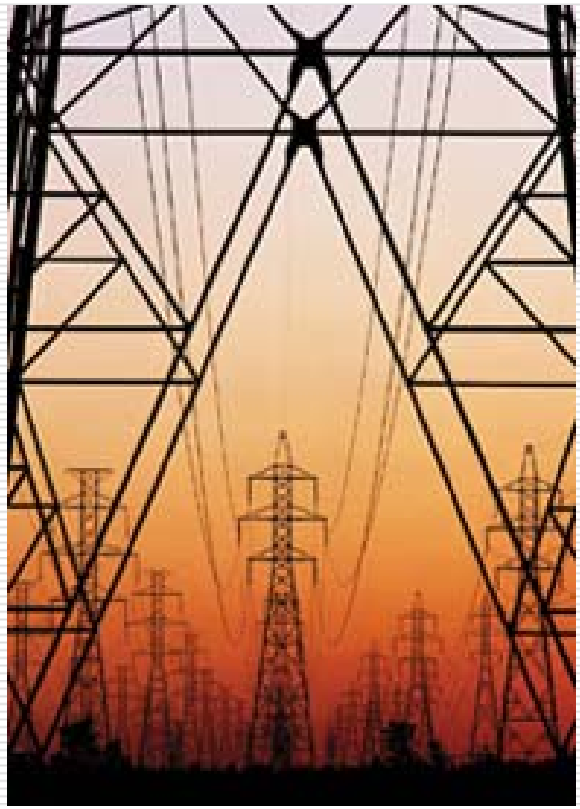
A few thoughts on demand response

- DR is an essential component of a competitive electricity market
- A challenge to traditional utility regulation – both retail and wholesale
- A little DR goes a long way



Potential benefits of demand response

- Operational savings
- Reduced generator market power
- Lower market prices
- Reduced price volatility
- Improved grid reliability
- Improved customer options
- Provision of ancillary services
- Positive environmental benefits



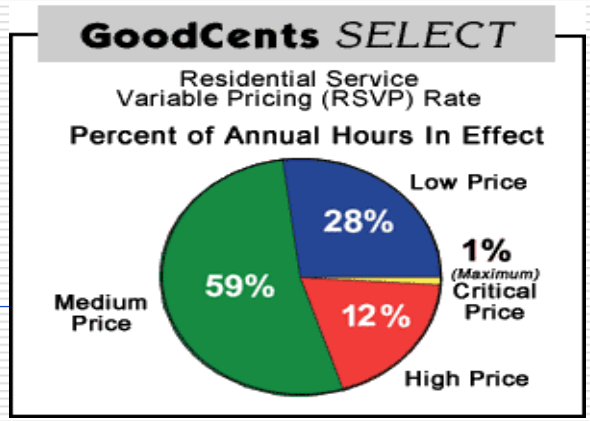
Barriers to demand response

- Traditional retail rate designs that blend costs & dampen price signals
- Jurisdictional split between retail & wholesale markets
- Ratemaking formula that rewards maximization of throughput
- “Fractured value chain” in unbundled competitive markets

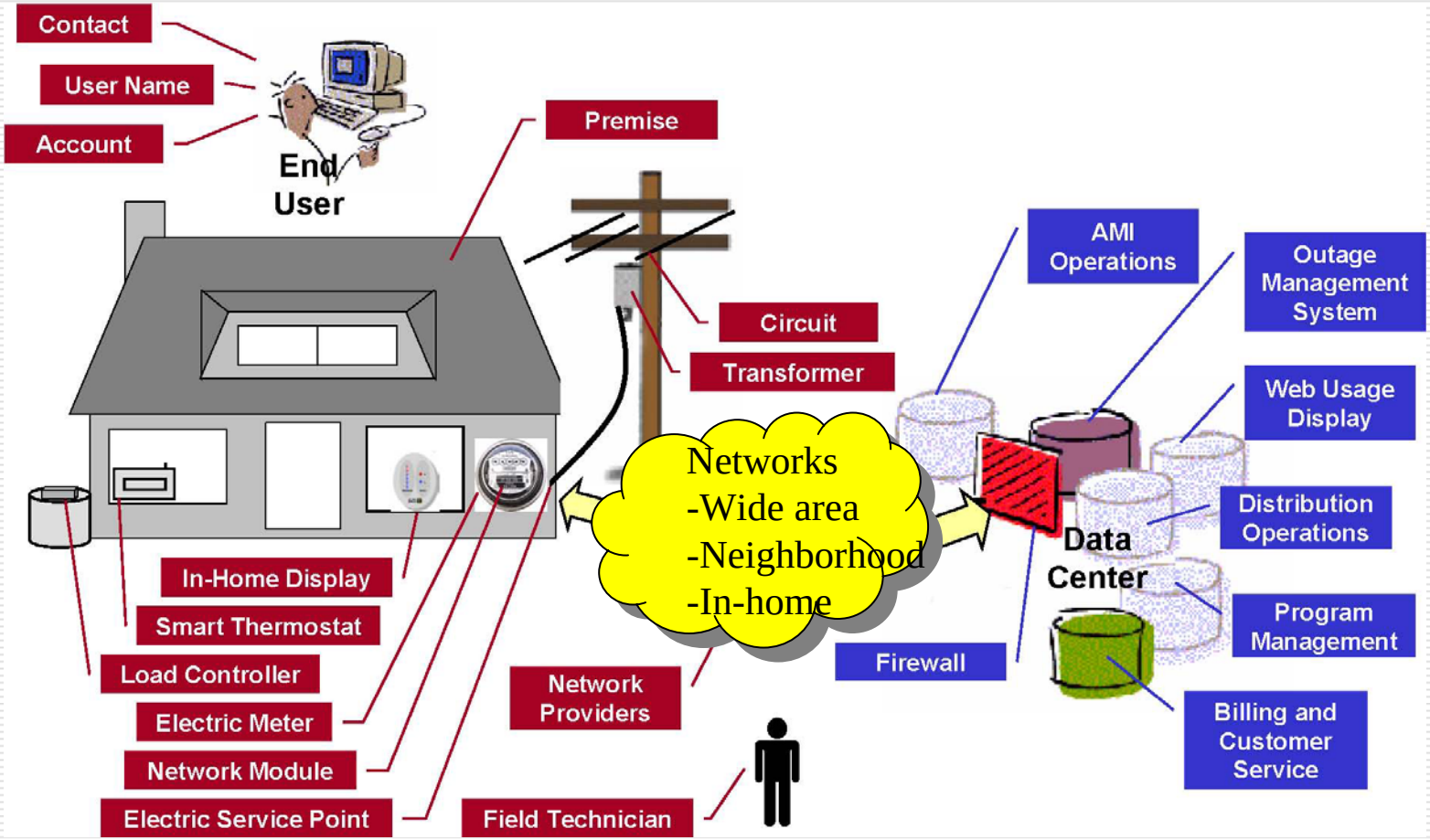
DR examples & success stories

- Reliability programs
  - Curtailable load
  - Distributed generation (emerg. back-up)
- Economic programs
  - Time-of-use rates
  - Critical peak pricing
  - Real-time pricing

- In SW Connecticut, ISO-NE achieved up to 280 MW in curtailable load in <2 years
- At Florida's Gulf Power, "GoodCents" customers save by controlling a/c, w/h load, achieving:
  - 41% average peak-load reduction
  - 96% customer satisfaction

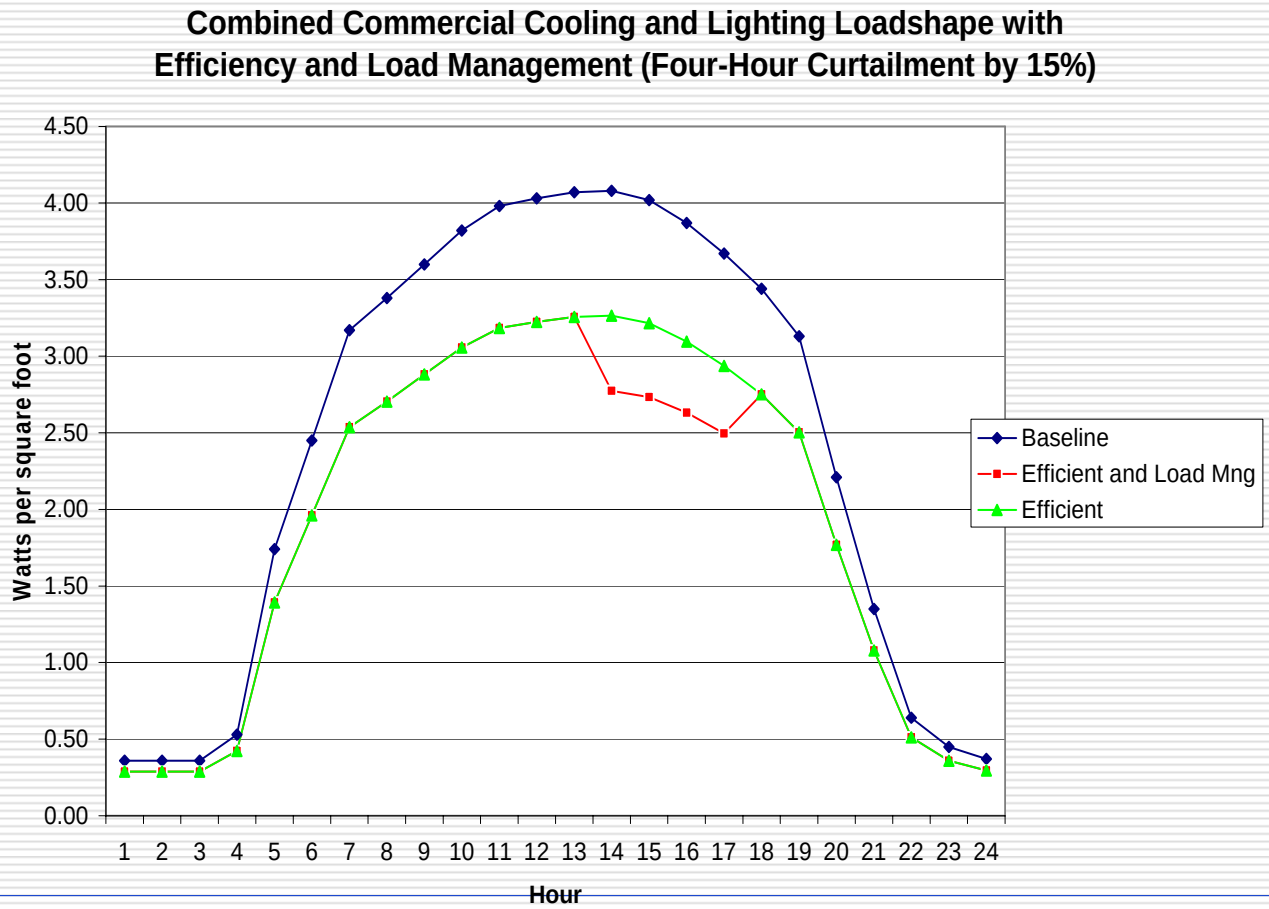


Advanced metering infrastructure: A key enabling technology for DR

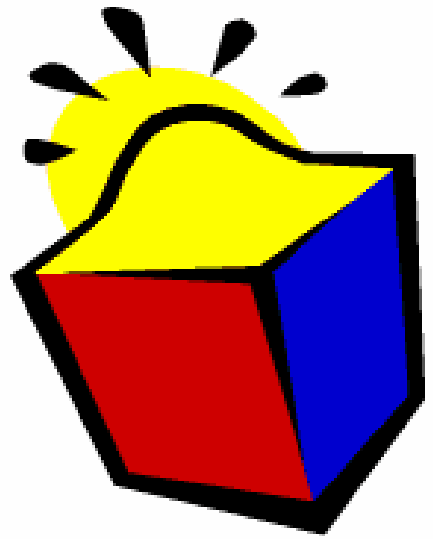


AMI is more than just advanced meters!

DR and energy efficiency aren't mutually exclusive



Challenges for DR implementation



- Thinking outside the box
  - Parity for DS resources
  - Retail price signals are essential
- Public acceptance of dynamic pricing
  - Make it an opportunity, not a hassle
- Optimizing technology options
  - Metering, communications & pricing
- Addressing utilities' throughput incentive

EPAct's Smart Metering standard (§ 1252)

"Each State regulatory authority shall conduct an investigation and issue a decision whether or not it is appropriate for electric utilities to provide and install time-based meters and communications devices…which enable…customers to participate in time-based pricing rate schedules and other demand response programs."

Examples:

- time-of-use pricing
- critical peak pricing
- real-time pricing
- credits for consumer peak load reduction

EPAct's Smart Metering standard (cont'd)

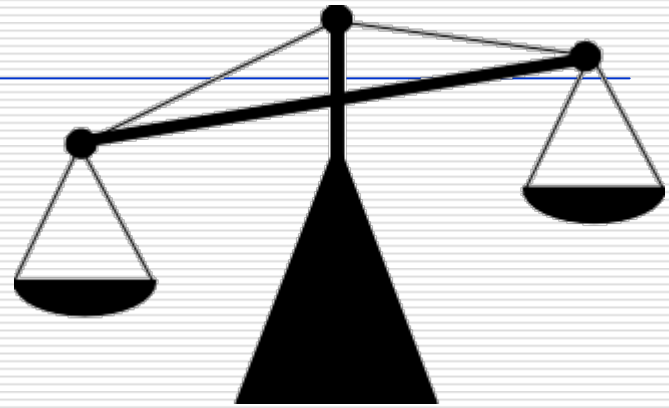
Excerpts of PURPA standard for state PUC consideration (completion by August 8, 2007):

"(E)ach electric utility shall offer each of its customer classes, and provide individual customers upon…request, a time-based rate schedule under which the rate…varies during different time periods and reflects variance…in the utility's costs…. The time-based rate schedule shall enable the electric consumer to manage energy use and cost through advanced metering and communications technology."

"Each electric utility shall provide each customer requesting a time-based rate with a time-based meter…."

"In a State that permits third-party marketers to sell electric energy to retail consumers, such consumers shall be entitled to receive the same time-based metering and communications device and service as a retail electric customer of the electric utility."

Enforcement of PURPA standards

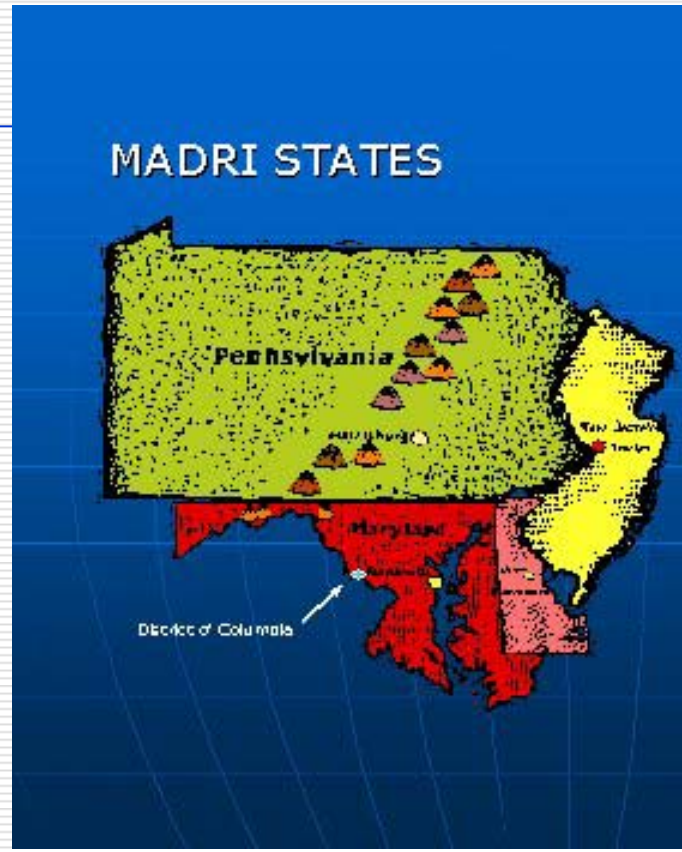


- PUC itself makes determinations
- No penalty provision
- No federal review
- Missed deadline triggers a requirement that the consideration and determination take place in the first subsequent rate proceeding
- Apparent conflict with customer choice – unenforceable?

‘SmartPowerDC’ pilot

- Test AMI & dynamic rates on PEPCO default customers in Washington, DC
- Interval meters & two-way communications for 2000+ residential customers
  - Customers offered smart thermostats
- Test 3 dynamic rate options
  - Critical peak pricing
    - “pure” CPP w/o TOU)
  - Critical peak rebate
  - Hourly pricing
- Two-year pilot starts Oct ‘06

Mid-Atlantic Distributed Resources Initiative (MADRI)



- Regional approach to DR, DG, & EE
- PUCs from 5 jurisdictions w/ DOE, EPA, FERC & PJM
- Facilitated stakeholder process w/ open mtgs
- MADRI 'working group' meets every 6-8 weeks

MADRI Objectives

- Identify and remedy retail barriers that slow deployment of cost-effective distributed energy resources
- Educate stakeholders on opportunities, barriers, and solutions
- Provide decision-makers with strategic information and actionable items
- Facilitate regional cooperation among utility regulators and other decision-makers

Five MADRI initiatives

- Advanced metering infrastructure (AMI)
- Small generator interconnection
- Environmental policies for DG
- Business models for distributed energy resources
- Regulatory policies

For more info: www.energetics.com/madri/

MADRI's 'AMI Toolbox'

MADRI Advanced Metering Infrastructure (AMI) "Toolbox"

A compilation of reports, studies, and other web resources related to advanced metering infrastructure options

- Return to Main
- AMI Background Information
- AMI / Vision Strategy Papers
- AMI Business Cases
- Ontario Energy AMI Plan
- Pricing Policy & Pilots
- Competitive Metering Studies
- AMI Standards
- MADRI Metering Survey
- AMI Organizations & Companies
- Individual Contact Information

The Mid-Atlantic Distributed Resources Initiative (MADRI) Toolbox was developed to provide Mid-Atlantic PUCs with additional resources for learning more about advanced metering infrastructure (AMI). The "toolbox" was identified as a key action item following the MADRI AMI Workshop held on May 4, 2005.

The AMI Toolbox represents a compilation of reports and studies as well as other web based resources that have been accumulated by MADRI support staff as they have evaluated AMI strategy options. The "toolbox" is not intended to provide a definitive library and should be viewed as a work-in-progress with the expectation that additional resources will be added as the MADRI states begin their evaluations of AMI opportunities. All of the documents contained in the "toolbox" are public documents and users should feel free to distribute them or quote from them.

http://www.energetics.com/madri/toolbox/

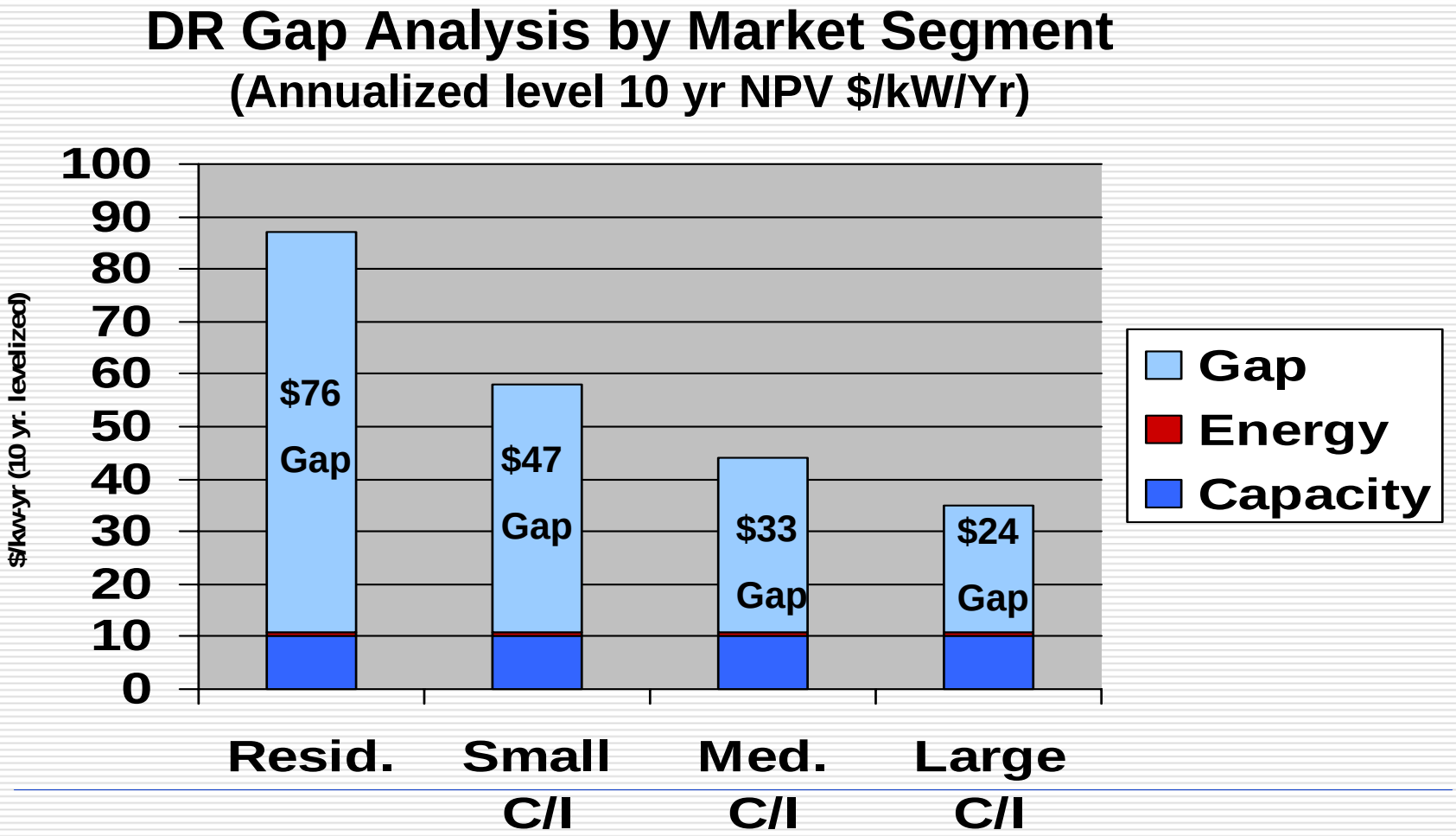
MADRI 'Model Small Generator Interconnection Procedures'

Developed via stakeholder process to reduce interconnection barriers across Mid-Atlantic region (11/05)

- *Based on FERC & NJ procedures*
- *Key considerations:*
  - *Technical standards (establish common requirements for DG interconnection equipment)*
  - *Implementation procedures (establish common rules for how DG equipment gets connected)*

http://www.energetics.com/MADRI/pdfs/inter_modelsmallgen.pdf

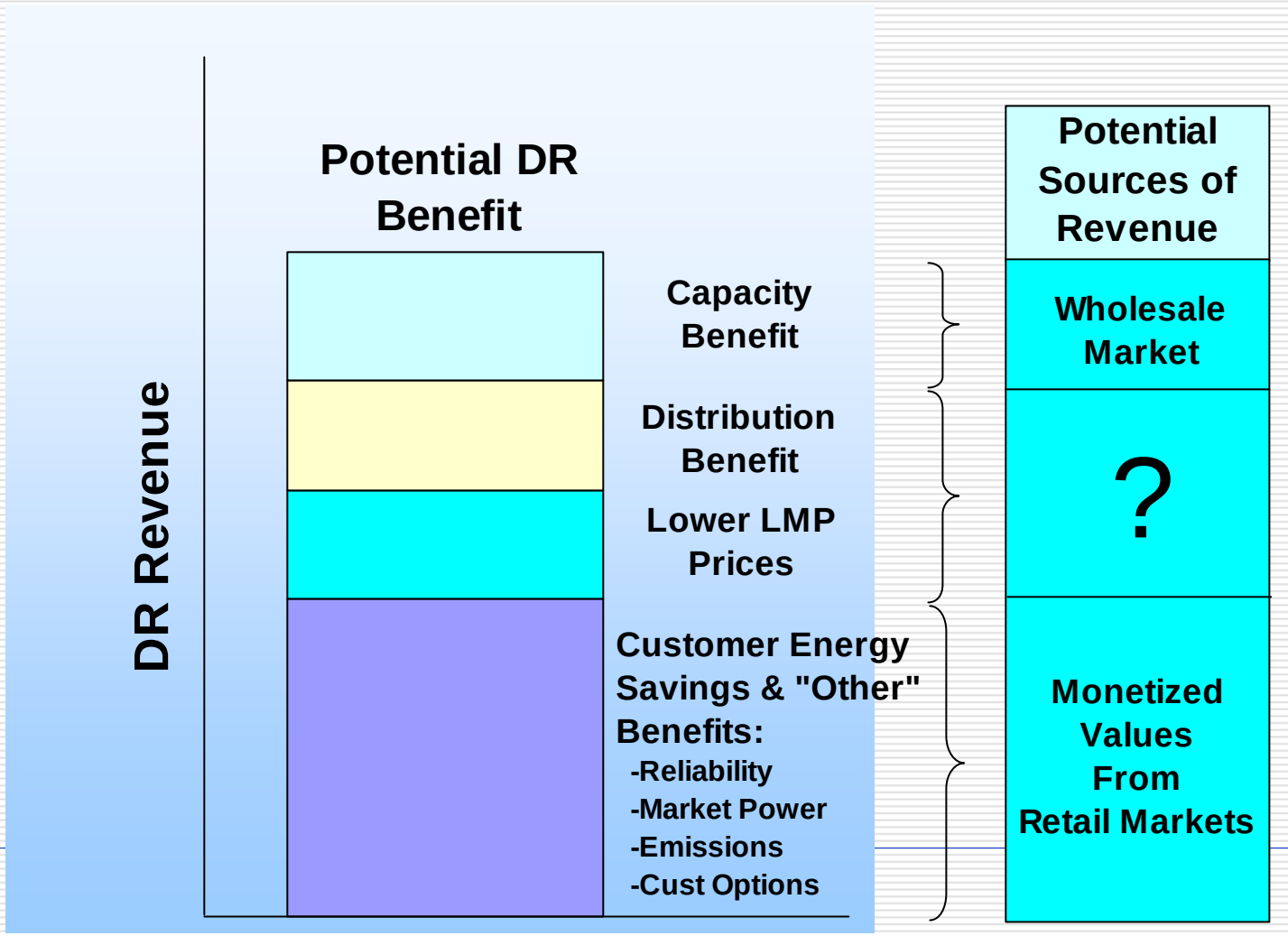
DR business case is challenging in Mid-Atlantic



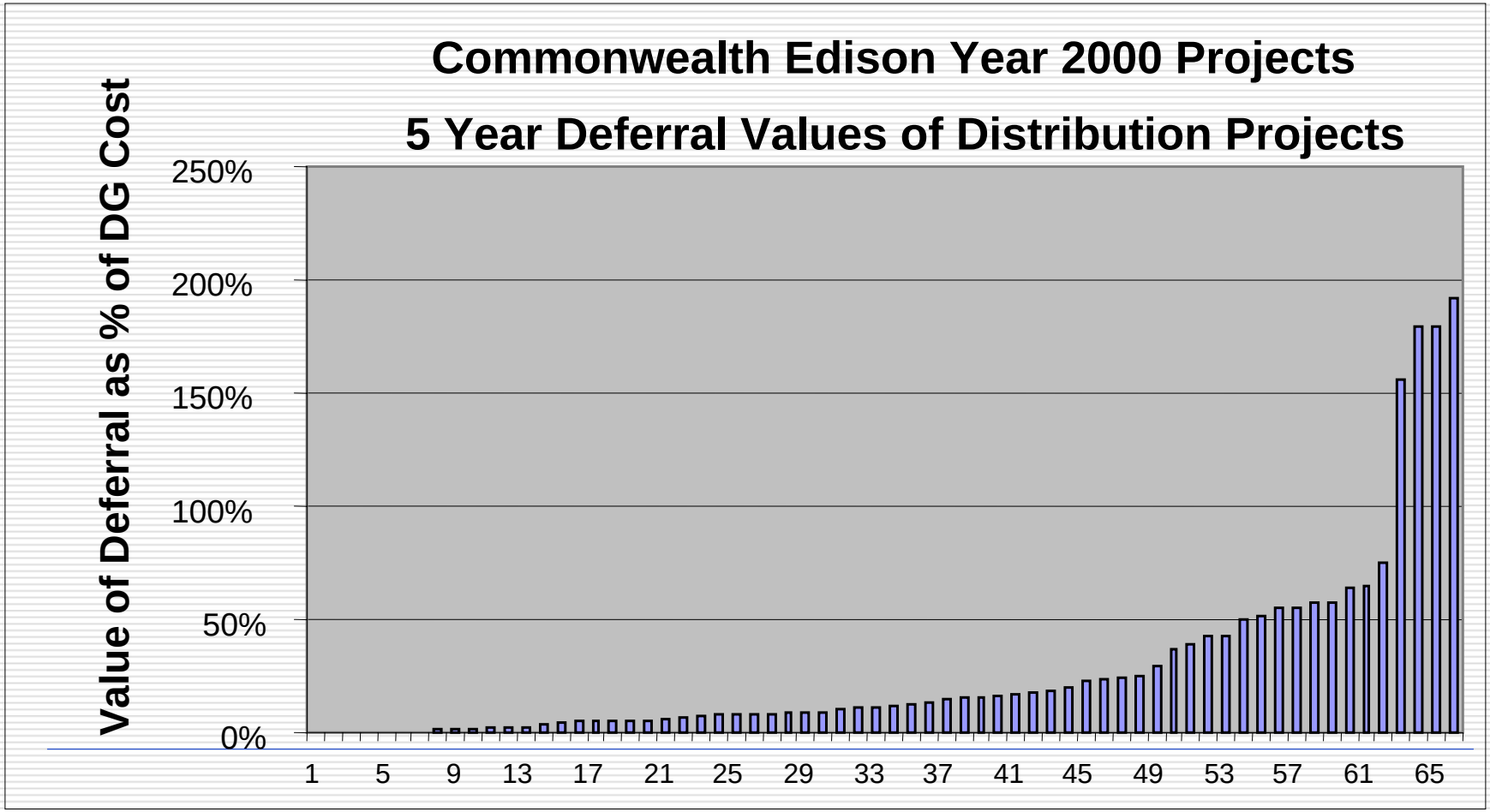
AMI operating benefits exceed DR benefits

PG&E Estimate of Operational Savings From Full AMI Deployment						
Benefit Category	PV of Savings ($ million)	Benefit Description		Benefit Category	PV of Savings ($ million)	Benefit Description
Meter reading	$714	Includes saved labor and related costs and support functions.		Cash flow imporvement	$35	AMI allows bills to be issued sooner after meter reads
Other employee expenses	$103	Savings from labor force reductions		Records exception processing	$45	Reduced need to address various "exceptions" related to meter reading & billing
Storm Restoration	$74	AMI outage data can be used to dispatch crews more effectively and to improve power-restoration processes after significant outages		Avoided Dispatch if power is on	$44	AMI allows electronic "call aheads" to eliminate dispatching field crews
Avoided TOU meter maintenance	$62	Avoided maintence of TOU meter fleet		Miscellaneous	$27	e.g. avoided repurchase of handheld meter reading devices that have a one-time value
Interval meter program	$62	Cost savings from migrating 7,000 interval accounts to mass billing system		One time benefits	$32	Net benefit beyond 20 business case time period
Call center benefits	$50	Saved cost due to reduced calls to call centers and reduced length of calls		Post Period Benefits	$290	Net benefit beyond 20 business case time period
Source: PG&E AMI Business Case Filing 3/15/05				Total Benefits	$1,538	
				Total Costs	**$1,947**	

Putting the DR Value Chain Back Together



Distribution value of DR can be substantial



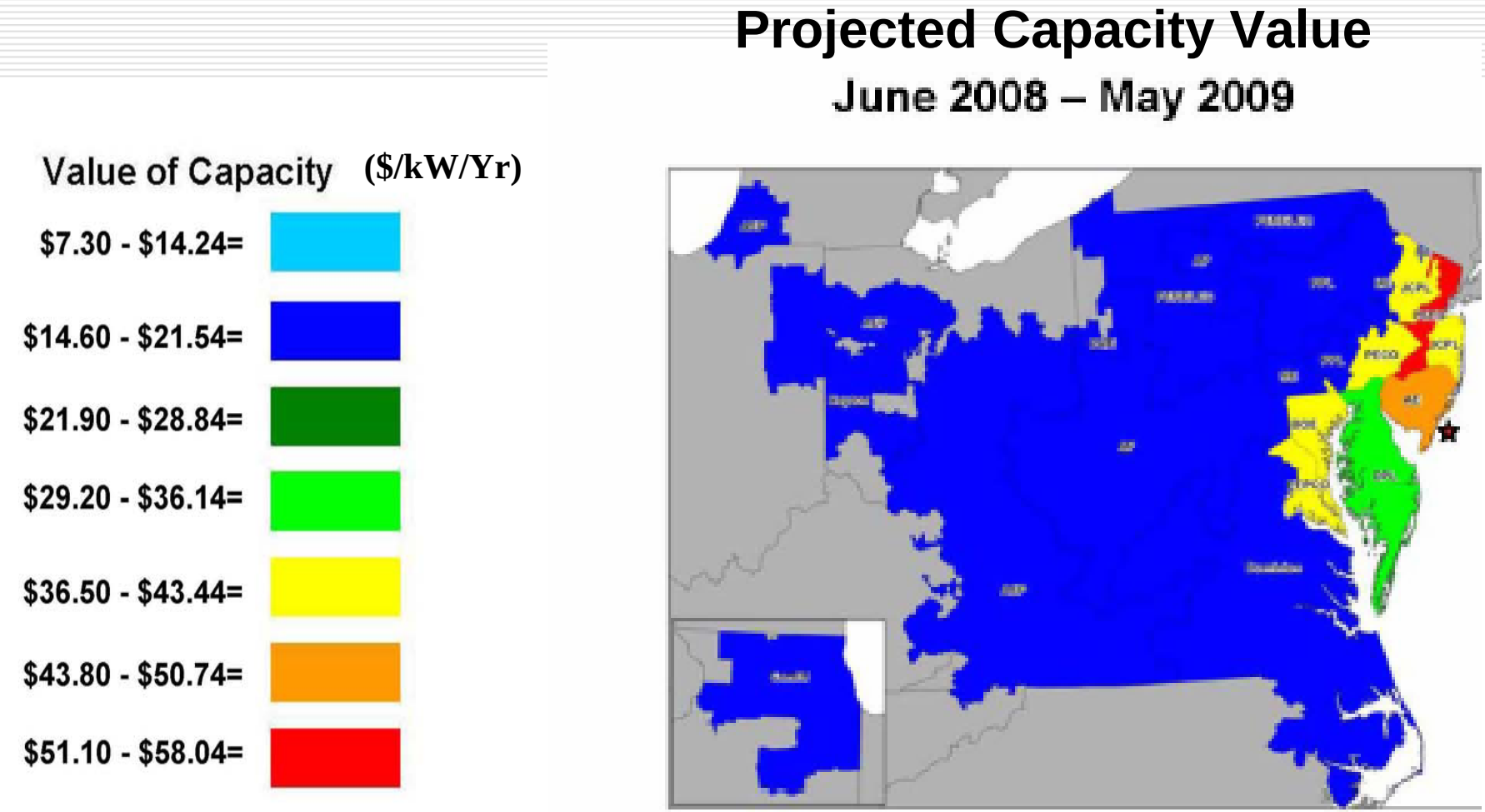
Small Load Decreases Can Have a Large Price Impact

REGION	% Change In Load	% Change In LMP
California	-2.5%	-24.0%
New England	-3.5%	-37.0%
New York (By Zone)		
Capital	-3.2%	-20.1%
NYC	-0.1%	-7.4%
Long Island	-1.5%	-8.9%
Western Region	-4.4%	-25.1%
Hudson Region	-0.8%	-4.4%

Multi-state/PJM analysis of market price benefits of DR

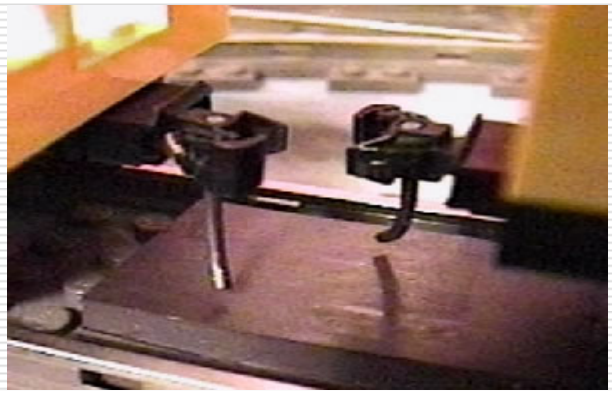
- Objective: quantify potential LMP reductions via DR in 'classic' PJM
  - Determine net cost savings by curtailing demand by 3% in key PJM zones
  - Focus on top 20 five-hour LMP blocks
- Joint project of PJM and 5 MADRI states (DC, DE, MD, NJ, PA)
- Results expected later in 2006

PJM simulations show higher capacity value in Eastern PJM



Source: PJM RPM Simulations 2005

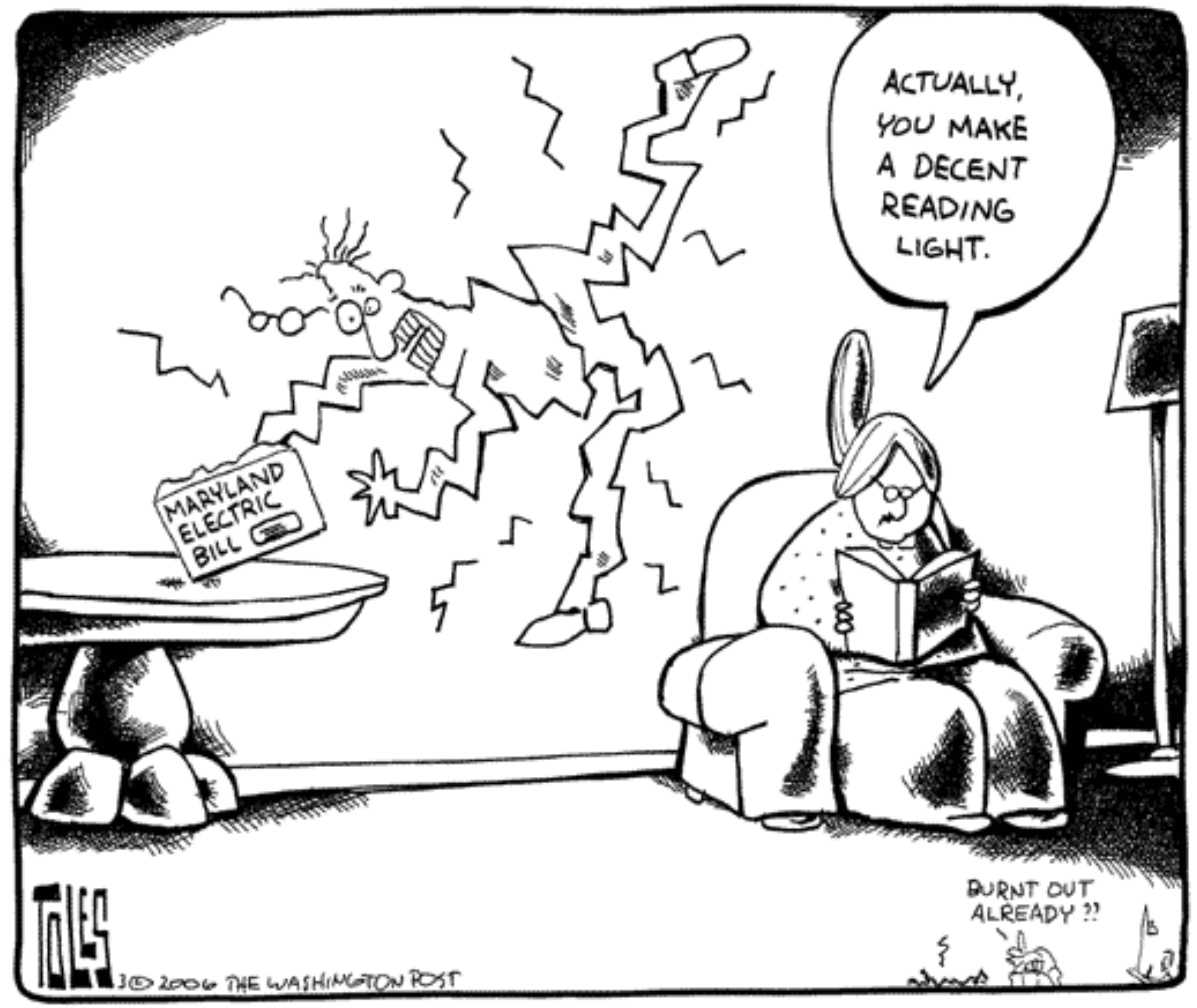
Regulatory policies to facilitate distributed energy resources



Forthcoming from MADRI:

- Model dynamic pricing tariff
  - Focus on critical peak pricing
- Model revenue stability mechanism
  - Decouples profits from sales volume
  - Monthly true-up
  - Based on Baltimore G&E's gas tariff
- Workshop on DR business models & regulatory policies & issues
  - June 5 in Trenton, NJ

Seizing opportunities for DR



Credit:
The Washington Post

Rx for state PUCs in enabling DR

- Explore AMI/DR potential
  - Examine technology
  - Examine utilities' business case
- Deploy smart meters & dynamic pricing
  - Establish DR goals
- Remove existing regulatory barriers
- Cooperate regionally

"Time to stop talking and start doing!" –N. Brownell