

# Demand side options

## An international perspective



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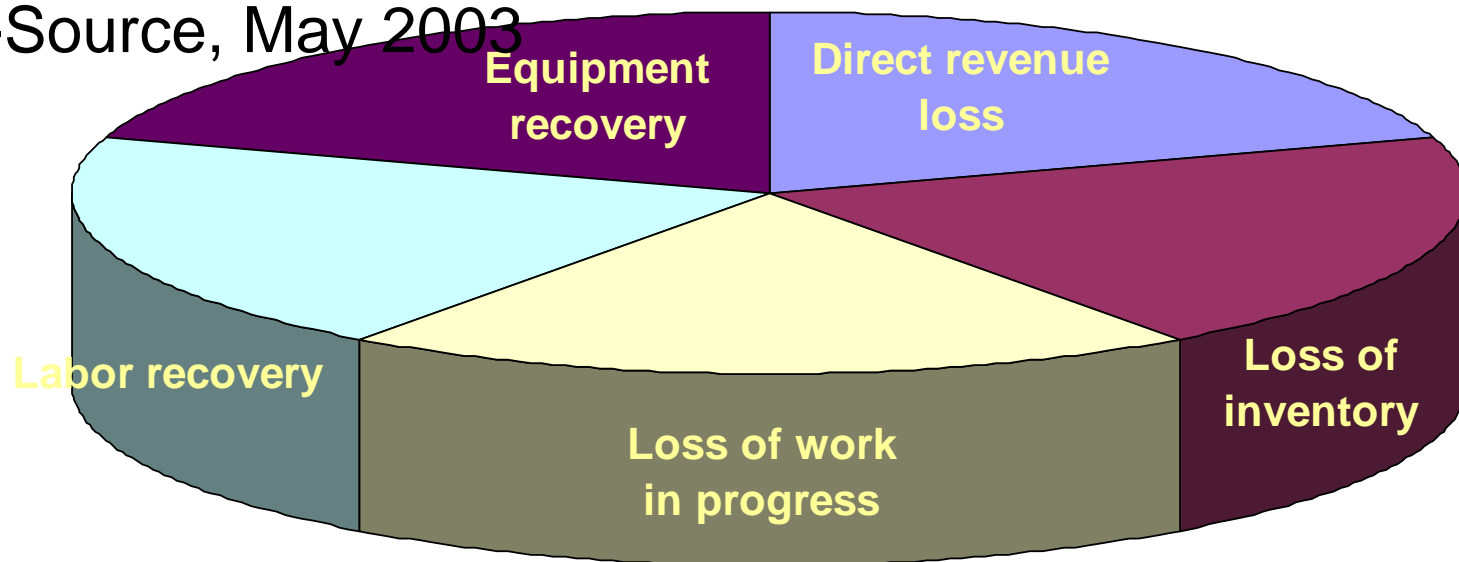
# What we will cover

- The “problem”
- A solution
- Practical experience
- Is gas different?
- Some thoughts on possible progress

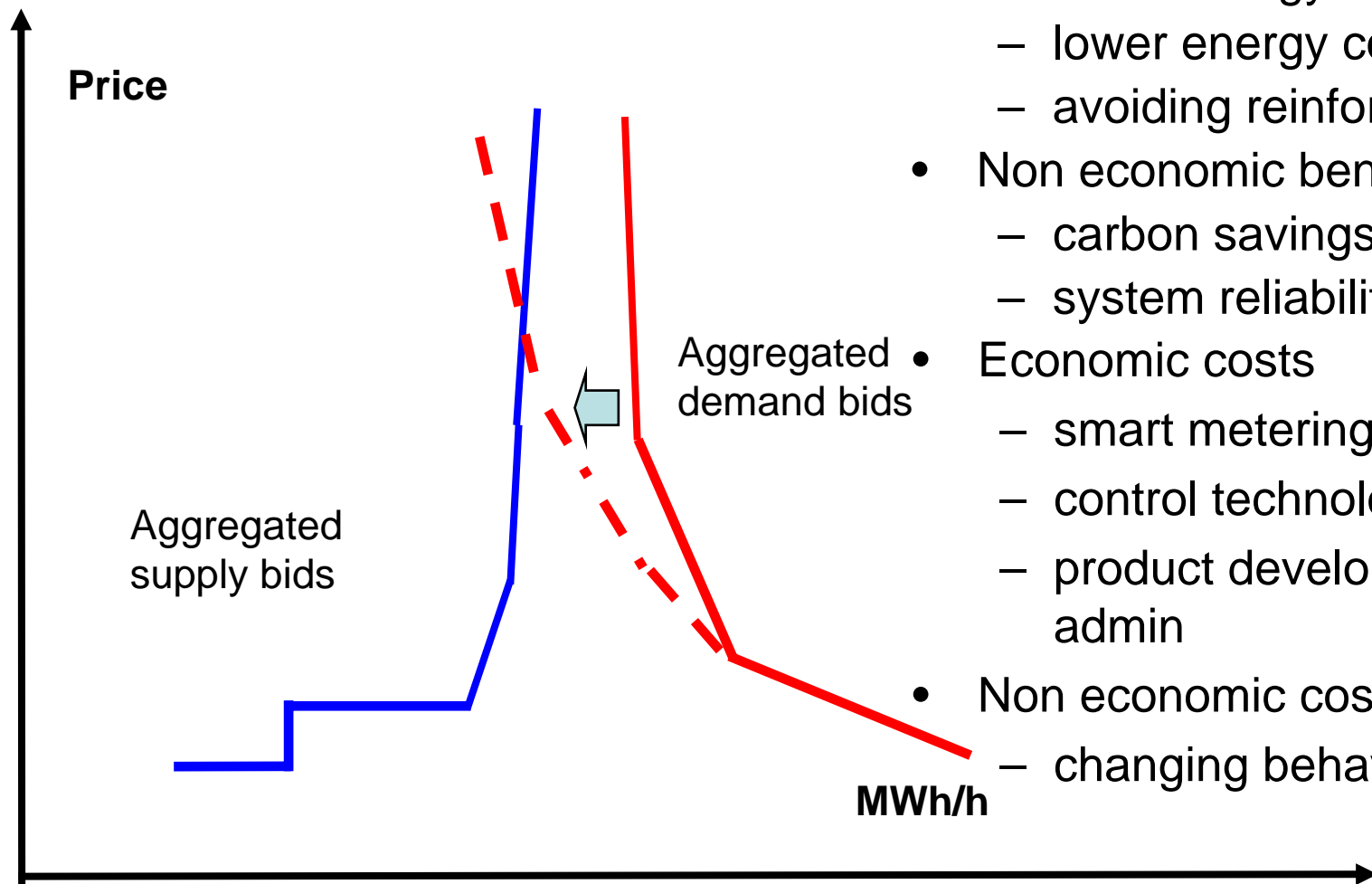
# Costs of unplanned interruption

“Outages cost facilities an average of \$4,000 to \$11,000 each, although many end users suffer much greater losses. For example, one semiconductor manufacturer reports that a single five-second outage could cost the company \$12 million in lost production alone - the equivalent of its entire annual electricity bill.”

E-Source, May 2003



# Key economic costs and benefits













































- Economic benefits
  - lower energy costs
  - lower energy consumption
  - avoiding reinforcement
- Non economic benefits
  - carbon savings
  - system reliability
- Economic costs
  - smart metering technology
  - control technology
  - product development and admin
- Non economic costs
  - changing behaviour

# Typical mechanisms

Method	Description
<b>Real-time pricing</b>	Customers are charged a market-based price for all or a portion of their loads. Prices are provided either day-ahead or the morning-of use, sometimes against indices. Prices may vary by hour, or by peak/off-peak period. Customers can control costs by managing usage relative to these indexed or real-time prices.
<b>Voluntary load curtailment</b>	Customers are offered a price for curtailing load during peak price or demand periods. Customers not obligated to respond, but are paid the energy value of their curtailment if they do.
<b>Committed or contracted load curtailment</b>	Customers commit to curtail loads. The commitment is generally limited to specific time-frames and to a specific number of events. Customers can be paid a capacity payment for the commitment, plus an energy price when they are required to curtail.
<b>Committed DG</b>	Same as committed load curtailment, except that response is backed by distributed generation or fuel switching.
<b>“Ancillary services”</b>	Customers commit to curtail loads when dispatched within the confines of non-spinning or replacement reserve markets. Customers are paid a capacity payment and an energy payment when dispatched.

markets

# Example - GPU

Customer Preferences	Voluntary Load Reduction Program Options			Seasonal Savings Program Options		
	VLR*AM	VLR*PM	VLR*DO	SS: 2-HR	SS: Day-Ahead	SS: Both
<b>Lots of Advance Notice</b>	 Day-Ahead Morning Notice	 Day-Ahead Afternoon Notice	 Short (2 Hr) Notice	 All Short Calls	 Morning Ahead Calls	 Some Short Calls
<b>Predictable/Fixed Incentive</b>	 No Fixed Payment	 No Fixed Payment	 No Fixed Payment	 Fixed Payment	 Fixed Payment	 Significant Fixed Payment
<b>Limited Tolerance for Risk</b>	 Moderate Risk (once pledged)	 Moderate Risk (once pledged)	 Least Risky	 Significant Risk	 Moderate Risk	 Significant Risk
<b>Participate Only Emergencies</b>	 	 	 	 	 	 
<b>Desire for Largest Incentive per event</b>	 Fair Share Incentive	 Strong Incentive	 Significant Incentive	 Significant (few events)	 Significant Incentive	 Significant Incentive (more events)
<b>Limit the Number of Offers</b>	 Most Frequent Offers	 Most Frequent Offers	 Limited Offers	 Limited Offers	 Up to 20 Events	 Up to 25 Events
<b>Flexibility in Deciding Whether to Participate</b>	 Voluntary Participation	 Voluntary Participation	 Voluntary Participation	 No Flexibility Mandatory Participation	 No Flexibility Mandatory Participation	 No Flexibility Mandatory Participation

 Supports Preference

 Moderate Support for Preference

 Least Support for Preference

# Example - RTOs

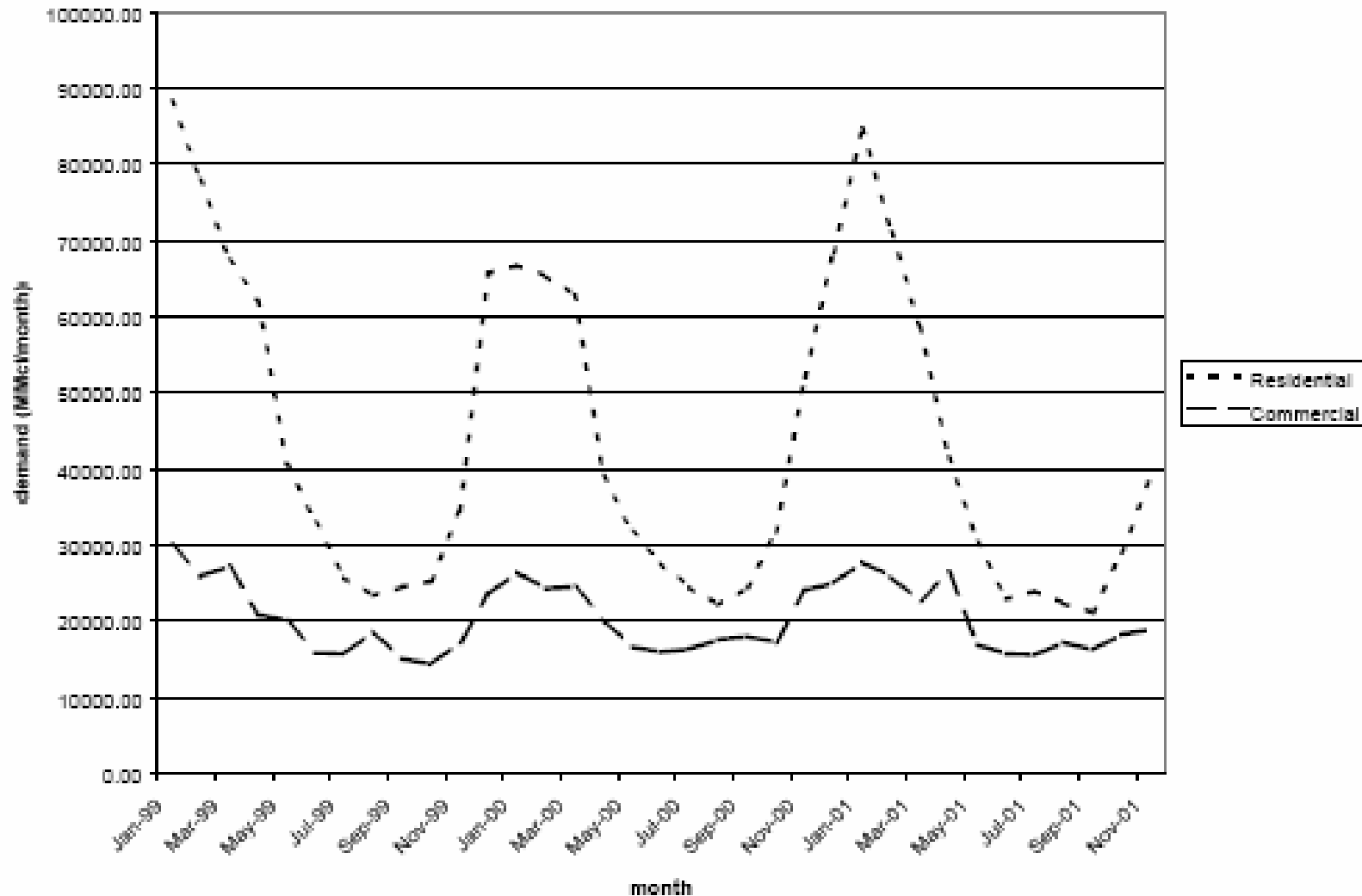
Northeast RTO Demand Response Programs						
	Program Type		2004 Program Usage			
	Price-Based	Reliability-Based	Achieved Reduction	Program Enrollment	Enrollment as % of 2004 Peak Load	Regional Variations
ISO-NE						
Real-Time Price Response Program (RTPR)	Price-Taker		9,216 MWh	108 MW	0.4%	Enrollment varies by zone. CT zone accounts for 89% of RTDR and 29% of RTPR. NEMA makes up majority (37%) of RTDR and ME is majority (91%) of Profile program.
Real-Time Demand Response Program (RTDR)		Emergency &	0	165 MW	0.7%	
Real-Time Profiled Response Program (Profile)		Contractual	0	83 MW	0.3%	
NYISO						
Day-Ahead Demand Response Program (DADRP)	Bid-Based		3,535 MWh	377 MW	1.3%	Enrollment varies by zone. NYC and Long Island (Zones J&K) account for 53% of EDRP load, 28% ICAP-SCR, & 4% DADRP. Western superzone (Zones A-E) is 29% of EDRP, 64% of ICAP-SCR, & 73% of DADRP.
ICAP Special Case Resources (SCR)		Contractual	0	981 MW	3.5%	
Emergency Demand Response Program (EDRP)		Emergency	0	581 MW	2.0%	
PJM						
Economic Load Response Programs (ELRP)			48,622 MWh	724 MW	0.7%	Economic program enrollment varies significantly by PJM Control zones. 82% of MWh reductions occurred in single zone (AP). Two zones had no DR activity (PEPCO and RECO).
• Day-Ahead Option (ELRP-DA)	Bid-Based		179 MWh			
• Real-Time Option (ELRP-RT)	Price-Taker		46,561 MWh			
• Nonhourly, Metered Program (Pilot)	Varies		1,881 MWh			
Emergency Load Response Program (Emergency)		Emergency	0	1,385 MW	1.3%	
Active Load Management (ALM)		Emergency	0	1,806 MW	1.7%	

# Experience with gas (1)

- Nominations, tolerances and penalties on stress days
- Limits to contract quantities, capacity rights
  - priority customers
  - must supply, “protection” levels/insurance volumes
  - blocks of energy
  - firm, non-firm rights
- Sell back pools, daily spot markets
- Rotated curtailment, reduction queues



# Experience with gas (2)



Source - NERA

# Gas is not that different

- Various grounds put forward:
  - balancing roles?
  - incentives?
  - operations daily vs. half hourly balancing?
  - response parameters?
  - participant requirements?
- Same operator, same legal framework, same objectives, similar customer issues

# Barriers

<p><b>Regulatory</b></p> <ul style="list-style-type: none"> <li>• Limited routes to market                     <ul style="list-style-type: none"> <li>– network operators</li> <li>– customers</li> </ul> </li> <li>• 28 day switching rule                     <ul style="list-style-type: none"> <li>– cost recovery</li> </ul> </li> <li>• Network operator incentives</li> </ul>	<p><b>Commercial</b></p> <ul style="list-style-type: none"> <li>• Price visibility</li> <li>• Supplier uncertainty over investment</li> <li>• Customer uncertainty over prices</li> <li>• Prices for peak power</li> <li>• Tariffs from supplier</li> </ul>
<p><b>Sociological</b></p> <ul style="list-style-type: none"> <li>• Price elasticity</li> <li>• Demand elasticity</li> <li>• Wider attitudinal barriers</li> <li>• "It will be over next year"</li> </ul>	<p><b>Technological</b></p> <ul style="list-style-type: none"> <li>• Cost of equipment</li> <li>• "New problem" syndrome</li> <li>• Infrastructure has been dismantled</li> <li>• Process fit</li> <li>• Proven control methods</li> </ul>

# Direction of longer-term work

- Explore customer attitudes to the market:
  - understanding of market design
  - level of interest in demand-side initiatives
  - expectations of suppliers and third-parties in delivering programmes
  - support for existing demand-side product offerings
  - suggestions for enhancing market design
- Database recording quantitative statistics on:
  - demand-side programmes being offered by market participants
  - level of customer involvement

# Key points

- Wide experience of examples of demand side management around world
- Supply fears a factor but efficiency & innovation
- Regulatory, contractual and mixed solutions
- Electricity has been focus because of instantaneous balancing imperative but many different approaches in gas too
- Many lessons and pointers for network operators, suppliers and customers here
- An enduring requirement, not just winter 05/06

**IT'S ALL ABOUT  
THE CUSTOMER!**



**Thank you for listening**

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