RAP Energy solutions for a changing world

Demand Response: The Atlantic Divide

iiESI European Workshop

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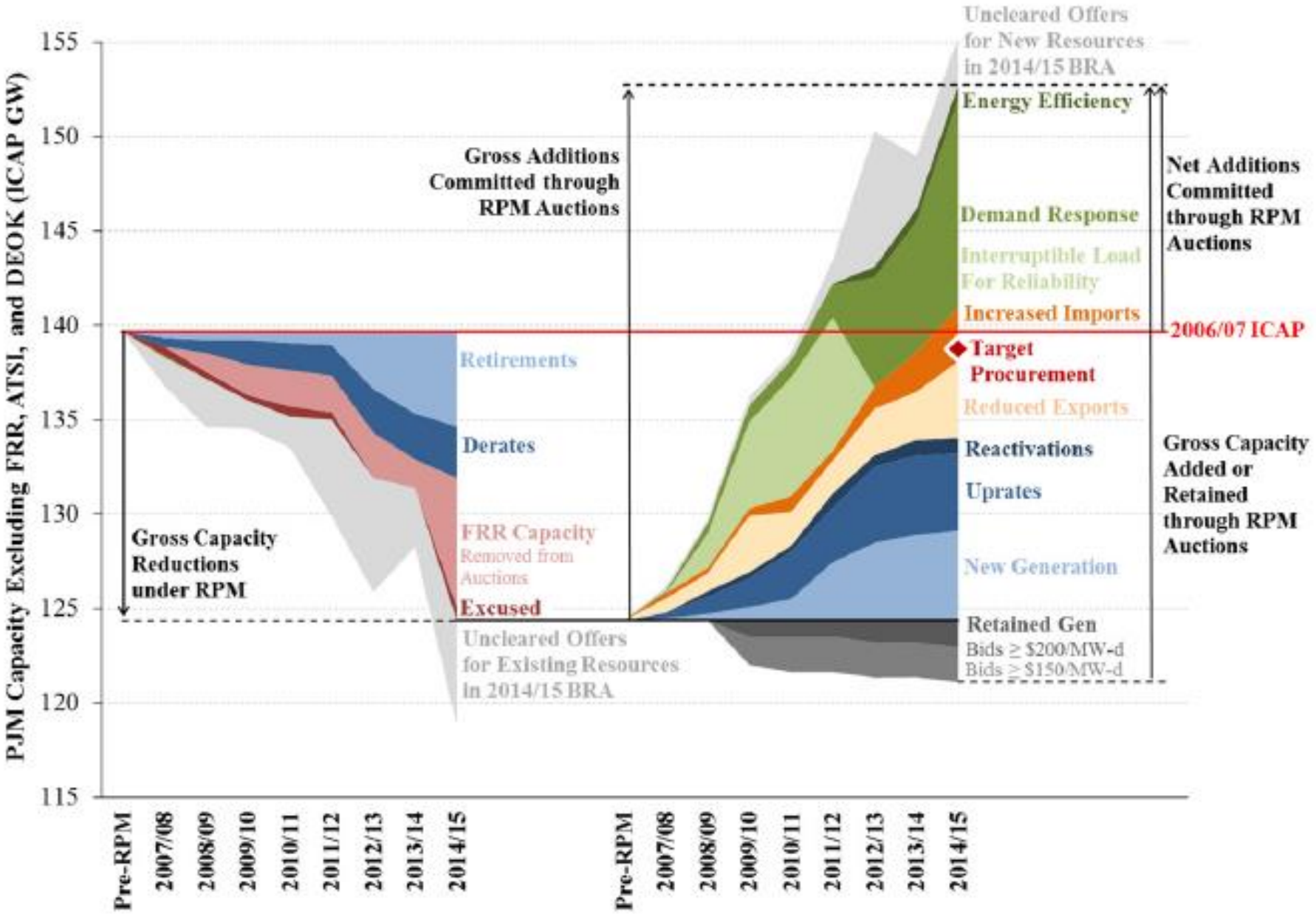
Demand response in North America: From strength to strength


PJM Capacity Excluding FRR, ATSI, and DEOK (ICAP GW)
155
150
145
140
135
130
125
120
115
Pre-RPM
2007/08
2008/09
2009/10
2010/11
2011/12
2012/13
2013/14
2014/15
Gross Capacity Reductions under RPM
Retirements
Derates
FRR Capacity Removed from Auctions
Excused
Uncleared Offers for Existing Resources in 2014/15 BRA
Gross Additions Committed through RPM Auctions
Uncleared Offers for New Resources in 2014/15 BRA
Energy Efficiency
Demand Response
Interruptible Load For Reliability
Increased Imports
Target Procurement
Reduced Exports
Reactivations
Uprates
New Generation
Retained Gen
Bids ≥ $200/MW-d
Bids ≥ $150/MW-d
2006/07 ICAP
Net Additions Committed through RPM Auctions
Gross Capacity Added or Retained through RPM Auctions

Cost benefits have been substantial

- First auction (New England ISO) 2007: demand resources including EE won **2/3rds of the bids for new capacity** & lowered the clearing price to the floor
- PJM auction (for 2012/2013) DSM **bids lowered the clearing price by 90%** (from ~$179 per MW/day to $16.46 per MW/day) – savings of over $1 billion

DR has proven to be reliable

Real-Time Demand Response dispatched by ISO New England

July 19, 2013 13:35 – 20:35.

Load Zone	Obligation (MW)	Performance (MW)	Percent
CT	87.1	81.2	93.2%
NEMA	25.4	26.0	102.5%
NH	3.6	9.8	276.9%
RI	19.4	8.2	42.3%
SEMA	10.1	9.6	94.9%
VT	23.0	29.3	127.1%
WCMA	24.7	19.7	79.7%
Total	193.3	183.8	95.1%

Jan 28, 2013 from 6pm – 8pm.

		Performance	
State	Net CSO (MW)	MW	%
CT	75.3	52.0	69.1%
ME	141.5	197.5	139.6%
NEMA	17.7	19.3	109.4%
NH	21.4	13.9	65.0%
RI	18.4	13.9	75.6%
SEMA	12.8	9.5	74.3%
VT	36.3	33.3	91.7%
WCMA	49.8	32.1	64.5%
Total	**373.1**	**371.6**	**99.6%**

Demand Response maintained guaranteed delivery amounts well beyond the peak hour, even as customer loads were falling.

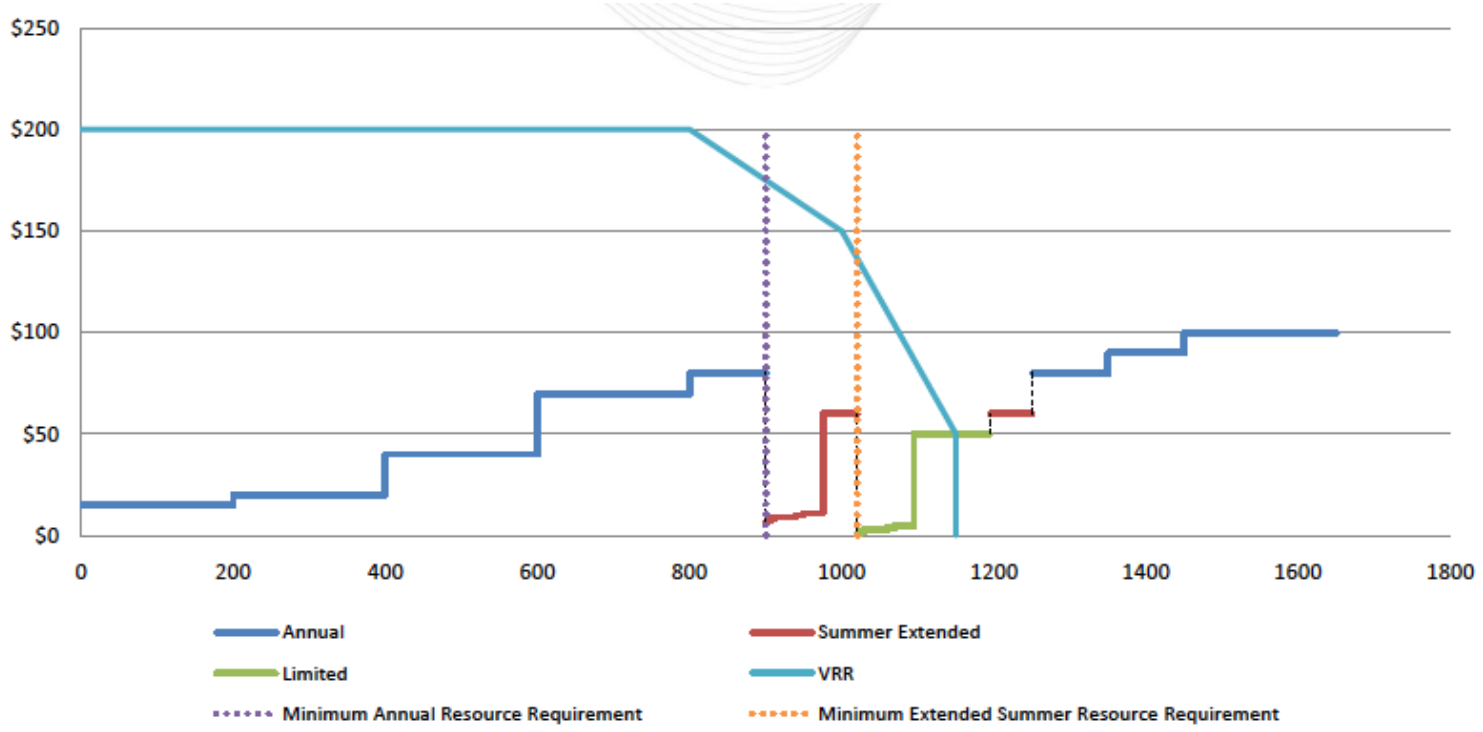
Source: ISO New England.

The Polar Vortex (7 Jan 2014) in PJM

- Generation outage rate was 22%, 3x normal winter outage rate – *half of it coal, a third of it diesel, only 20% of it gas*
- "The responding, voluntary demand response resources…performed very well…The load management deployment in particular attracted imports because it set high prices ($,1800/MWh)…This helped PJM successfully meet an all-time record winter peak of 141,846 MW at 7:00 p.m. January 7 with no reliability issues."
- Not a negative peep out of the media about DR

Source: PJM Interconnection, "*Analysis of Operational Events and Market Impacts During the January 2014 Cold Weather Events*" (8 May 2014)

DR product differentiation (as it should be with generation



Marginal Value Of System Capacity = $50
Annual Resource Price Adder = $20
Extended Summer Price Adder = $10

Source: Brattle Group

Demand response in Europe: Missing in action

Brussels says all the right things…

- "[It is] useless to develop European supply without a corresponding approach to the demand side."
  European Commission, "Generation Adequacy in the IEM" (5 Nov 2013)
- "DR is a first approach before considering public intervention on the supply side." *Ibid.*
- "Where consumers voluntarily reduce demand, as part of their supply contract or in response to high prices, this is a sign of well-functioning markets and not a sign of a generation adequacy problem." *Ibid.*
- "The terms and conditions related to Balancing shall allow the aggregation of Demand Side Response…where appropriate to offer Balancing Services…."

  Draft Electricity Balancing Network Code (Dec 2013)

…but the public narrative is abysmal

Mail Online

Firms may be paid to turn out lights: Four- hour curfew to save Britain from blackouts

- **Factories and businesses will be paid to turn out lights from 4pm to 8pm**
- **Emergency measures designed to head off threat of blackouts next winter**
- **Ofgem decides plan is necessary to ensure adequate supply of electricity**

'This can't be a sustainable way of managing the energy system.

"This can't be a sustainable way of managing the energy system….How are we supposed to expect investment into this country if we are in danger of moving toward having Third World levels of reliability for power?"

Jeremy Nicholson, Energy Intensive Users Group

19 December 2013

…and the reality is starkly at odds

- Proposed UK capacity mechanism includes DR…provisionally and only *after* an all-supply auction.
- Aggregation in Germany is effectively *verboten*
- "Demand response is progressing slowly in the EU."

  Eur. Comm., Staff Working Paper on Demand Response (5 Nov 2013)
- "In the majority of Member States today, [aggregated] DR is illegal or impossible due to regulation."

  SEDC, "Mapping Demand Response in Europe Today" (April 2014)

Why?

Structural issues – a personal list

- Generator market power, political influence remain formidable barriers, especially to aggregation, in key MSs (UK, Germany, Spain, Italy)
- Weak MS regulators; a regulatory void at EU level
- Resource adequacy methodologies effectively disenfranchise demand-side resources
- Self-dispatch & decentralized resource planning provide ample opportunity for gaming
- Legacy “sweetheart” interruptible deals for industry appear to be a major roadblock in some MSs

Structural issues – a personal list

- Balkanized balance control areas, intra-day & balancing markets inhibits standardization & transparency
- Lack of locational pricing, missing linkage between balancing mechanisms & energy markets
- Oversupply and aggressive suppression of scarcity pricing in energy and balancing services markets
- Capacity market opportunities largely missing
- Primary focus is on the side of the market divide that is accessible – TSOs – effectively ghettoizes DR in the ancillary services market (e.g., the EED)

What to do?

Structural fixes – a personal list

- Enforce EU guidelines on priority integration of DR into capacity mechanisms
- Crack down on NRA failure to open markets to aggregators, take action on NRA independence
- Take aggressive action on market power
- Improve scarcity pricing (raise price caps; liberalize balancing services pricing; dynamically link energy and balancing services markets; locational pricing)
- Expand real-time pricing opportunities/options
- Speed integration of intra-day & balancing markets
- Promote regional market governance, increased centralization of short-term market operations

Structural fixes – a personal list

- Bottom line: Strong correlation in NA between growth of demand response and centralized market operation by an independent system operator
- Failure to move toward something resembling regional ISOs will only make DR more indispensible as the share of intermittent renewables grows
- Irony: NA, in part because of DR, has a market structure well suited to integrate RES but limited ambition to do so; EU has ample ambition to do so, but the market structure is not quite up to the job.

About RAP

The Regulatory Assistance Project (RAP) is a global, non-profit team of experts that focuses on the long-term economic and environmental sustainability of the power and natural gas sectors. RAP has deep expertise in regulatory and market policies that:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

Learn more about RAP at www.raponline.org

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