

# DR in PJM Wholesale Market

MADRI

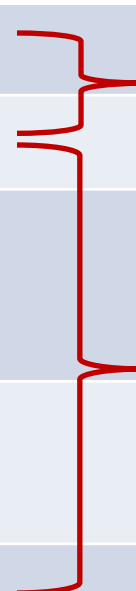
Valley Forge, PA


September 2013

Pete Langbein

# PJM Opportunity by Wholesale Service

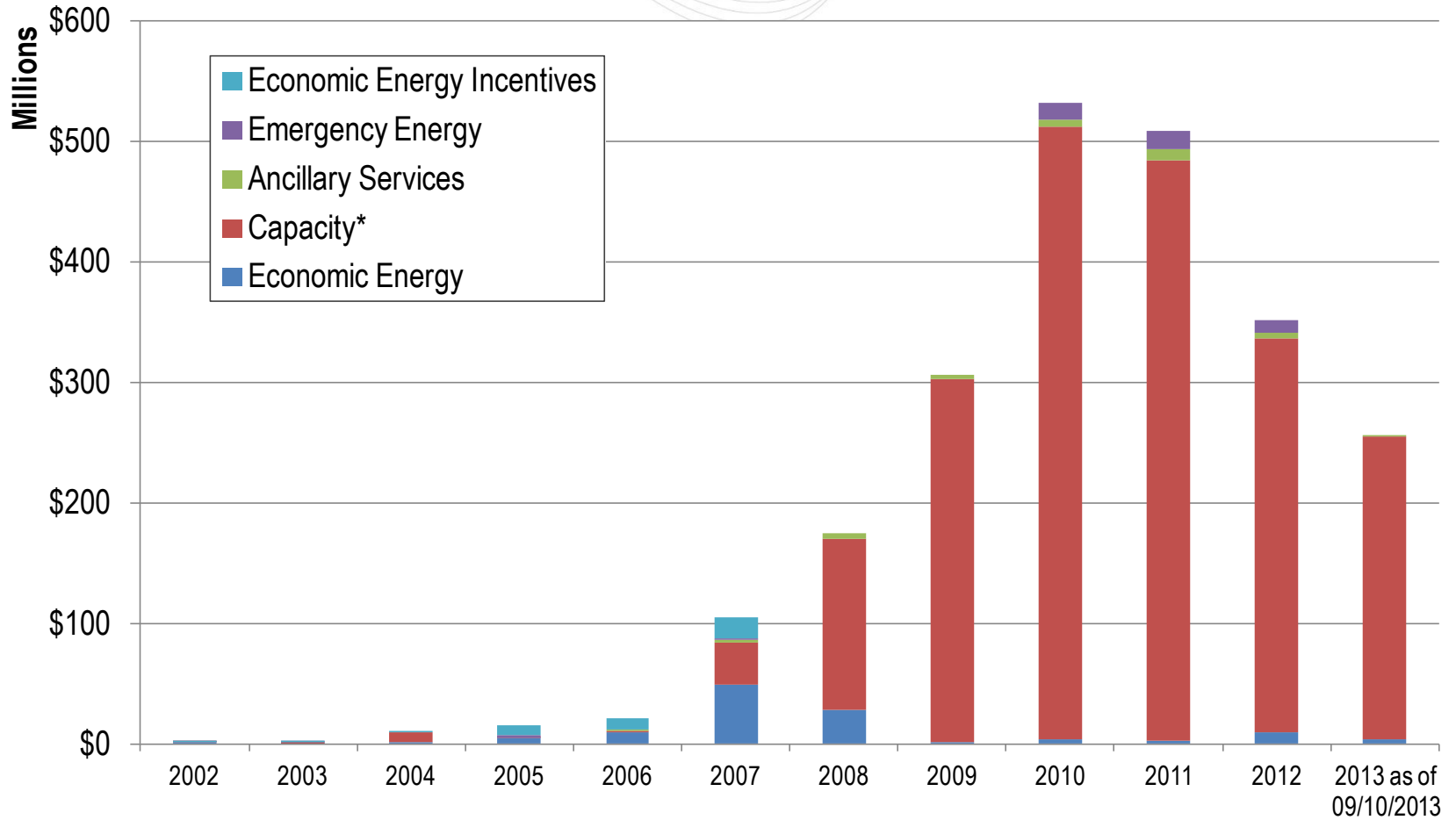
Wholesale Service	Demand Side Response	Energy Efficiency	Price Responsive Demand
Capacity	Yes	Yes	yes
Energy	Yes		
Day Ahead Scheduling Reserves (30 min)	Yes		
Synchronized Reserves (10 min)	Yes		
Regulation	Yes		

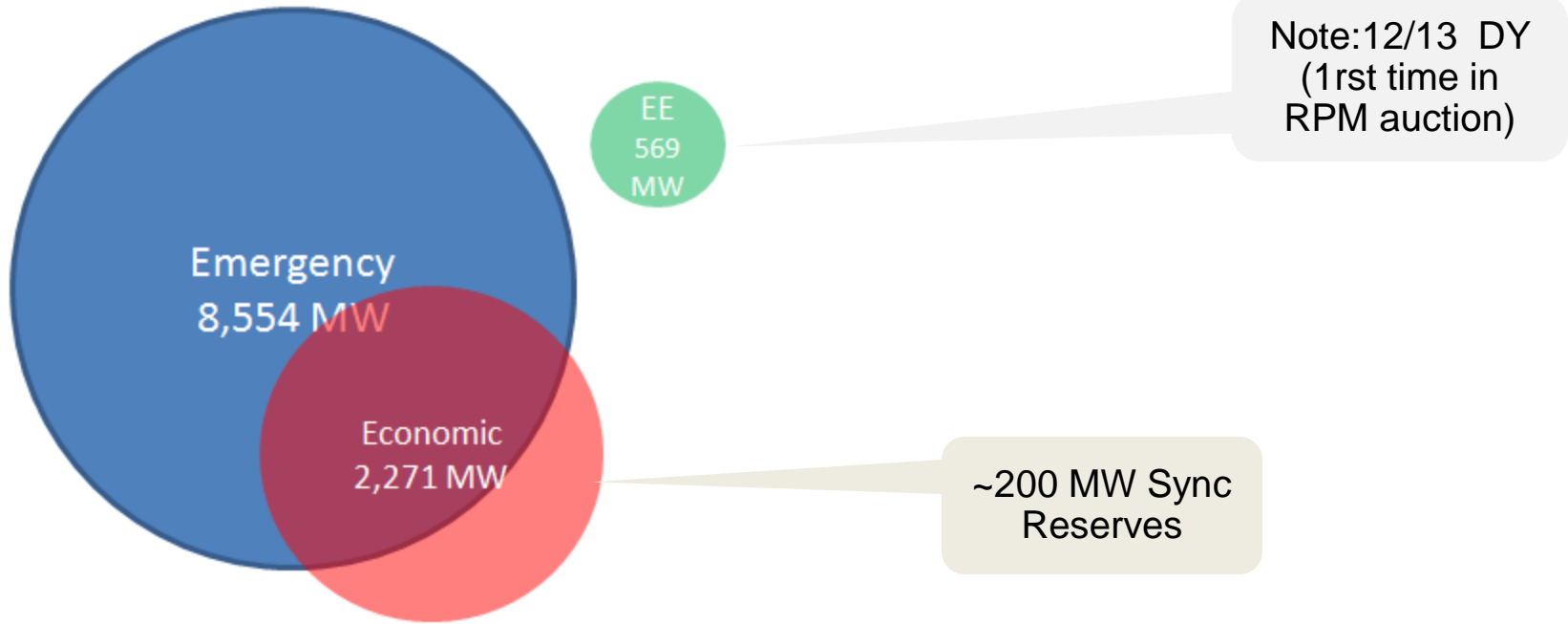

**Emergency resource**


**Economic resource**

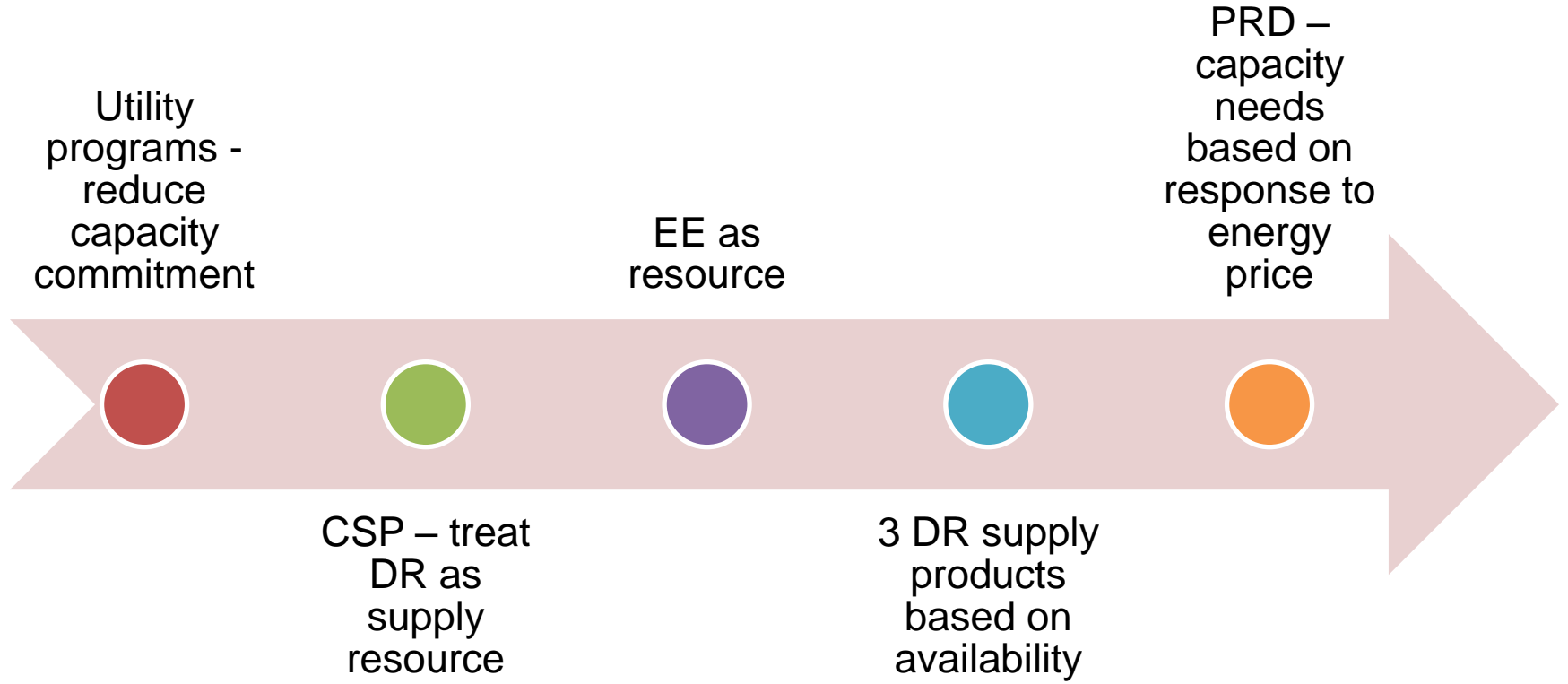
*Customer may participate as Emergency and Economic DSR and as EE*

# DR Revenue by Year by Wholesale Service





*Represents over 1 million end use customers (~14,000 C&I) across PJM*



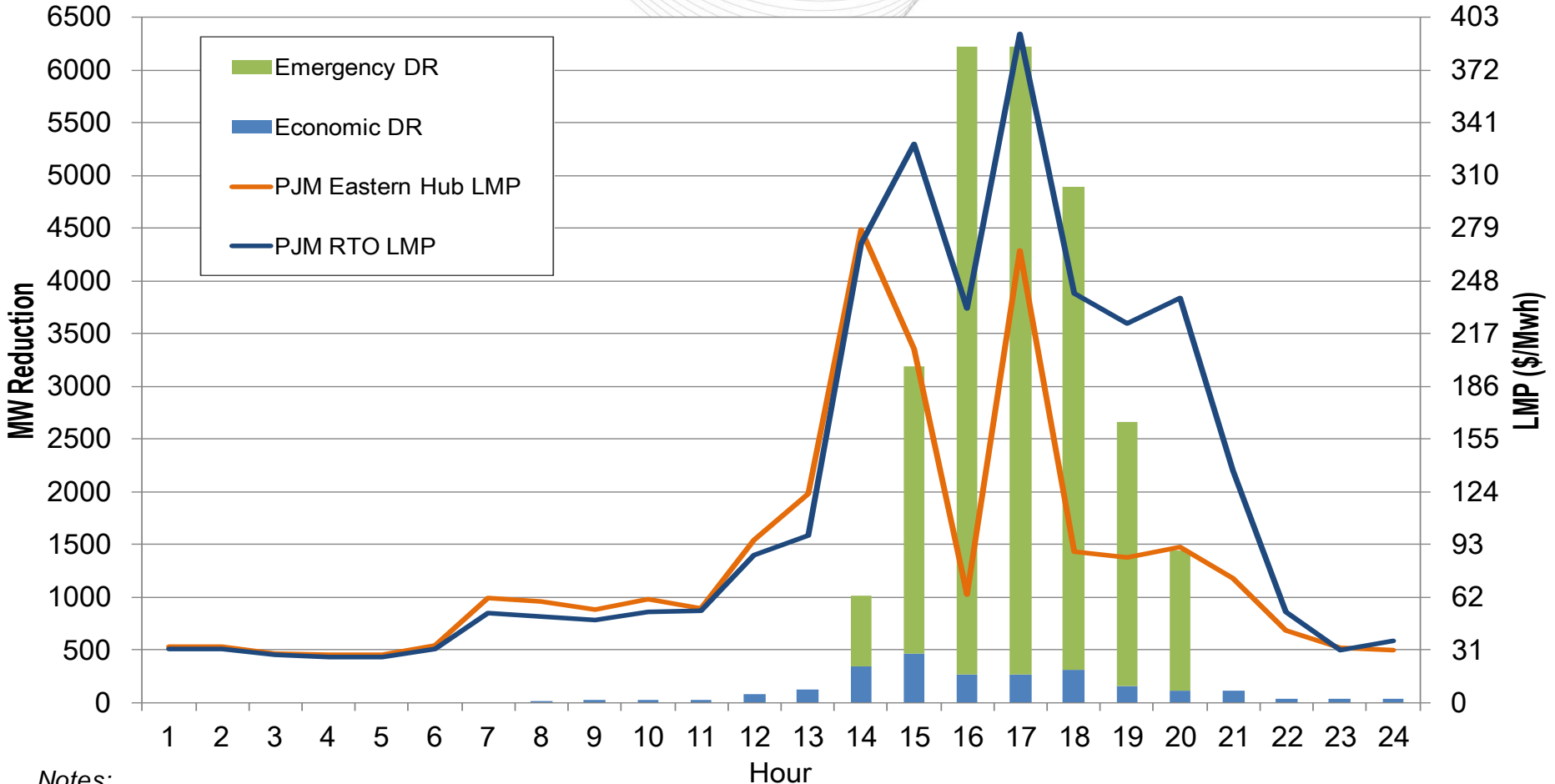
# PJM Emergency DR dispatched this year

- All emergency demand response (known as “load management” or “DR”) capacity resources called by PJM to reduce load that had not already reduced economically.
- July 15 and July 16 – Long Lead Emergency (DR) resources dispatched in ATSI Zone for total DR of 652 MW each day.\*
- July 18 – Long Lead Emergency (DR) resources dispatched in ATSI, PECO, PPL, and AEP Canton sub-zone for total DR of 1638 MW.\*
- September 10<sup>th</sup> – Long Lead Emergency (DR) resources dispatched in ATSI Zone and AEP Canton sub-zone for total DR of 706 MW.\*
- September 11<sup>th</sup> – Long Lead Emergency (DR) resources dispatched in AEP, ATSI, DOM, DUQ, and all Mid-Atlantic Zones, and Short Lead resources in all Mid-Atlantic Zones for total DR of 5961 MW.\*
- Actual reductions achieved will be known after all individual customer meter data is provided for compliance and settlements – deadline for compliance data submission is 45 days after the end of the month of the event and the submission deadline emergency energy settlements is 60 days following event.

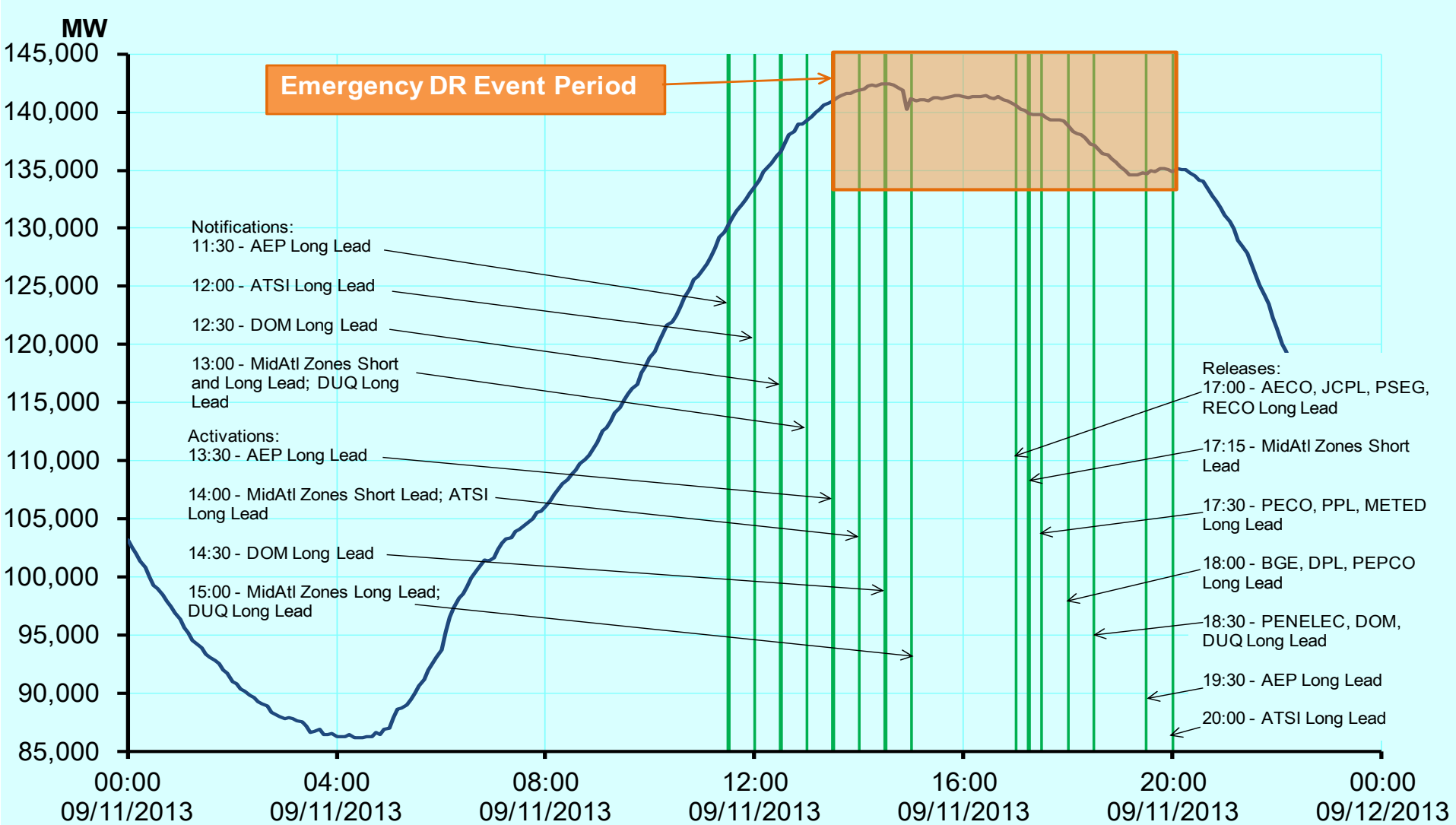
\*See following link for specific deployment time for each zone and lead time:

[http://www.pjm.com/planning/resource-adequacy-planning/~/\\_media/planning/res-adeq/load-forecast/alm-history.ashx](http://www.pjm.com/planning/resource-adequacy-planning/~/_media/planning/res-adeq/load-forecast/alm-history.ashx)

## Estimated Demand Response in PJM: September 11, 2013



Notes:  
 Registered Emergency DR Amounts adjusted for RPM Commitments (do not represent actual energy reductions).  
 LMPs included to represent energy market conditions on the operating day and not a relationship between dispatched DR and prices.  
 Actual load reductions are not finalized until up to 3 months after event.



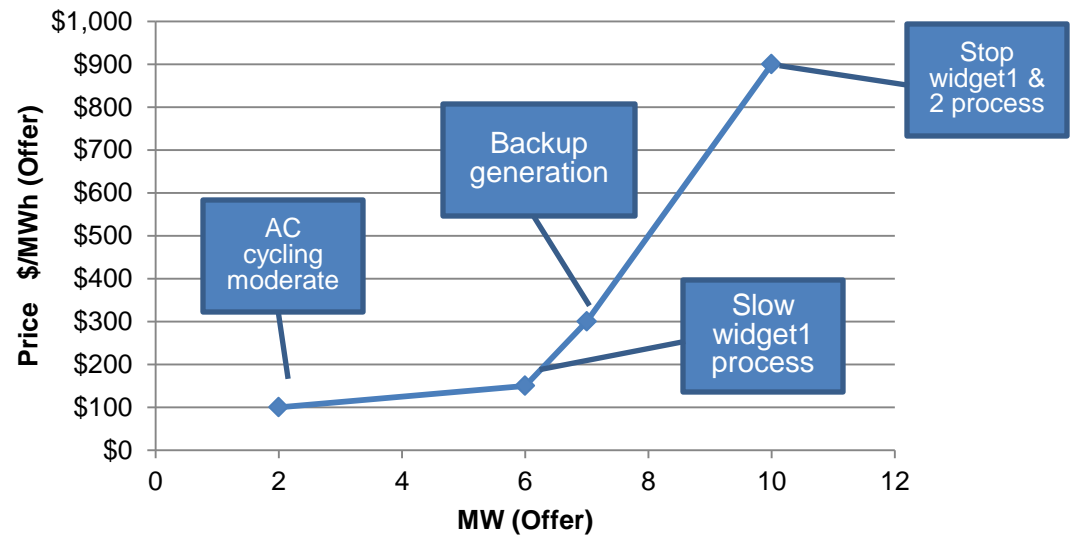


- Are DR and Generation reasonable comparable?
- Improve operational capability
  - How, when and where to dispatch
    - Ramps and snapback
  - More granular dispatch
    - Geographic: for transmission constraints
    - Volume: to meet system need
- Administrative Action > Economic Dispatch
- Re-evaluate DR saturation based on product availability and modify Capacity auction process



Not too big, not too small, just right.

- Incremental offer curve
- Day-Ahead vs. Real Time market availability
- Hourly availability
- Offer curve and schedule can change daily



*Use generation offer flexibility in eMKT system for demand resources*

- Energy
  - More participation in day ahead market
  - Better measurements for variable loads
- Synchronized Reserves (10 minute spin)
  - Ability to migrate FROM Inflexible (1 hour ahead commitment) TO Flexible (5 minute ahead commitment)
- Regulation (Frequency Control)
  - Economic Regulation registration
  - Ability to sub-meter for telemetry and compliance calculation