

PJM Demand Side Response and POLR

**Overview of Programs,
Activities and Implications for
POLR**

July 14, 2004

**John J. McCawley, P. E.
Director - Energy Acquisition
Exelon Energy Delivery**

Comparison of three PJM Demand Side Response (DSR) programs

Older (pre-Open Access; pre-Retail Choice; Still in effect)

- **Active Load Management (ALM) and Mandatory Interruptible Load (MIL)**
 - Mandatory load reduction activated by a call from PJM
 - Payment = capacity credit based on MW reduction
 - Reward or penalty for over / under compliance.

Newer (began summer of 2000)

- **Emergency DSR program**
 - Voluntary load reduction activated by a call from PJM
 - Payment = cash
- **Economic DSR program**
 - Voluntary load reduction self managed.
 - Payment = cash

PJM Active Load Management / Mandatory Interruptible Load program Overview

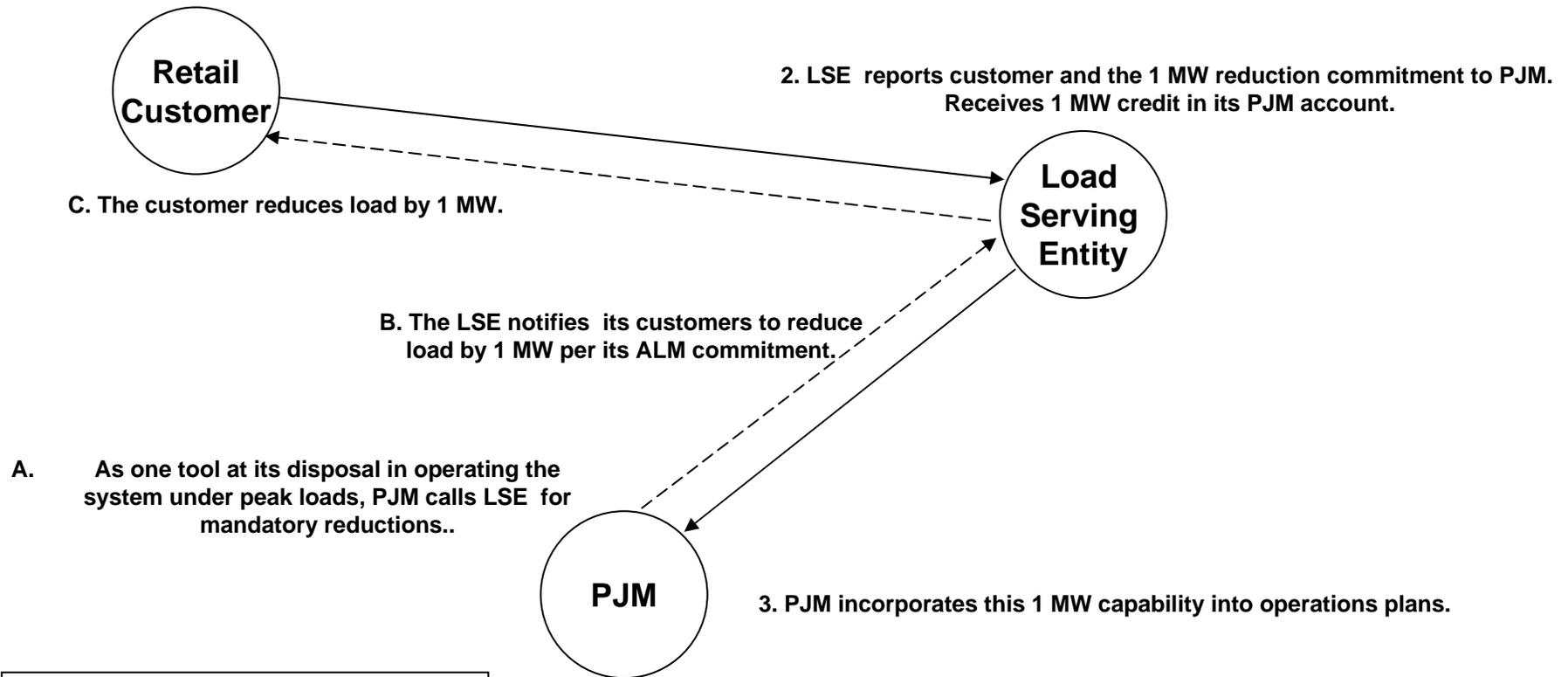
- All Load Serving Entities (RES's, Muni's, Coop's, and utilities) have a capacity obligation to cover the retail load they serve.
- ALM/ MIL program basics:
 - **PJM member commits to reduce load by either a fixed MW amount or to a certain MW load when called upon by PJM.**
 - **This load reduction is tied to specific end-use customer accounts.**
 - **In exchange for this call option to reduce 'X' MW's of load, the member receives an 'X' MW credit to their account. This credit can either be sold or used to meet the member's capacity obligation.**
 - **After-the-fact performance is measured. Penalties are charged for under compliance; payments are made for over compliance.**

Three types of load response.

- 3 types of load response under MIL:
- Direct Load Control – signal controlled by LSE (load serving entity such as coop, muni, RES, or utility) to cycle equipment
- Firm Service Level – customer drops load to a predetermined firm service **level** when called by LSE
- Guaranteed Load Drop – customer load drops by a predetermined **amount** when called by LSE

Active Load Management / Mandatory Interruptible Load program - HOW IT WORKS

1. Customer commits to a certain (e.g 1 MW) MW reduction, if called, under a tariff or an agreement.



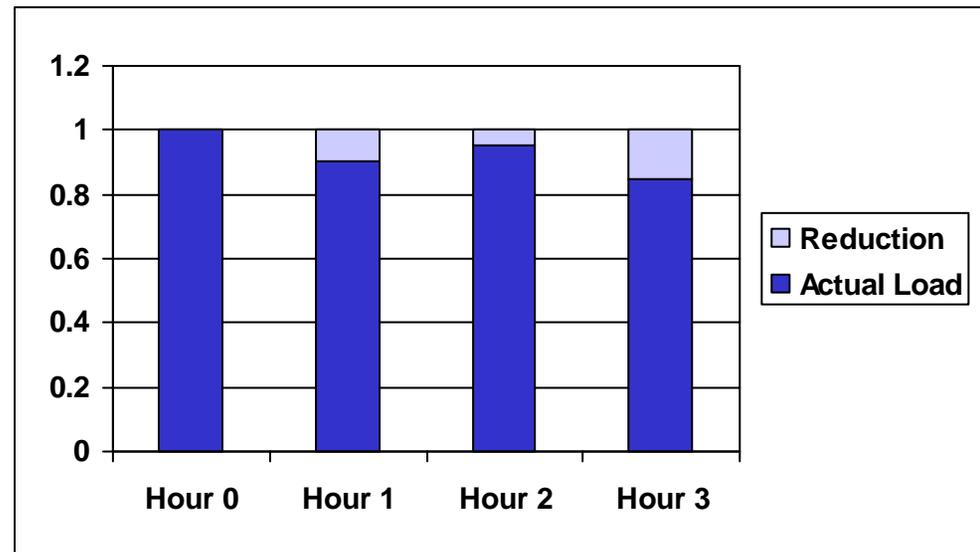
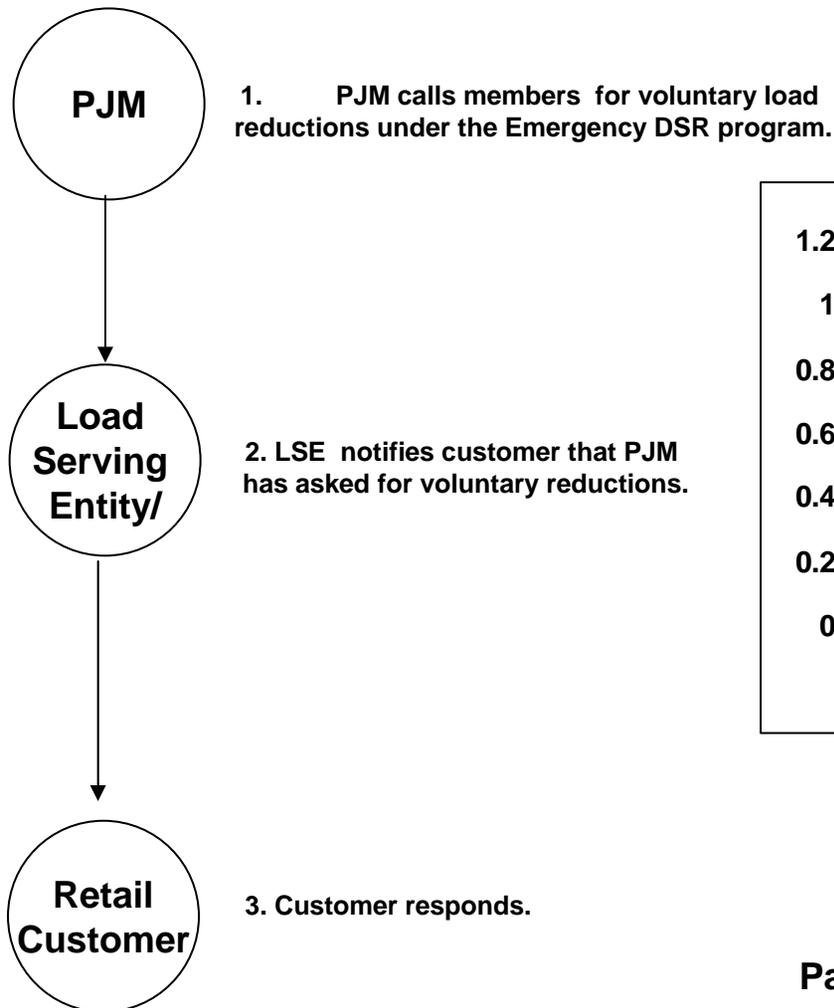
PJM Emergency and Economic DSR Programs - ExelonSM

Design Objectives

EMERGENCY: designed to provide a method by which end-use customers may be compensated by PJM for voluntarily reducing load during a PJM-called emergency event.

ECONOMIC: designed to provide an incentive to customers or curtailment service providers to reduce consumption when PJM Locational Marginal Price (LMP) aka/ real time spot prices are high.

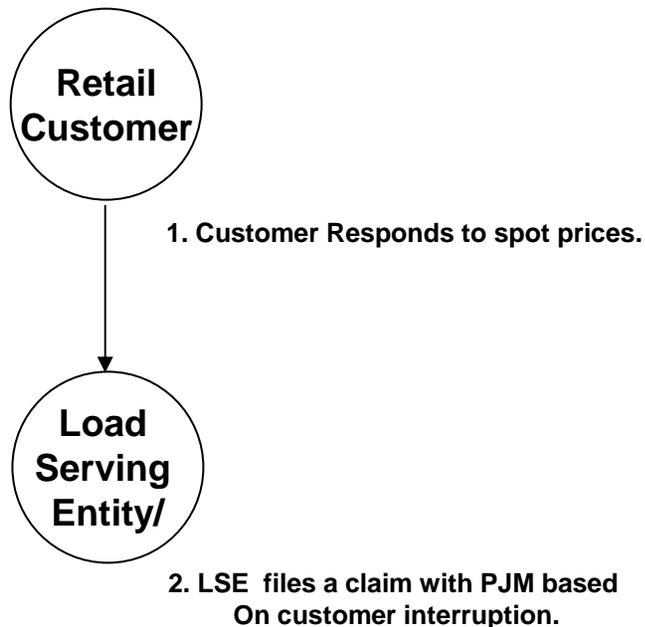
PJM Emergency DSR Program - HOW IT WORKS



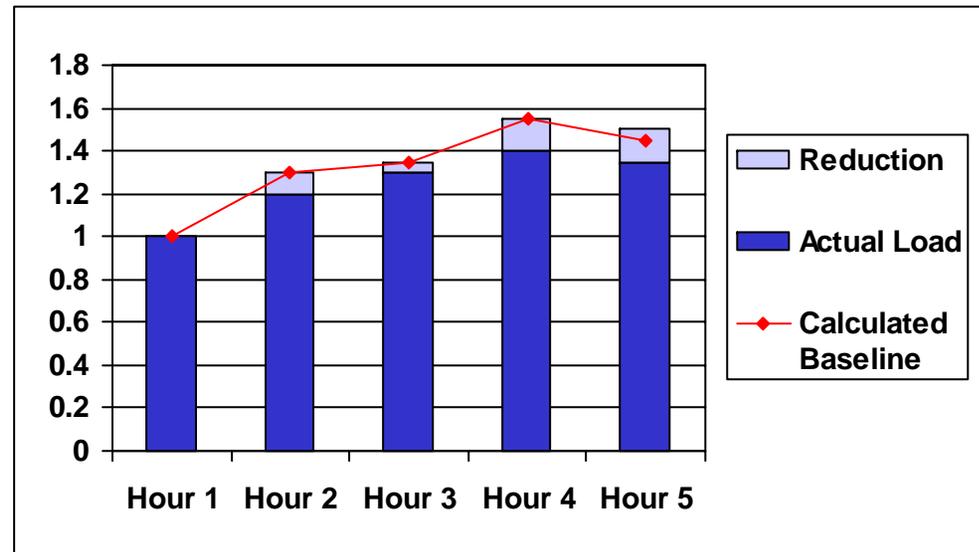
**Payment to PJM Member =
MW reduction relative to Hour 0 x
Greater of (Spot Price or \$500/MWH)**

**Payment to Retail customer is based on
agreement between PJM member and retail customer.**

PJM Economic DSR Program - HOW IT WORKS



Load reductions in the economic program are measured relative to a calculated baseline value, based on recent history, of what the load would have been, absent the reduction.



$$\text{Payment to PJM Member} = \text{MW reduction relative to baseline} \times (\text{spot price} - \text{retail price})$$

(Payment is at spot price when spot price is above \$ 75/MWH)

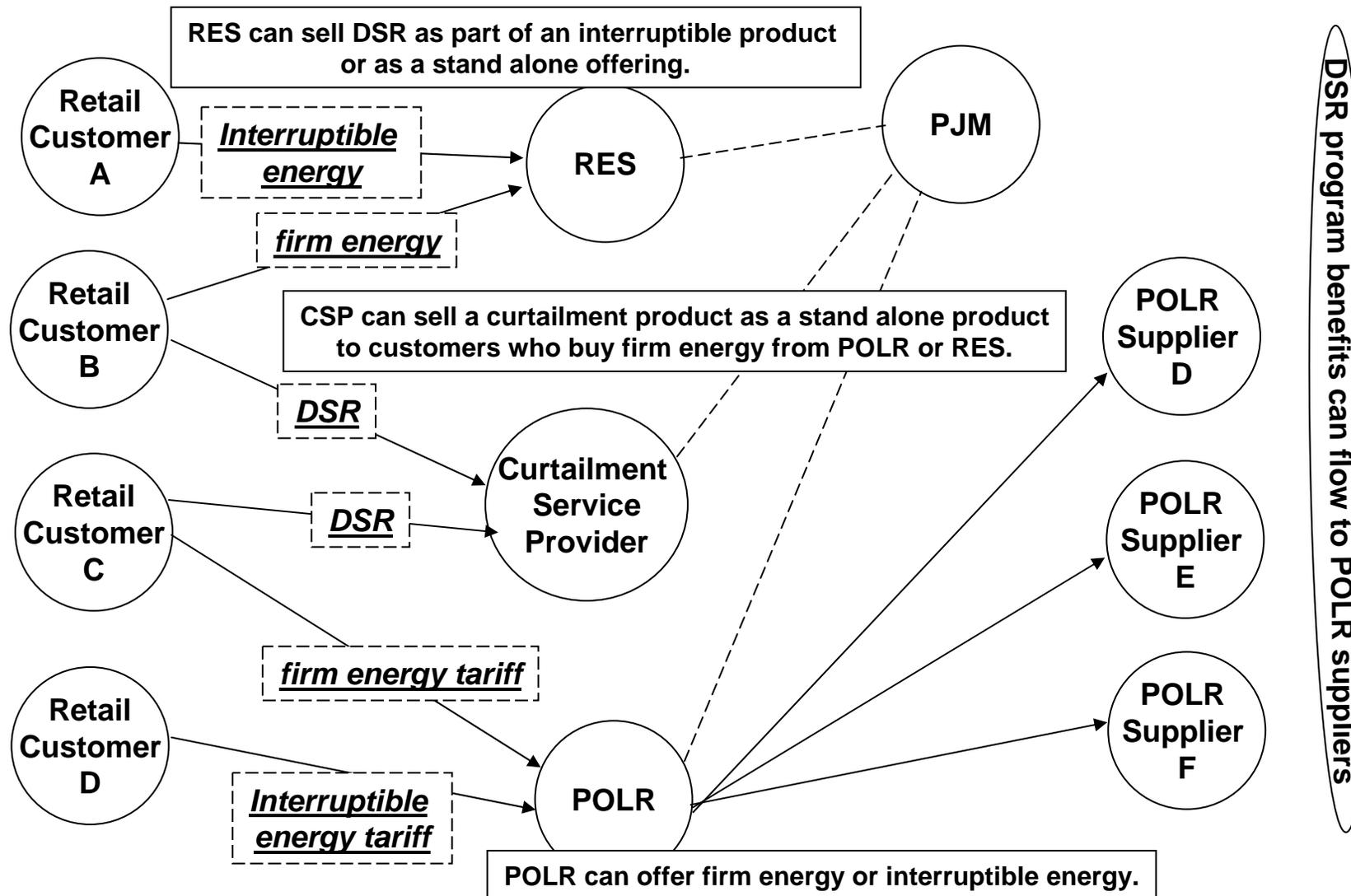
Payment to Retail customer is based on agreement between PJM member and retail customer.

PJM DSR programs enable demand response for end use customers in a variety of ways.

Various ways to bring Demand Response to End Use Customers under the current PJM Programs:

1. A load server can build DSR into a retail energy offering.
2. A load server can sell an unbundled curtailment product
3. A CSP (curtailment service provider) can develop and market separate curtailment service products to customers. A CSP may or may not be a RES/Utility/Muni/ or Coop.
4. A large C&I customer may join PJM, either as a member, or under special DSR member rules, and participate directly in the DSR program without an intermediary.

How PJM DSR can work in a post-transition POLR world.



APPENDIX

Details of the PJM Emergency and Economic DSR programs

Current DSR enhancement activities in PJM

Under PJM's Market Implementation Committee , a DSR working group is working to encourage more DSR in the following ways:

1. Expanding special membership for economic response.
2. Modifying program rules so energy market pricing is influenced by demand response.
3. Developing a standard demand response call option product and determining forward pricing through regular auctions.

PJM DSR Programs

Options to Participate

EMERGENCY:

- **PJM sends notification**
- **Voluntary Curtailment**

ECONOMIC (except for Real Time LMP based customer):

Day Ahead Market

- Customer submits Day Ahead bid in PJM eMKT system
- PJM notifies customer in eMKT
- if bid clears, then customer is obligated to reduce in Real Time

Real Time Market

- Customer notifies PJM via email one hour prior to reduction
- Voluntary curtailment

Dispatched by PJM in Real Time

- Customer submits operational information via PJM eSuites
- PJM notifies customers via phone call

PJM DSR Programs

Payment to load reducers

EMERGENCY:

- PJM pays HIGHER of \$500/MWh or spot energy price of EDC zone where customer is located (e.g. ComEd zone LMP)

ECONOMIC

- If zone spot price < \$75, then PJM pays zone spot price less retail rate (Generation & Transmission). Otherwise, PJM pays zone spot price.
 - Note: The Spot minus Retail rate is seen as the economic benefit of the reduction and is charged to the Load Server of the customer who is reducing load.
 - When the payment is for the full spot price, there is an incentive payment that is currently socialized over all the load servers in the zone.

PJM DSR Programs

Cost recovery – who pays for this?

EMERGENCY:

- Cost recovery is modeled same as PJM payments for emergency generation. Costs are allocated to members whose energy accounts are short (Market Buyers) in the hour.

ECONOMIC

- LMP less retail rate (G&T) is recovered from the LSE who normally serves the customer

NOTE: The logic is that this provider benefits by having less load to serve, and although the LSE 'loses' the G&T sale, it has extra energy that it can sell at the LMP.

- For LMP GT/EQ \$75, the retail rate (G&T) is recovered from all LSEs in the Zone, on a prorated basis.

NOTE: The logic is that this reduction at high prices will tend to temper price spikes and that the LSEs in the zone should benefit by lower energy costs. It is not charged to generators or transmission because generators lose money by lower prices and transmission is not affected.

PJM DSR Programs

Risks to Load Reducers

EMERGENCY:

- None.

ECONOMIC

- Real Time and Dispatched by PJM in Real Time Market – none.
- Day Ahead Market –
 - if a load reduction is committed in the DA market, and the member cannot deliver, they are charged Real Time LMP * shortfall on commitment + balancing operating reserves charges.

PJM DSR Programs

Who can participate

EMERGENCY:

- Full members
- Special membership category created to encourage participation.
- Interval metering required. If you don't have it, customer pays for it.

ECONOMIC

- Full members only.
- Interval metering required. If you don't have it, customer pays for it.

PJM DSR Programs

Other rules – ALM related rules and switching

EMERGENCY:

- ALM may participate if contract EXPLICITLY excludes payment for energy
- Cannot receive simultaneous credit for ALM reductions.
- Must stay in program at least 15 days.

ECONOMIC

- ALM may participate if contract EXPLICITLY excludes payment for energy
- Cannot receive simultaneous credit for ALM reductions.
- Must stay in program at least 15 days.
- Real Time LMP based customers can only participate in Real Time Market

PJM DSR Programs

Metering/ measurement / performance verification

EMERGENCY:

- Generation: metered output.
- Load reductions: metered load the hour prior to the emergency, and during. Payments based on reductions relative to the hours prior.

ECONOMIC

- Generation: metered output.
- Load reductions: every hour.
- Customer Baseline Calculation – the calculation method for the load the customer would have had absent the reduction. Payments are for reductions measured off this theoretical load.
- May be weather adjusted.

PJM DSR Programs

Key points

EMERGENCY:

- Helps out in an emergency
- PJM doesn't count on this when planning for reliability
- Special membership and payment minimum of \$500/mwh to encourage greater participation
- PJM initiates this only when reduction is desired.

ECONOMIC

- Helps out in emergency AND to mitigate price spikes.
- Enables demand to participate in the markets similar to Supply.
- Usually only worthwhile when LMPs are expected to be above \$75 for a string of hours AND customers can adjust operations to take advantage of this.