STATEWIDE EVALUATION TEAM

UPDATE ON DEMAND RESPONSE STUDY

Pennsylvania Public Utility Commission
Demand Response Stakeholders Meeting
08/07/2012

Nexant

GDS Associates, Inc.
Engineers and Consultants

MONDRE ENERGY, INC.

Objectives of the DR Study

Overarching Objective: Provide the Commission with information that will inform their decision on whether or not to include DR programs in future phases of Act 129 by quantifying the ability of DR programs to reduce retail electric rates.

1. Examine the structure of current DR requirements and evaluate alternatives to the Top 100 hours criteria as well as evaluate other programs, ISO's and utility structures.
2. Determine if the cost of acquiring resources is greater than the energy and capacity benefits they produce given market conditions tied to the top 100 hour issue but also looking at the economics for each service territory
3. What impact do Act 129 programs have on reducing retail electric rates over and above existing PJM programs?
4. Develop a high level program design with recommendations to the Commission for future DR programs by evaluating the incremental value of Act 129 DR resources in PA.

Overall Approach to the Study

- Develop an interim report for the Commission staff-November 2012
  - Present secondary research on cost effectiveness testing, program design, assessment of the top 100 hours and propose a high level program design and cost effectiveness models for future Act 129 programs.
- Final Report-April 2013
  - Will include the results of incremental savings and cost effectiveness analysis of the 2012 programs
  - Expect data ~45 days following the close of DR season-November 2012 timeframe)

Incremental Value of Act 129 DR

- Give the Commission information on whether or not to include DR in future phases of Act 129
- Conduct cost-effectiveness analysis on the incremental value of load curtailment programs
- What is the incremental value of Act 129 DR beyond what is being achieved via the PJM DR market?

PROPOSED TOPICS FOR FINAL REPORT

Interim Report

- Overview of existing program structures and treatment of payments for TRC in other States
- Review of Top 100 hours structure and limitations
- Recommended/Proposed structure for any future DR programs for the State

Final Report

- Summary of Incremental Value survey results
- Incremental impact analysis to determine impact of Act 129 programs
- Economic analysis of Incremental Savings and effect on TRC

DEMAND RESPONSE STUDY OVERVIEW

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Incremental Savings Analysis

- Expected to be a subset of customers participating in Act 129 load curtailment programs who are also active in the PJM DR markets.
- The 2011 TRC Final Order directed the EDCs to ignore any charges, penalties or payments from PJM in the calculation of the TRC ratio.

Incremental Savings Analysis

- How *should* benefits be attributed when a customer receives incentives from two revenue streams for the same action?
- Important question for future program design.
- Act 129 benefits will be discounted because some portion of the load reductions observed in 2012 may have happened in the absence of the Act 129 programs.

APPROACH

- 2011 TRC Final Order directed the EDCs to conduct Net-to-Gross research on programs.
- Research should be focused on customer motivation and decision making. What would have happened in the absence of Act 129 Load Curtailment programs?

SWE DR Data Request

- Record for each participant for each hour that an Act 129 load reduction is reported.
- Information about PJM participation during that hour. Identify overlapping participation.
- SWE assumes that EDCs will know which days a customer participates in PJM events because those days must be excluded from the CBL window in order to calculate the Act 129 load reduction.

SWE DR Data Request

UniqueID	Date	Hour Ending	Act 129 kW Reduction	Act 129 Payment	Temp	PJM Event	PJM Event Type	PJM kW Reduction	PJM Payment
4545484863	6/28/2011	14	280	$126.00	91	No		0	$0.00
4545484863	6/28/2011	15	305	$137.25	92	No		0	$0.00
4545484863	6/28/2011	16	317	$142.65	92	No		0	$0.00
4545484863	6/28/2011	17	301	$135.45	90	No		0	$0.00
8795411978	6/28/2011	15	1540	$693.00	92	Yes	Econ	1540	$408.10
8795411978	6/28/2011	16	1615	$726.75	92	Yes	Econ	1615	$427.98
8795411978	6/28/2011	17	1647	$741.15	90	Yes	Econ	1647	$436.46
8795411978	6/28/2011	18	1514	$681.30	88	Yes	Econ	1514	$401.21

SWE DR Data Request

- Confidentiality concerns over providing the SWE with PJM interchange accounting records
- Non-Disclosure Agreements
- March 4, 2011 Secretarial Letter

For non-residential customers enrolled in Act 129 demand response programs, both Act 129 and PJM demand response events will be disclosed for each participant and for each hour of the event.

Allocation of Benefits

- The data request response tells us the frequency of dual participation.
- When a customer participates in both markets during the same hour, how should the energy and capacity benefits be allocated?
- Not an issue for Phase 1 of Act 129. All benefits are attributable to Act 129.
- Likely to vary from participant to participant.
- Can only be answered by contacting customers and understanding their motivations and decision making process.

Allocation of Benefits

- Standardized set of survey questions to be administered by EDC evaluators.
- EDCs will need CSP assistance to identify the correct interviewee at participating businesses.
- Additional support will be needed to gather PJM participation records for customers who use a different CSP for PJM and Act 129.
- Standardized scoring system.
- 90/10 confidence and precision at the statewide level.
- Survey responses will be used to calculate an Incremental Benefits Ratio, or portion of benefits attributable to Act 129.

Incremental Benefits Ratio

- Calculated separately for the dual participation in the PJM Economic and Emergency programs.
- Equal to 1 for any hour during which a site participates in only an Act 129 event.
- When overlapping participation is observed:

$$Act\ 129\ Benefits = (Total\ Energy\ and\ Capacity\ Benefits) * (Incremental\ Benefits\ Ratio)$$

$$PJM\ Benefits = (Total\ Energy\ and\ Capacity\ Benefits) * (1 - Incremental\ Benefits\ Ratio)$$

Cost Effectiveness Analysis

- The SWE DR Study will use the discounted benefits as inputs in TRC analysis.
- Discounted load reductions for each EDC will be averaged across a SWE estimate of the top 100 hours and multiplied by the avoided cost of capacity for that EDC.
- Avoided cost of capacity values will be determined using the most recent PJM auction results for the delivery year.

Avoided Capacity Costs

EDC	Zonal Capacity Price by Year (kw/year)			
	2012	2013	2014	2015
Duquesne	$6.11	$10.12	$45.97	$49.14
West Penn Power	$6.11	$10.12	$45.97	$49.14
Met-Ed	$48.69	$82.54	$49.37	$60.51
PECO	$52.21	$89.46	$49.37	$60.51
Penelec	$48.69	$82.54	$49.37	$60.51
PPL	$48.69	$82.54	$49.37	$60.51
Penn Power	$48.69	$82.54	$49.37	$60.51

Cost Effectiveness Analysis

- Is it realistic to value hour 1 and hour 100 equally?
- Is a load reduction during hour 100 even a capacity benefit?
- Avoided energy benefits?
- Avoided costs of Transmission and Distribution?
- Should the entire payment from the EDC be included as a cost? Other jurisdictions consider a portion of the payment a benefit to participating customers.

Sensitivity Analysis – Load Curtailment

- The study is meant to be forward looking.
- Capacity prices are expected to increase.
- If demand impact is measured over fewer hours, program administration costs and total customer incentives drop drastically.
- California protocol that only passes through 75% of customer incentive as cost.

SENSITIVITY ANALYSIS - DLC

- Measure life of direct load control equipment.
- Dropout rate and loss of operability over time.
- Reduced customer incentives if fewer events are needed.
- Load reduction per device.