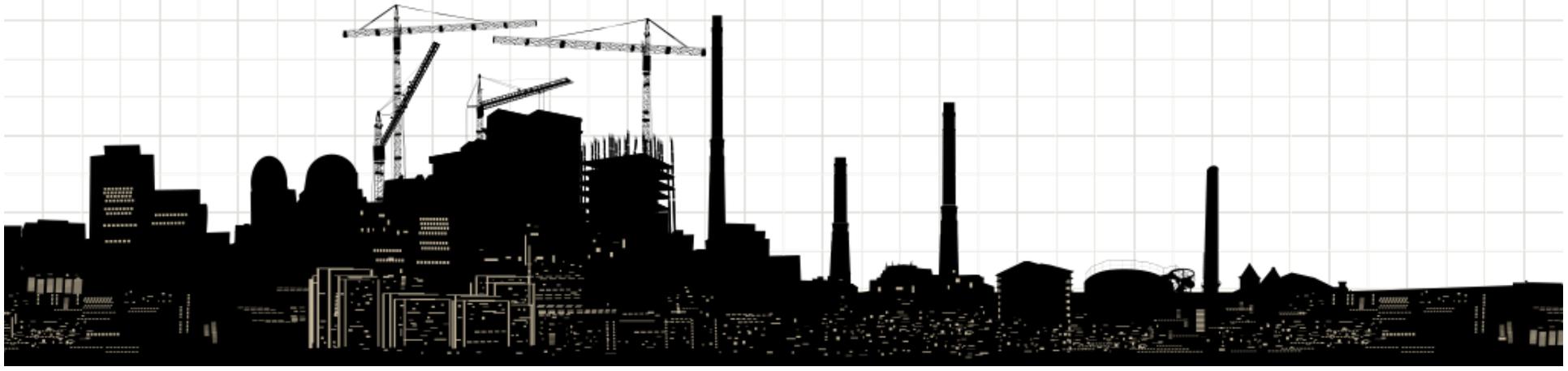




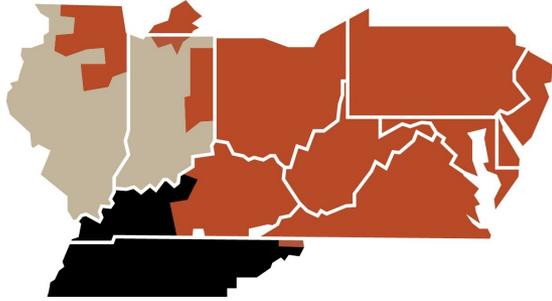
CPOWER'S PJM WEBINAR SERIES

PART 2: Myth Busting: Living in a Capacity Performance World



DAILEY TIPTON

Vice President and GM, PJM



WHAT IS THE WEBINAR SERIES?

Provide our customers and partners education and insight into the PJM demand-side energy market to help them maximize their knowledge of market structures, changes and demand response. We hope this information will help you maximize your earning potential, participation and help you reach your energy and sustainability goals.



Philadelphia, PA



WEBINAR SERIES & AGENDA

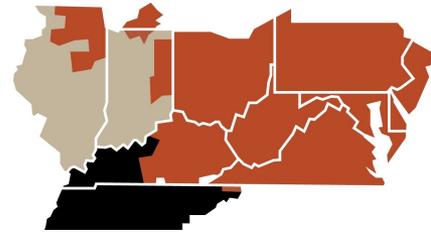
Today's Webinar

- The Capacity Performance rules and program participation.
- Market situations and drivers behind the program.
- What are the truths and the myths of the program.
- How will "CP" impact different industries and what can they do about it.
- Plus, a live Q&A Session

Webinar Series

- 03:** Leveraging the Value of Energy Efficiency
- 04:** Getting the Most Out of Economic-based Demand Response
- 05:** Timing is Everything: How to Make Synchronized Reserves work for your business
- 06:** The Future of Demand-side Management: Storage and Frequency Reserves
- 07:** PA Utility Programs: Everything You Need to Know About The Act 129 Programs
- 08:** Preparing for the 2018 DR Season in PJM





Dann Price
Executive Director,
Market Development



Rocco Venuto
Account Executive, PJM



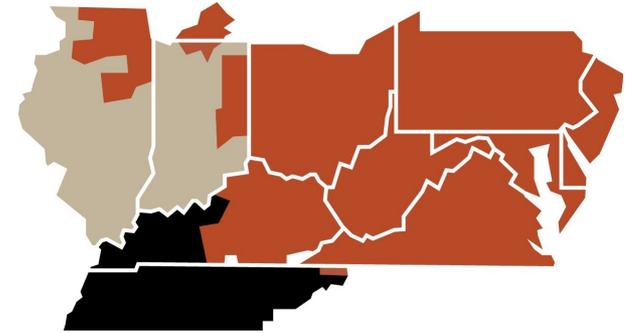
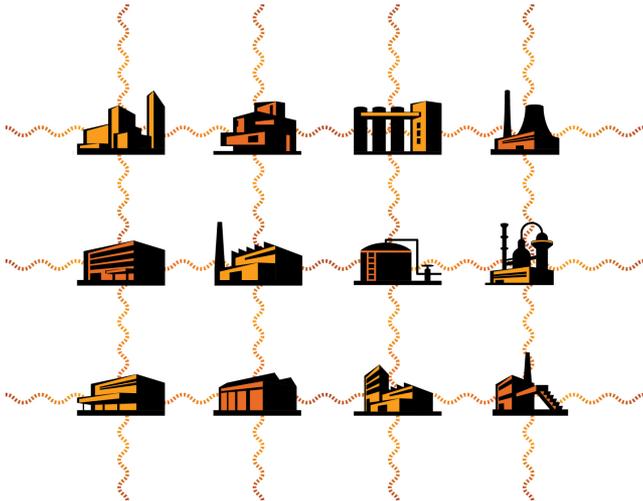
PJM AND THE CAPACITY PERFORMANCE PROGRAM

Richmond, VA



PJM DEMAND RESPONSE HISTORY

- Demand Response is pretty young in PJM – 10 years old.
- The birth of “DR” was the result of the creation of the RPM
- RPM: Auction-based forward capacity market
 - 3-year forward market

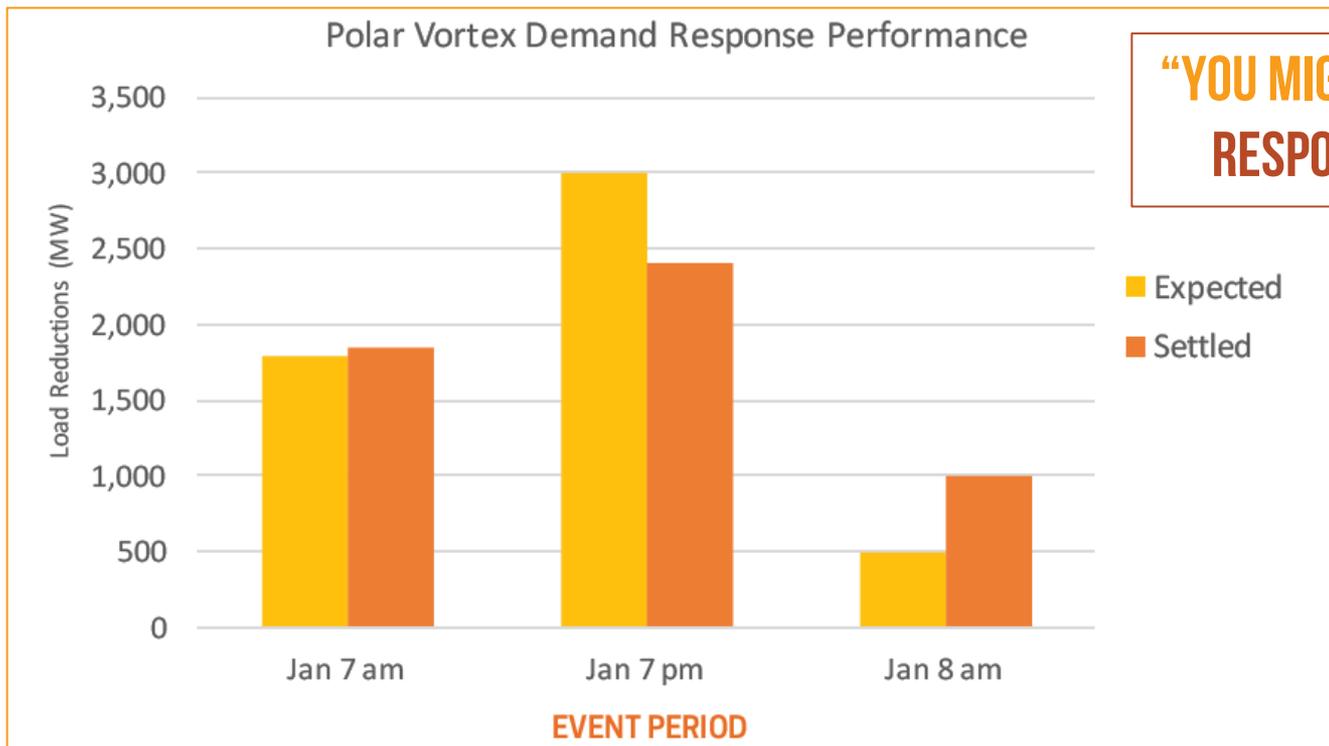


ILR and DR

- Highly Lucrative
- No Tests
- Significant conflicts with generation
- ILR removed from the market (2012)
- Shift from GLD to FSL
- 30 min response time
- The Extended Summer and Annual Programs are born

POLAR VORTEX DRIVES MARKET CHANGES

- Fast-forward 2 years - the Polar Vortex changes the market
 - Severe reliability issues were a result of the vortex
- PJM proposed a market redesign to FERC
 - The Base Capacity and Capacity Performance (CP) programs are born



“YOU MIGHT EVEN SAY — DEMAND RESPONSE SAVED THE DAY!”



POLAR VORTEX DRIVES MARKET CHANGES

- FERC approved the market restructure
- PJM's desire was for a full CP market by 2020/21 and began phasing in CP gradually
- Two CP transitional auctions were held to introduce CP
 - 2016/17, 2017/18
- 2018/19 both new products were introduced into the BRA
 - Base Capacity is viewed as a two-year bridge from current Summer DR to Annual CP
- In 2020/21, Base Capacity will be eliminated, leaving Capacity Performance as the only program available



WHAT IS CAPACITY PERFORMANCE?

- Designed to increase reliability by mitigating issues derived from excess summer only resources
- Achieve greater reliability through stricter compliance and availability requirements
- Non-performance penalties will be calculated differently
- Year-round (winter load) availability requirement
- More requirements does not mean lower rewards.
- Participation will be rewarded, period.
 - Reaping those rewards however, requires a little myth busting!

CAPACITY PERFORMANCE

THE TRUTHS AND THE MYTHS



Pittsburgh, PA

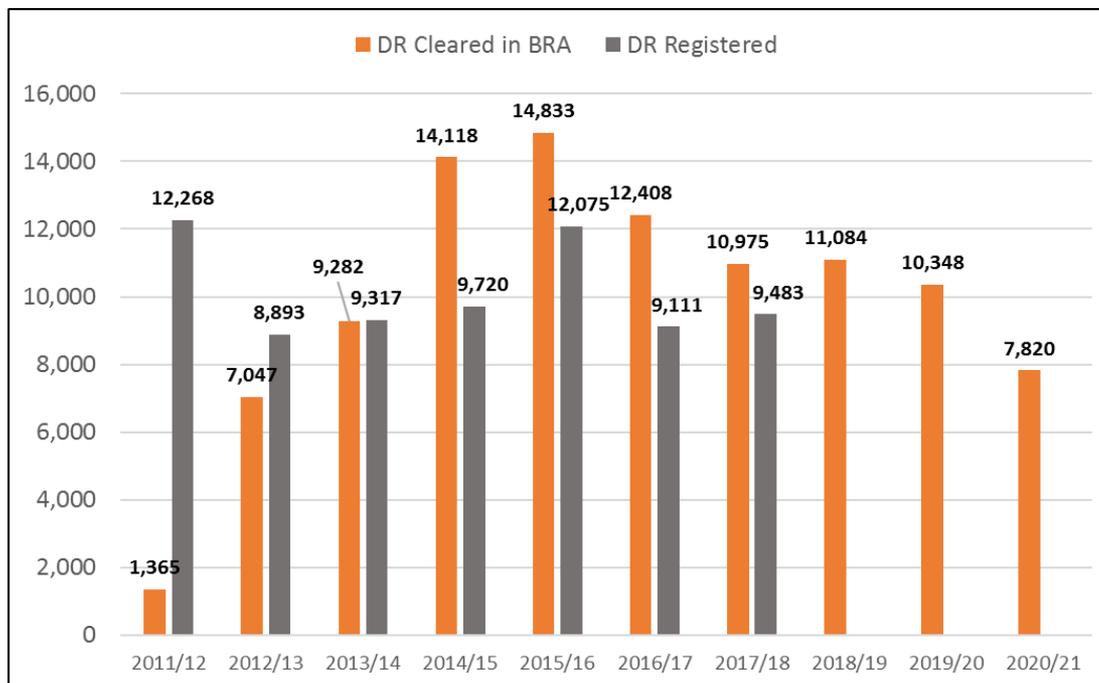


WHAT ARE THE MYTHS?

MYTH #1

Demand Response had declined over the past six years.

Cleared vs. Registered DR



- Registered DR has been around 9,000 MWs since 2012/13 on average.
- Cleared DR was much higher in most years.
- DR has slightly decreased but is hardly declining.
- What does this mean for the future of DR?

MYTH #2

MYTH #2

New CP requirements and penalties make it difficult to participate in DR.

- The stakes are higher – for all but the bulk of the heavy lifting is on generators
- Generators have increased availability and performance requirements
- Chances for emergencies should decrease, making the likelihood for a DR event lower
- Still a summer-peaking RTO
- Still much greater risk of a summer DR event than winter
- Limited DR program required mandatory 60 hours of DR events in just the Summer
- Participation, not penalties should be the focus for how your business will benefit
- Don't forget about energy payments!



MYTH #3



MYTH #3

100% CP means PJM is moving away from DR.

- PJM believes DR is an effective market tool:
 - *demand response (DR), if visible and dependable, has proven to be a valuable operational tool that assists in maintaining reliability both for real-time grid stability and long-term resource adequacy.* – PJM Demand Response Strategy (Jun 2016)
- This is not the first change to market structure, it will probably not be the last
- You WILL potentially see a reduction in DR participation with a year round move
 - But .. CP aggregation with excess seasonal load
 - And ... a well-balanced CSP portfolio can help

CAPACITY PERFORMANCE

What's different?

Program Specs		Summer Programs	Capacity Performance Program
Compliance Period		Jun – Oct and May 10:00 am – 10:00 pm	June – Oct and May, Nov – Apr 6:00 am – 9:00 pm
Duration of Events		10—hour duration max	12-15-hour duration max
Non-compliance Penalty Rate	On-Peak	1/(number of events) or ½ shortfall MW x Annual Capacity Rate	\$/MWh rate that varies by zone & year
	Off-Peak	1/52 x shortfall MW x Annual Capacity Rate	
CBL Methodology		Summer PLC & FSL	Separate summer & winter PLC and FSL

CAPACITY PERFORMANCE

How will it impact my business?



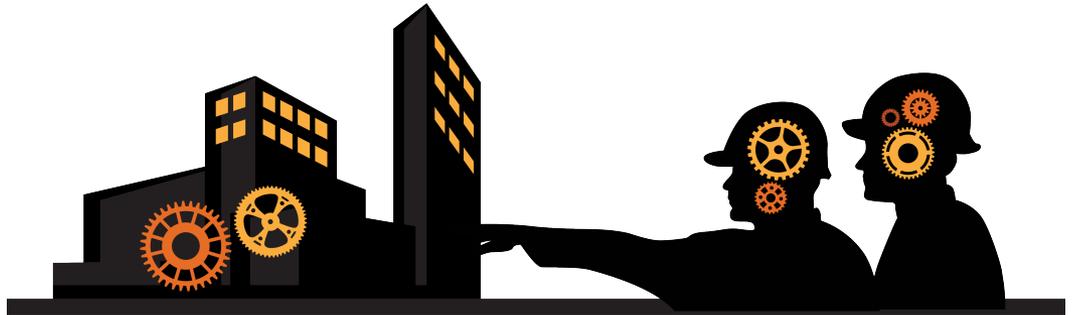
Baltimore, MD



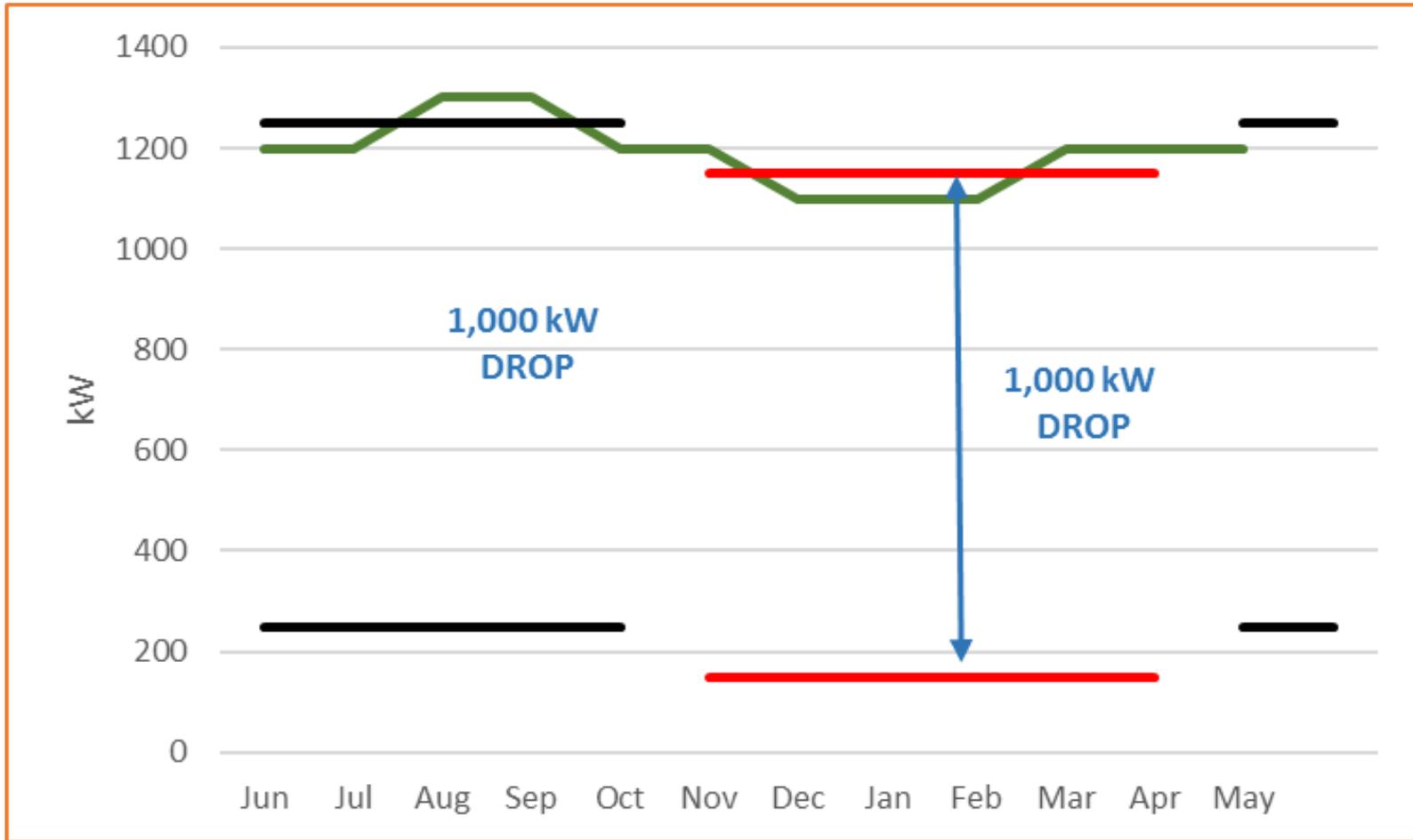
UNDERSTAND YOU CURRENT STRATEGY?

Your seasonal operation and load profile as well as how you curtail are the keys to understanding how you fit into the CP program.

- Facilities with flatter year-round loads with the ability to curtail the same way should see little impact to their curtailment amount as they transition to CP.
- Facilities that peak shave (PLC Management) or are unable to curtail the same loads in the winter as the summer will have excess winter or summer load shedding capabilities.
- If your current curtailment strategy or load profile alters your CP capabilities what else can we consider?
 - Process Shifting?
 - Behind the Meter Gens?
 - Other Loads?
 - Lighting
 - Cooling
 - Process
 - Heating
- CP Aggregation

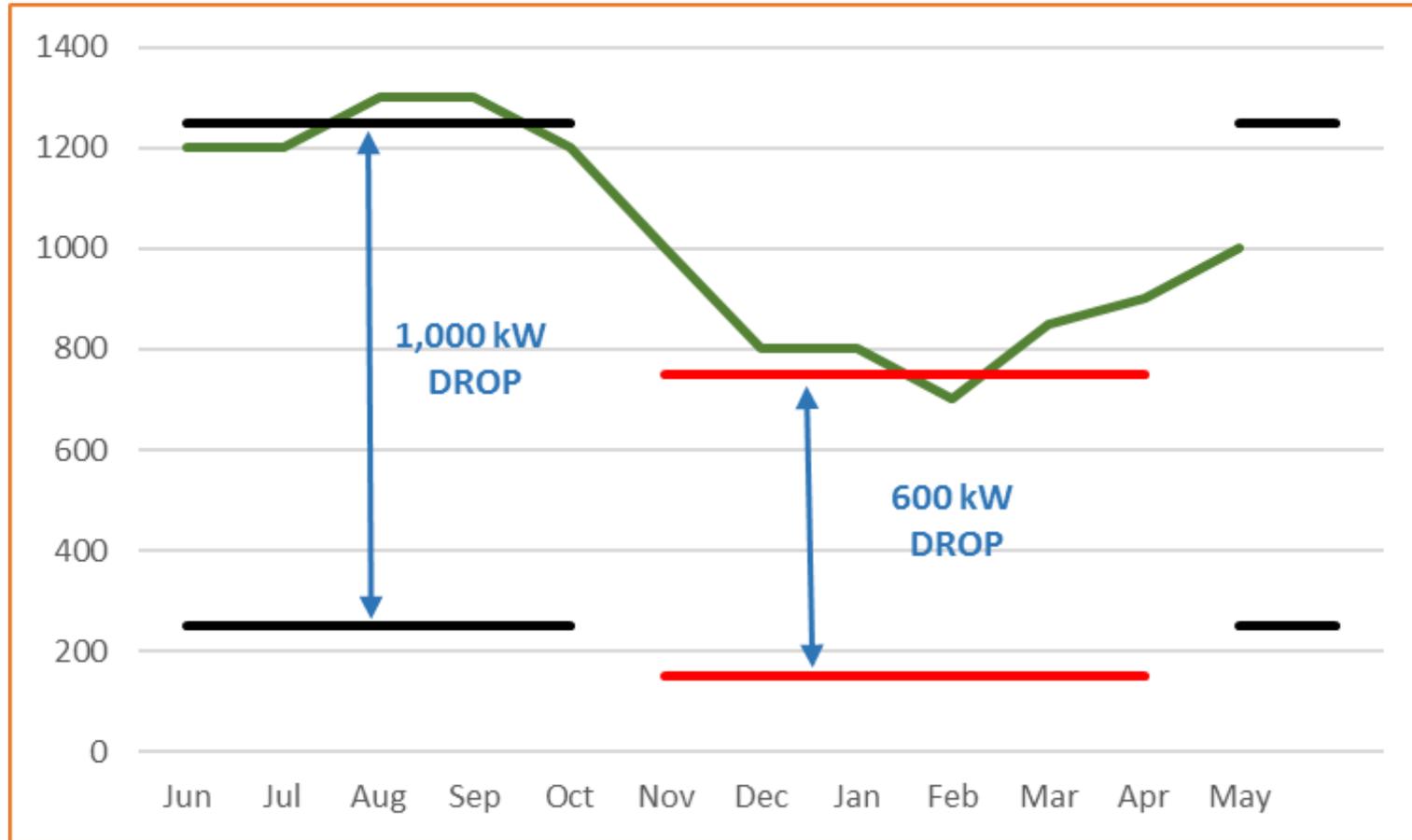


HOW YOUR LOAD PROFILE IMPACTS YOUR CP CAPABILITY



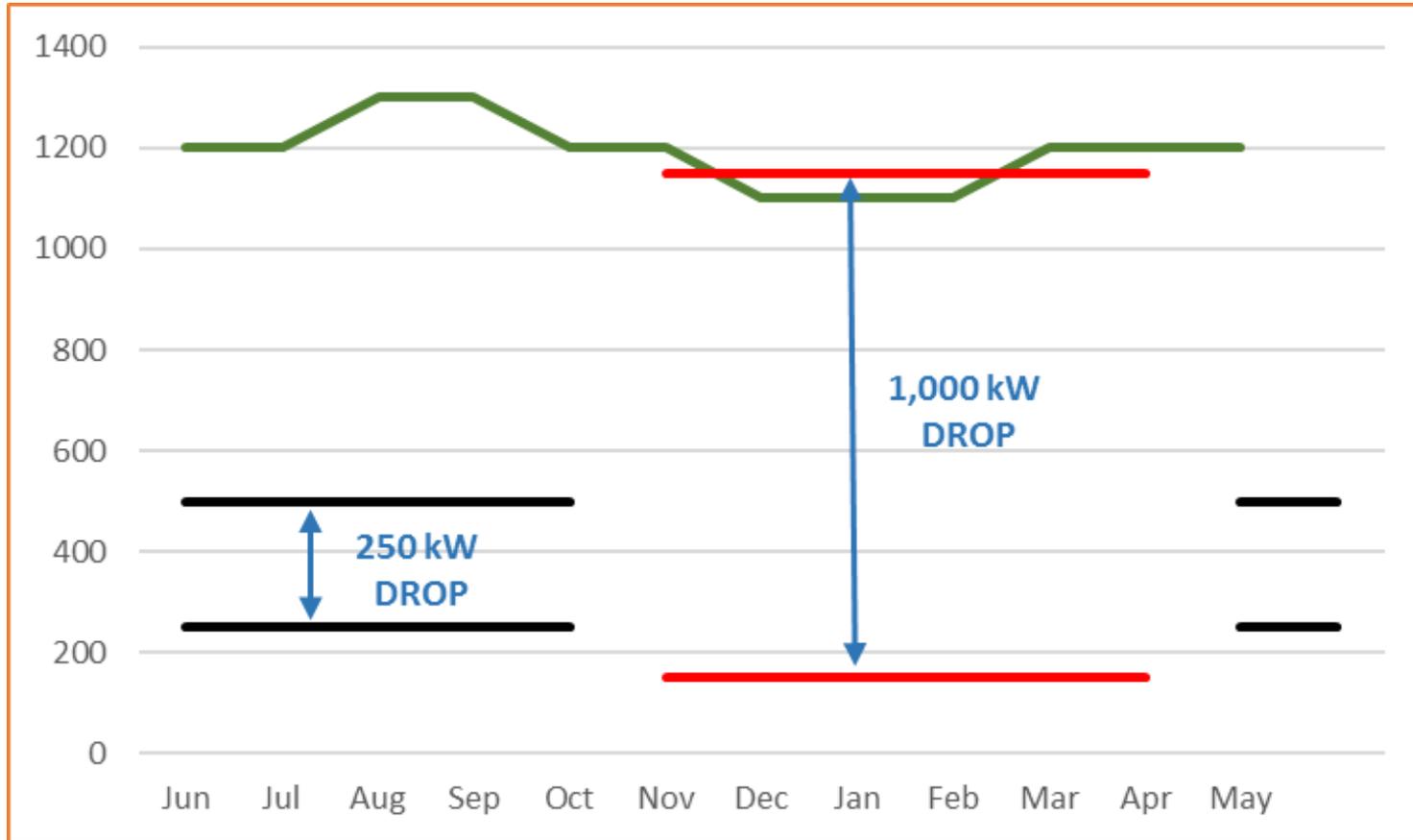
Facility with a year-round flat load. Summer PLC/FSL and Winter PLC/FSL both allow for same curtailment amount. Customer would be a 1,000 kW CP load drop candidate.

HOW YOUR LOAD PROFILE IMPACTS YOUR CP CAPABILITY



Facility with a lower load profile in the winter than the summer. The Winter PLC/FSL is lower than the Summer PLC/FSL. Customer would be a 600 kW CP load drop candidate with 400 kW of excess Summer load drop capabilities.

HOW YOUR LOAD PROFILE IMPACTS YOUR CP CAPABILITY



Facility is a peak shaver (PLC Management) but has a year-round flat load. Summer PLC/FSL is lower than the Winter PLC/FSL. Customer would be a 250 kW CP load drop candidate with 750 kW of excess Winter load drop capabilities.

BEYOND CP

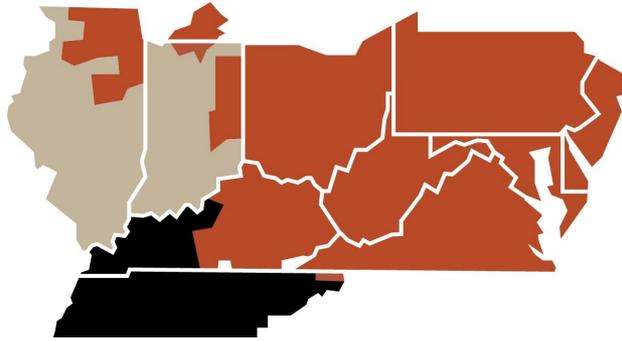
WHAT TO CONSIDER WITH .. AND BEYOND ... CAPACITY



Norfolk, VA



STACKING PROGRAMS



Understanding your organization's operations and capabilities is paramount. Three fundamental questions can help begin the framework for your demand management strategy:

- **WHAT** can be curtailed?
- **HOW QUICKLY** can it be curtailed?
- **HOW LONG** can curtailment be sustained?
- **WHAT PROJECTS** should be considered for long term energy goals?

Demand Response "Stacking" \$\$

Economic

Synch Reserve

ACT 129
Programs

Capacity
(Emergency, CP)

+

Demand Management "Stacking" \$\$

PLC Management

Energy Efficiency
Load Shifting

= \$ (Saving &
Earning)



“OTHER” RESOURCE TO CONSIDER

IN ADDITION TO YOUR CURTAILING STRATEGY, ADDITIONAL ITEMS TO CONSIDER:

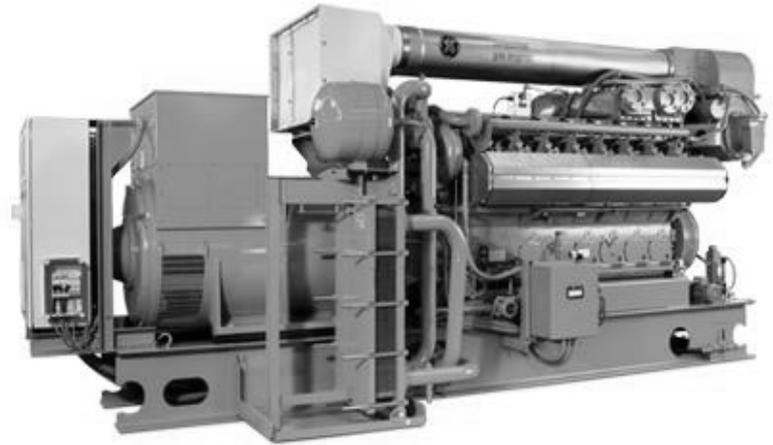
Do you have an EG?

- **Is it permitted or has it been assessed?**

Do you have any EE projects you are trying to fund?

- **DR is an excellent funding source**

These items can potentially become resources and revenue streams in your demand-side energy management strategy. Find out more by contacting your account manager.



QUESTIONS?

PLEASE CONTACT CPOWER WITH ANY QUESTIONS!

<https://cpowerenergymanagement.com/markets/pjm-interconnection/>
844-276-9371

