



New York Low-Emissions Solutions Conference

September 20, 2017

Agenda

Progress toward a dynamic grid through the lens of demand response

- Overview
- Market activity
- Benefits

Transitioning to the DER Grid of the Future

- The evolution of customer participation
- Five key factors for how quickly we'll get there

About EnerNOC, an Enel Group



Proven Customer Track Record

- Market leader in demand response
 - 50+ DR programs in 10 countries
 - 6,800 MWs of curtailable load
- 1,100+ software subscription customers
- More than US \$1B in customer payments/savings to date

Full Value and Technology Offering

- Energy intelligence platform and applications
- Combines technology, professional services, and market access
- More than US \$200 M invested in to date technology
- 24x7x365 Network Operations Center & customer support

World Class Team and Resources

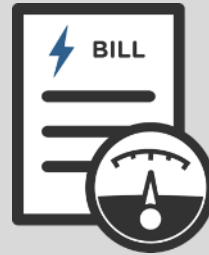
- Acquired by Enel on August 7, 2017, core to e-Solutions
- Global business driving the “open power” transformation
- Ranked #20 in Fortune’s 2017 “Change the World”

Comprehensive Enterprise Solution



How you buy it

Budgets and Procurement
Utility Bill Management



How much you use

Visibility and Reporting
Facility Optimization
Project Tracking



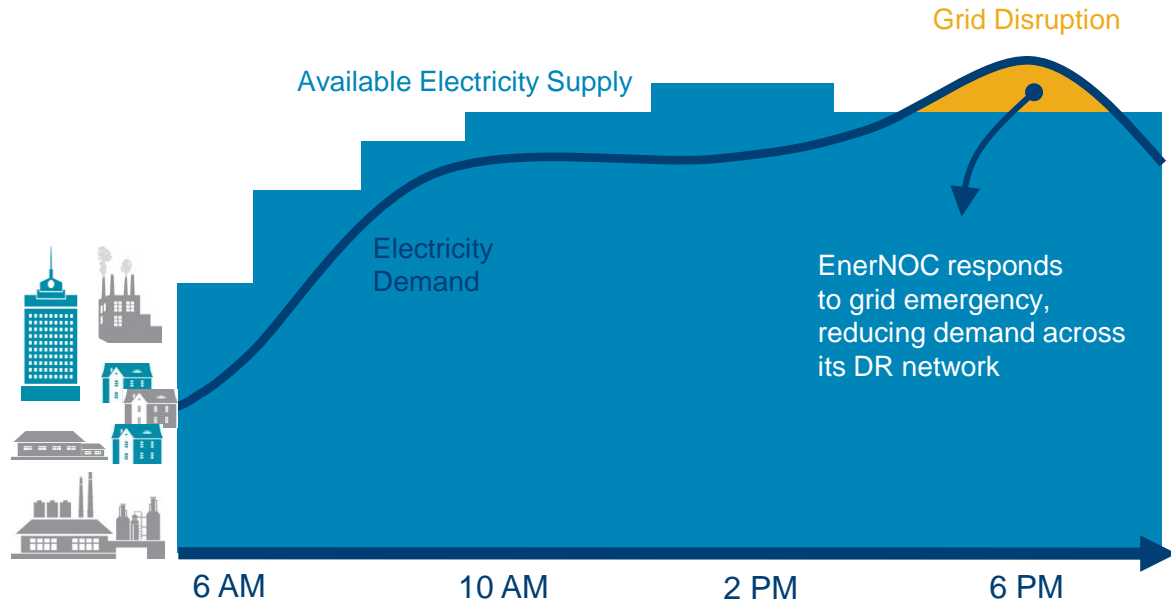
When you use it

Demand Response
Demand Management

Demand Response

What is Demand Response (DR)?

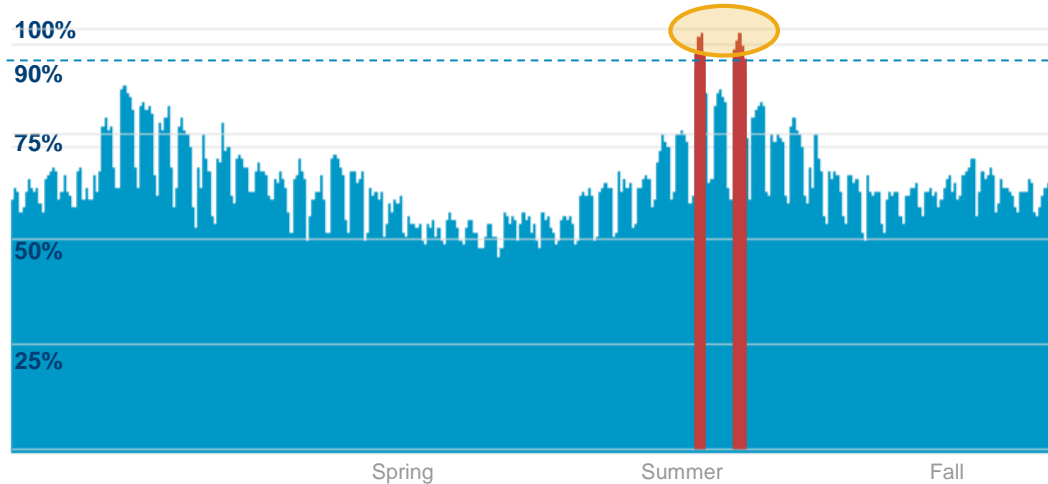
DR pays companies to reduce energy use in response to emergencies that threaten grid stability



- Balancing supply and demand on the electricity grid is difficult and expensive.
- Curtailing usage during grid emergencies is a cost-effective alternative to building more power plants.
- Grid emergencies can be due to extreme weather, wholesale price spikes, or unexpected system issues.

DR provides payments to the customers that provide it, and saves all electricity customers money

Annual Electricity Demand
as a Percent of Available Capacity



- More than 10% of grid infrastructure costs are spent to meet peak demand that occurs less than 1% of the time.
- Building a new power plant for that 1% of the time is incredibly expensive.
- Demand response is a fast and cost-effective way to meet peak electric demand.

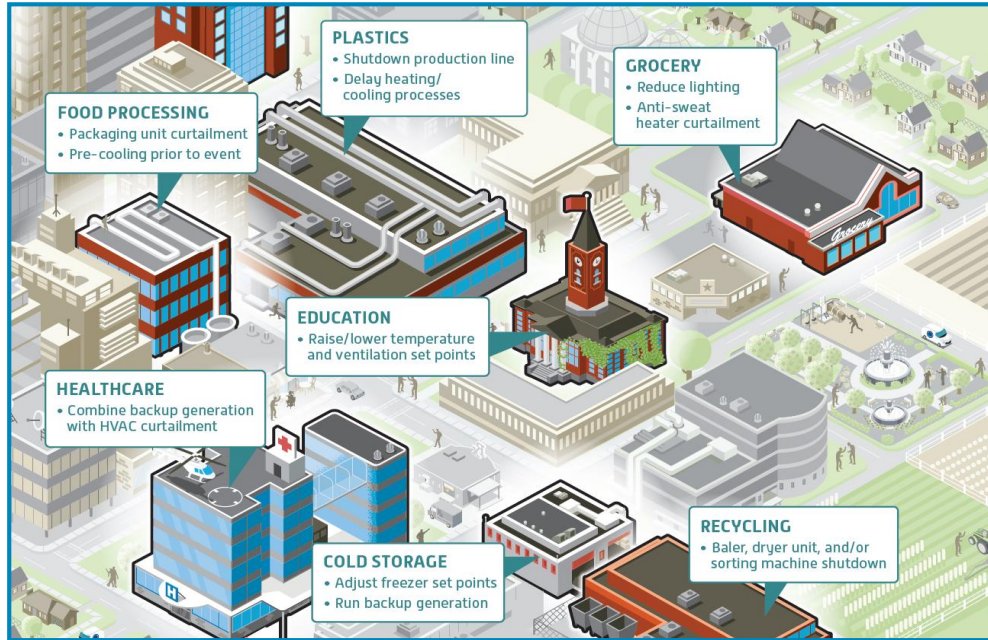
DR: The digital layer connecting energy users to market opportunities to balance supply and demand

We create value for **C&I customers** by identifying and monetizing load flexibility

We create value for **utilities and grid operators** by delivering cost efficient, reliable, and clean capacity and balancing resources



Diverse mix of industries contribute during DR events



When the electric grid needs resources, EnerNOC “dispatches” resources and thousands of facilities across nearly every industry reduce electricity consumption.

How Demand Response is executed

1. Grid operator or utility anticipates a supply imbalance and notifies EnerNOC



2. EnerNOC dispatches its portfolio of customers to curtail or increase energy usage



4. Load reduction or increase is delivered to the grid operator or utility

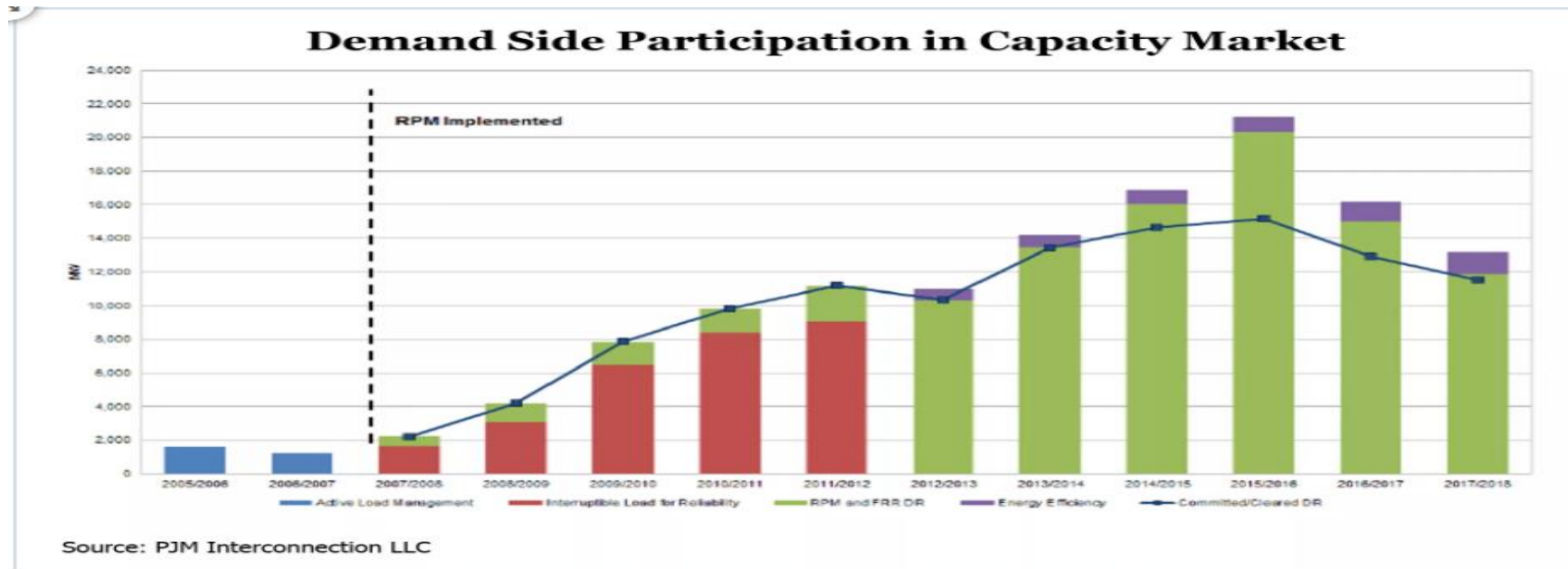


5. Customers receive payment for verifiable load delivery (increase or decrease)



Significant Growth in Customer Participation

MW Offered into PJM



Trivia: The Benefits of Demand Response

Lower energy bills

How much did demand response save all customers in electricity costs in the thirteen state region served by the PJM Grid Operator from June 2013 to June 2014?

- A) \$11,800
- B) \$11,800,000
- C) \$11,800,000,000
- D) \$111,800,000,000

Reliability and Resiliency Benefits

- Demand response helped stabilize the Florida electric grid post-Irma
 - With generator outages, and power quickly becoming restored, balance of supply and demand was in jeopardy
 - Demand response dispatched by large Florida utility to maintain grid reliability
 - Illustrates the value of “fuel” diversity, as generator outages can be correlated



Transitioning to the DER Grid of the Future

Current and Future Market Participation

Batteries and controls are critical for transforming how customers participate in the market

Current Participation

Participants: Most MW come from large C&I

Markets/Use Cases: Wholesale capacity, avoid gen.

Infrequent dispatch

Limited resiliency benefits



Future participation

Participants: Increase in mass market participation

Markets/use cases: Wholesale + retail, capacity, economic, and ancillary, T&D, renewables balancing

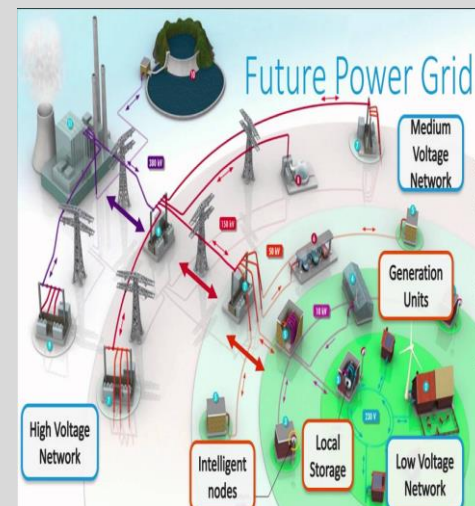
Frequent interruptions, more emissions reduction

Significant resiliency benefits

Five Key Factors for Enabling the Transition

In addition to decreasing battery costs...

1. Market access and ability to control bill – revenue stacking is key
2. Getting the market rules right – no unnecessary barriers to entry, don't try and fit a square peg in a round hole
3. Opportunities to compete – just put DER in the game
4. Utility business model reform – align interests with consumers
5. AMI as a means to an end, not the end –access to data is huge (don't let the “boring” stuff trip us up)



1) Revenue Stacking Critical to DER Business Case

Need transparent price signals and market access

REVENUE (GRID SERVICES)

Wholesale (ISO) Capacity

Services to Utilities

Ancillary Services

Energy Markets



BILL SAVINGS

Demand Charge Management

Wholesale Cost Management

Energy Arbitrage

Tariff Optimization

2) Getting the Market Rules Right

- Federal Energy Regulatory Commission's Notice of Proposed Rulemaking on Storage and Distributed Energy Resources
 - Positive step, but several improvements needed, especially on dual participation
- Independent System Operators should not create identical market rules for DERs as are in place for central station generation (e.g. metering & telemetry)
- Important to recognize DERs as an opportunity to increase competition, efficiency, and resiliency, and not simply view as a “challenge”



3) Opportunities to Compete

- Define the capital expenditure that needs to be made, the cost of making it, and what it would take to offset, and let DERs compete with traditional solutions to meet the need
- Brooklyn Queens Demand Management rightfully gets a lot of attention, but can take different forms
- Village of Minster in OH: Storage ability to provide VAR support to correct for low power factor saved \$350,000



Marcus Garvey Village Microgrid
New York City, New York

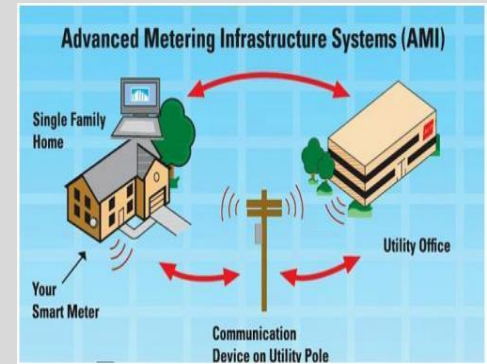
4) Utility Business Model Reform

- Critical to align utility interests with consumer interests
- If it is more cost-effective for a 3rd party to deploy a DER solution than it is for a utility to make a traditional capital investment, the utility should be better off with the 3rd party investment
- Utilities should be active enablers
- Several dockets open around the country examining this issue



5) AMI and Access to Data

- Data access has been a large barrier to the growth of customer participation in markets, especially mass market
- Costs of acquiring and validating data can be cost-prohibitive for smaller customers
- AMI deployments and Green Button protocols can be game changers, and when combined with customer engagement programs and market signals, unleash customer potential



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An Enel Group Company