A Look at Markets from the DR Perspective: Globally and the UK

Ofgem Winter Outlook Seminar

Topics

- DR - flexible resource for multiple users
- Global market experience
- Translating global experience into the UK
  - Lessons learned
  - Key challenges

ENERNOC

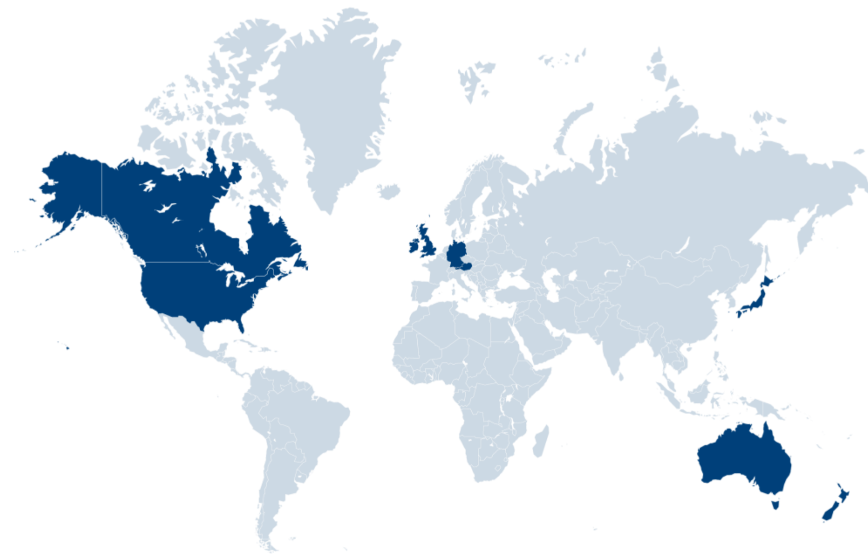
EnerNOC at a Glance

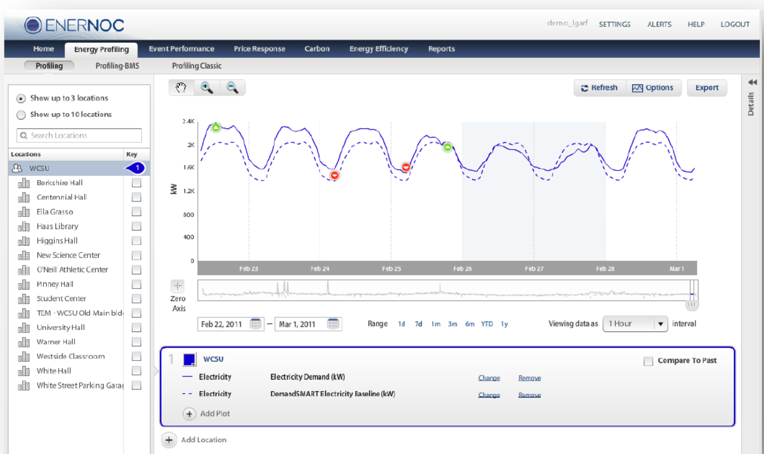
- The world's largest Demand Response (DR) provider.

- **~27,000 MW of Peak Load under management**
- **~9,000 MW of Dispatchable Demand Response**
- **100+ Utilities / System Operator relationships**
- **10 Countries with Demand Response operations**

- **~6,000 global customer accounts**
- **~15,000+ C&I Facilities in our network**
- **$800M+ in customer payments/savings to date**
- **~1.5 Billion Data Points / Month into our NOC**

- **~1,000 Employees worldwide**
- **FY2014 revenue guidance of $435 - $460M USD**
- **Publicly listed on the NASDAQ (ENOC)**
- **Winner, Platts Energy Industry Leadership Award**
- **Market leader in Energy Intelligence Software**





Energy Intelligence is Gaining Traction in the C-Suite

89%

of companies have set **goals** regarding electricity and energy management practices

81%

of companies say they consider energy management **vital** to their financial competitiveness

40%

of businesses have allocated a pool of **funds** for investing in energy management

THE WALL STREET JOURNAL.

Wall Street Journal's CFO Journal – Deloitte reSources 2013
Study from the Deloitte Center for Energy Solutions

ENERNOC

Comprehensive Energy Intelligence Software (EIS)

EnerNOC's full EIS suite greatly expands the value we can create for customers

How you buy it

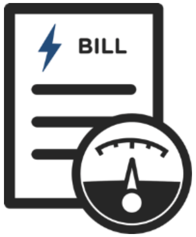
Tools to manage risk, energy purchasing, set budgets & track bills.

Supply Management

- Develop accurate energy budgets
- Track costs against budget
- Conduct budget scenario planning

Utility Bill Management (UBM)

- Collect historical utility bills
- Track trends in utility usage & cost
- Discover & report billing errors
- Streamline accounts payable



How much you use

Tools to benchmark usage, identify energy waste & prioritize opportunities.

Visibility and Reporting

- Track trends in energy usage & carbon impact
- Visualize real-time energy data to understand consumption patterns

Facility Optimization

- Benchmark & compare facilities
- Analyze meter data to identify cost saving opportunities
- Prioritize actions across a portfolio

Project Management

- Track the impact of measures

When you use it

Tools to maximize demand response revenue and minimize peak demand costs.

Demand Response

- Earn revenue to fund your energy projects
- Measure & manage DR event performance
- Track payment history

Demand Management

- Alert on demand thresholds
- Quantify cost impact of demand peaks
- Forecast new facility & system peaks

The DR Resource

DR is a Flexible, Multi-Purpose Resource

Capacity

- Peak Management / Combustion Turbine (CT) Alternative
- Emergency / Reliability
- Local Transmission & Distribution Network Support

Ancillary Services

- Frequency regulation
- Frequency responsive reserves (sub-second response)
- Renewable resource integration (bi-directional)

Energy

- Direct participation wholesale energy markets
- Dynamic pricing programs; demand side bidding programs

Demand Response by Purchaser Type

Across market structures, DR provides system operators and utilities of all types important operational and financial benefits.

Traditionally Regulated

Vertically-Integrated Utility

Avoidance or deferral of generation and/or network investments; optimization of generation assets

Liberalized Markets

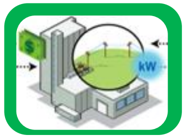
Market/System Operator

Substitute/alternative for generation resources in wholesale markets

Network (T&D) Utility

Avoidance or deferral of investments in network (T&D) infrastructure

Retail / Supplier



Physical hedge for high wholesale prices, support for new retail tariffs, competitive differentiation

Global Markets

DR Partnerships with Utilities & Retailers

We design custom programs based on partner needs, including both full-service “turnkey” resources and technology platforms delivered on a software-as-a-service (SaaS) basis.

Partner	Country	Product
Allegheny Power	USA	Peak Capacity
Ausgrid	Australia	Network Support
Baltimore Gas & Electric	USA	Peak Capacity
Bonneville Power Authority	USA	Load-following Reserves
Burlington Electric Department	USA	Peak Capacity
Consolidated Edison	USA	Network Support
Delmarva Power	USA	Peak Capacity
Energia (Viridian Energy Ltd.)	Ireland	Platform, Services
ERM Power Retail	Australia	Platform, Services
First Energy	USA	Peak Capacity
Genesis Energy	New Zealand	Frequency Response Peak Capacity
Idaho Power	USA	Peak Capacity Auto DR Platform, Services (Agricultural)
Kansai Electric Power	Japan	Peak Capacity
Louisville Gas & Electric	USA	Auto DR Platform, Services
Midwest Energy	USA	Peak Capacity (Agricultural)

Partner	Country	Product
Pacific Gas & Electric	USA	Peak Capacity (C&I + Agricultural) Auto DR Platform, Services
PacifiCorp	USA	Peak Capacity (Agricultural)
Pepco	USA	C&I DR: Peak Capacity
PNM	USA	Peak Capacity + Reserves
Portland General Electric	USA	Peak Capacity + Reserves
Salt River Project	USA	Peak Capacity + Reserves
San Diego Gas & Electric	USA	Peak Capacity
Southern California Edison	USA	Peak Capacity Auto DR Platform, Services
Tampa Electric Company	USA	Peak Capacity
Tokyo Electric Power	Japan	Peak Capacity + Reserves
Tennessee Valley Authority	USA	Peak Capacity
TransGrid	Australia	Network Support
Tucson Electric Power	USA	Peak Capacity
Verbund	Austria	Auto DR Platform, Services
Xcel Energy	USA	Peak Capacity

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EnerNOC DR in Liberalized Markets

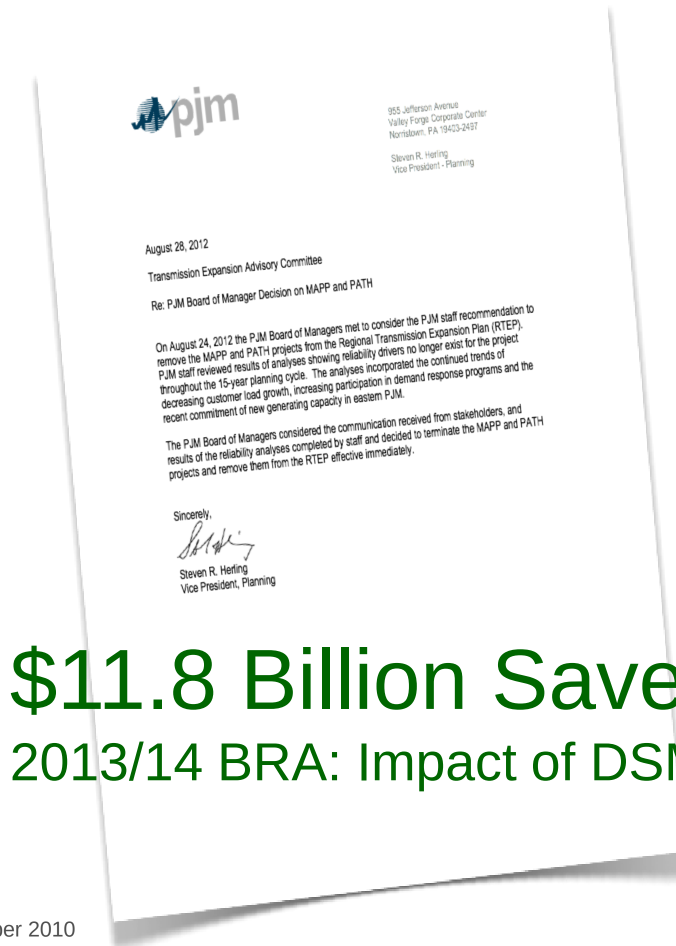
We have developed deep relationships with grid operators and TSOs in Europe, North America, and Australasia.

Operator	Country	Market/Program	Product
50Hertz Transmission GmbH (Elia)	Germany	AbLaV; Secondary Reserves	Ancillary Services
Alberta Electricity System Operator	Canada	Load Shed Service for Import; Operating Reserves	Ancillary Services
Amprion GmbH	Germany	AbLaV; Secondary Reserves	Ancillary Services
Australia Electricity Market Operator	Australia	National Electricity Market	Energy
Single Electricity Market Operator/EirGrid	Ireland	Single Electricity Market	Capacity
Electric Reliability Council of Texas	USA	Emergency Response Service	Capacity
Independent Market Operator	Australia	Wholesale Electricity Market	Capacity
ISO New England	USA	Forward Capacity Market Day-Ahead Load Response	Capacity Energy
New York ISO	USA	Special Case Resources	Capacity
Ontario Power Authority/IESO	Canada	Demand Response 3 Program	Capacity
PJM Interconnection	USA	Emergency Load Response Program Economic Load Response Program Synchronized Reserves Market	Capacity Energy Ancillary Services
National Grid	United Kingdom	Short Term Operating Reserves Market	Ancillary Services
TenneT TSO GmbH	Germany	AbLaV; Secondary Reserves	Ancillary Services
TransnetBW GmbH	Germany	AbLaV; Secondary Reserves	Ancillary Services
Transpower	New Zealand	Instantaneous Reserves	Ancillary Services

DR in Global Capacity Markets

Given market access, DR has proven to be an important resource in capacity markets

Market	DR capacity	% of total
PJM	14,118 MW	8.6%
NYISO	2,248 MW	6.7%
ISO-NE	2,164 MW	7.4%
WEM	499 MW	8.2%



pjm

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Steven R. Herling
Vice President - Planning

August 28, 2012

Transmission Expansion Advisory Committee

Re: PJM Board of Manager Decision on MAPP and PATH

On August 24, 2012 the PJM Board of Managers met to consider the PJM staff recommendation to remove the MAPP and PATH projects from the Regional Transmission Expansion Plan (RTEP). PJM staff reviewed results of analyses showing reliability drivers no longer exist for the project throughout the 15-year planning cycle. The analyses incorporated the continued trends of decreasing customer load growth, increasing participation in demand response programs and the recent commitment of new generating capacity in eastern PJM.

The PJM Board of Managers considered the communication received from stakeholders, and results of the reliability analyses completed by staff and decided to terminate the MAPP and PATH projects and remove them from the RTEP effective immediately.

Sincerely,

Steven R. Herling
Vice President, Planning

$11.8 Billion Saved

2013/14 BRA: Impact of DSM

PJM Market Monitor. Analysis of the 2013/2014 RPM Base Residual Auction Revised and Updated, September 2010
PJM 2014/15 Base Residual Auction Results, Doc #645284, page 9. 14,118.4 MW of DR Cleared in the RPM.
PJM 2014/15 RPM Base Residual Auction Parameters, Doc #631095, pg 2. Forecasted peak of 164,758 MW
NYISO's Demand Response Programs. Donna Pratt, Manager Demand Response Products. May 2011.
NYISO Press Release, 22 July 2011. Peak demand reached 33,454 MW on 21 July 2011.
Forward Capacity Auction 5 (FCA5, 2014-15) Results Summary, ISO New England, 2011.
ISO Installed Capacity Requirements, PAC Meeting. ISO New England, July 2011. Compares cleared FCA5 MW to the CELT 2011 Forecast 50/50 Peak of 29,380 MW for 2015 Year.
WA: Summary of Capacity Credits for the 2011 Reserve Capacity Cycle (October 2012-2013), IMO, Sep 2011
WA: Ibid. Compares cleared DSM capacity to the Reserve Capacity Requirement of 5,312 MW.

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Transitioning to UK

Lessons learned

DR participation requires significant up-front investment in technology and decision-making

- Availability payments are a critical construct of successful markets and programs
  - Help overcome many real-world issues with decision-making
  - Guarantee that participants start out ahead
  - Guarantee an ongoing return to those participants

- Continuity is very important for customers participating in markets and programs
  - Decisions are hard. It is generally easier to do what you did yesterday
  - Change represents a large re-investment

Challenges Facing DR in UK Market

UK Capacity Market offers mid-term opportunity, but how fast DR impacts that market depends on changes

- Two major challenges must be overcome
  - Lack of sustainable business model in legacy markets and programs
    - Cannot be undone
    - Imperative to avoid duplication between now and start of delivery in 2018
  - Design flaws exist in the current Regulations and Rules of the Capacity Market
    - Not too late to fix
    - If not addressed, consumers are the losers

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UK DR Legacy and Future Opportunities Lack Continuity

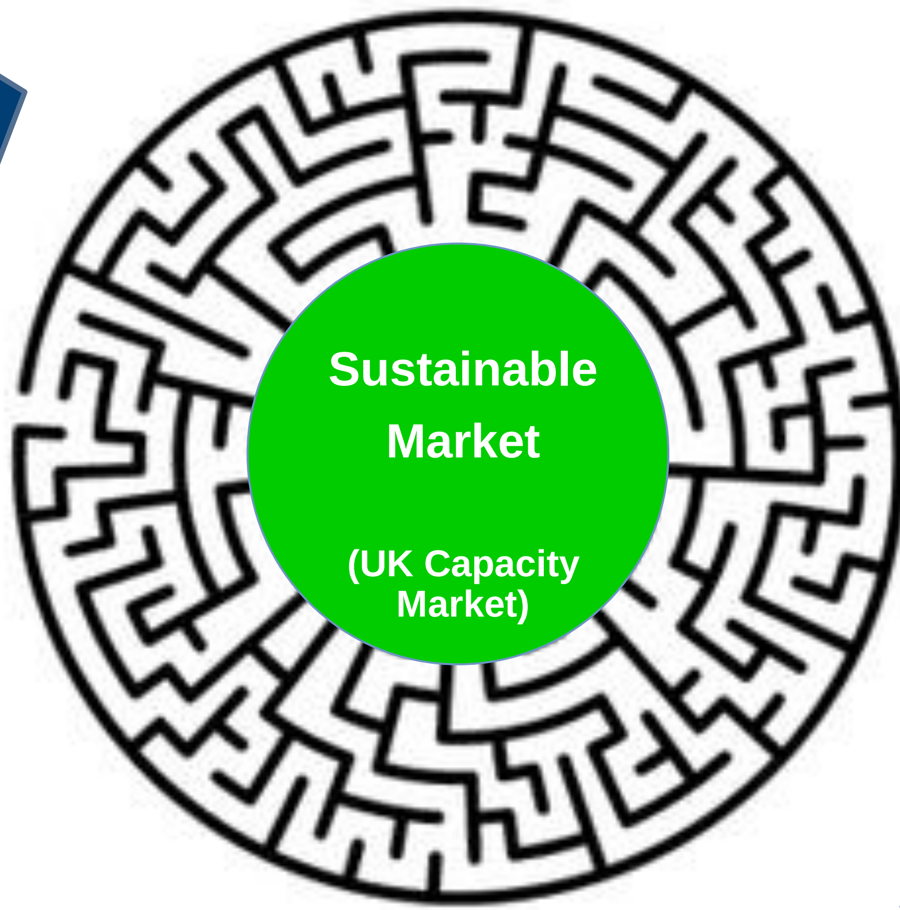
Legacy opportunities have failed to create either a sustainable business model for DR or a pathway to the enduring Capacity Market

Triad Management

- **Standard practice for many I&C customers**

Ancillary Services

- **STOR prices have crashed; future uncertain**
- **Possible emerging opportunities in FFR, Fast Reserves**



Utility Programs

(e.g. Low Carbon London)

DSBR

- **Not viable commercial opportunity**

Capacity Market Design Flaws

UK Capacity Market incorporates aspects that are unique, discriminatory and anti-competitive toward DR that will have negative impacts on consumers

- Two flaws impacting costs that consumer s pay
  - Exclusivity between the initial two primary T-4 auctions and the Transitional Arrangements
  - Availability of multiple year contracts only for new or refurbished generation

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