



Technical Challenges for System Operators in  
facilitating Demand Side Aggregation and the  
Smart Grid

# Patrick Liddy

- 12 years in the Energy Industry
- Founder of Activation Energy DSU
- First and Largest Demand Side Participant in Ireland
- In depth work with Regulator and MO to develop rules
  - Member of the Grid Code Review Panel – Physical Rules
  - Member of the Trading and Settlement Code Modifications Committee
  - Member of HLD Group for Post 2016 Market
  - Chair of DRAI
  - Various other committees and Groups
- Acquired by EnerNOC in February 2014
  - Regional Director for Regulatory Affairs and Operations

# EnerNOC Corporate Overview

## Company Facts & Figures

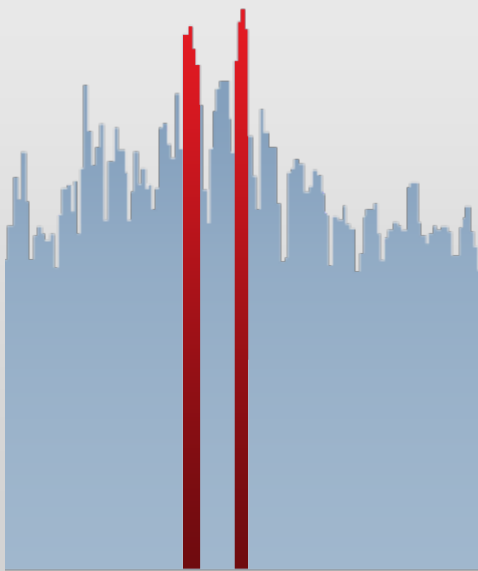
- Founded in 2001, IPO in 2007
- 1,000+ employees in 11 countries
- 24-27 GW of peak load under management
- 9 GW of dispatchable DR, across 15,000+ C&I facilities and 10,000 irrigation load control devices
- FY 2014 revenue guidance of \$435-\$460 million (USD)

## Commercial Solutions

- Energy Intelligence Software (EIS)
- Turnkey and service-based DSM offerings focused on the C&I sector
- 100+ partners including system operators, vertically-integrated utilities, T&D utilities, and competitive retailers
- Multi-purpose demand response (DR) solutions: Reliability, peak management, network support, ancillary services
- SaaS energy management technology: Data visualization, benchmarking, analytics, reporting

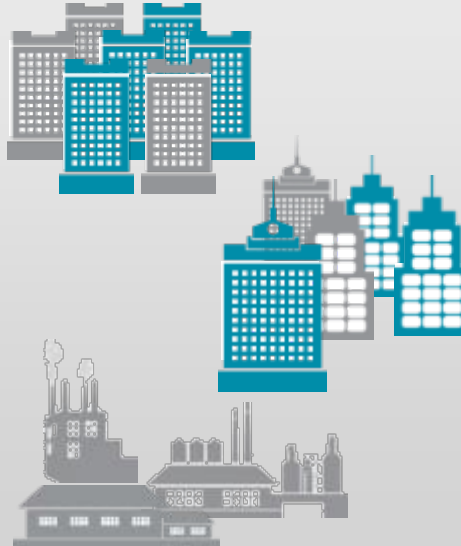
# The Power of Energy Intelligence Software (EIS)

*When you use it*



**Demand Response**

*How much you use*



**Data-Driven  
Energy Efficiency**

*How you buy it*



**Supply Management**

# A Global Demand Response Footprint

EnerNOC operates in 9 countries today. We are committed to continued global expansion.



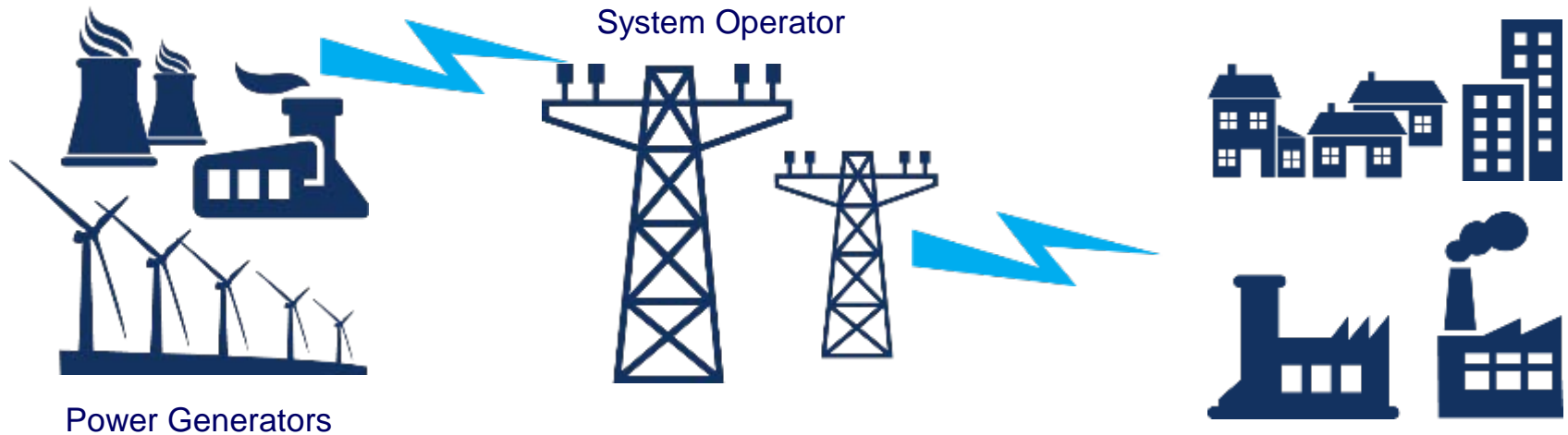
■ EnerNOC Demand Response

○ EnerNOC Office



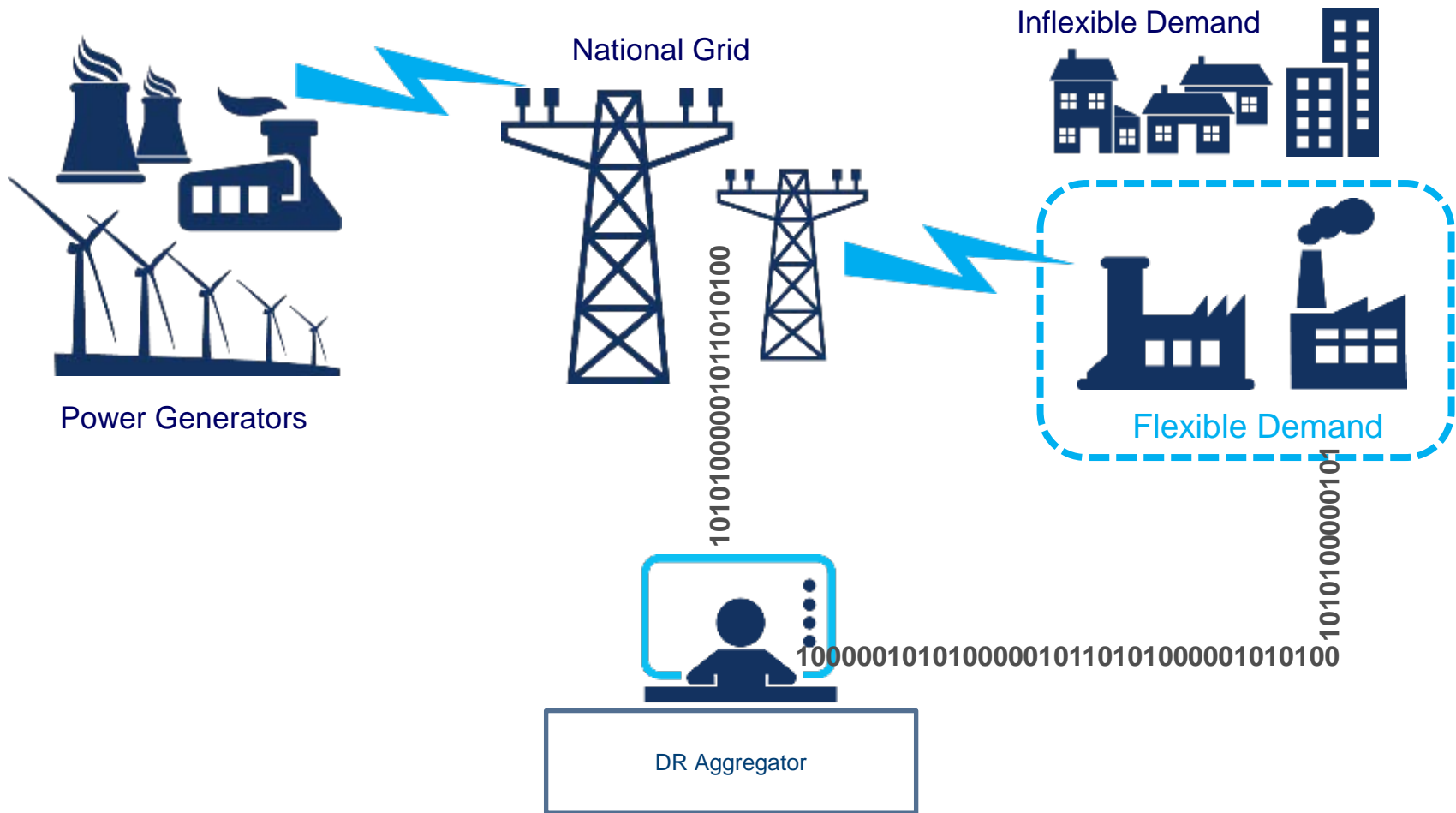
System Operators

# Traditional System



System Operator balances Power Supply  
With Power Demand on a Real-time Basis

# How Demand Response Works



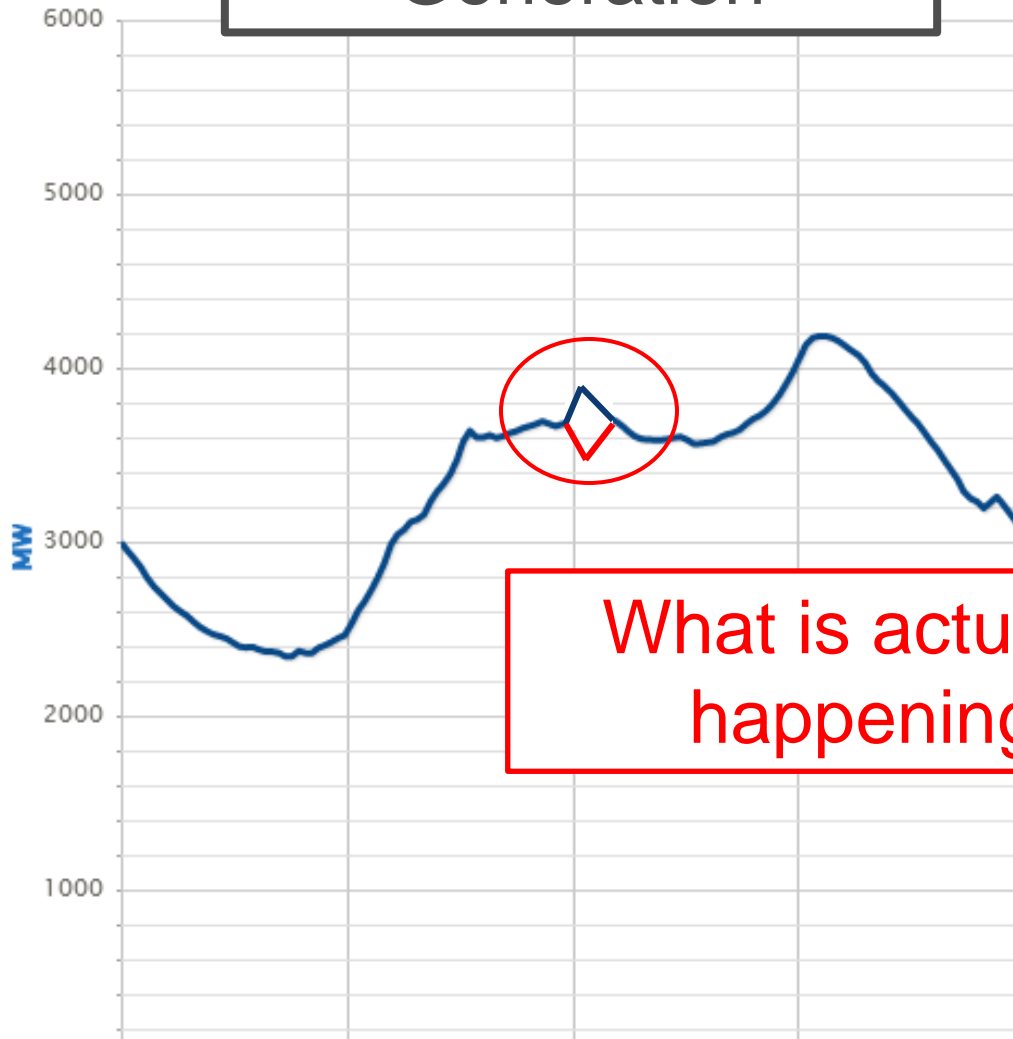


# Visualisation/Management

Previous 24 Hrs

Next 24 Hrs

## Monitored Generation



What is actually happening

Report

- › Capacity Adequacy Indicator
- › CO<sub>2</sub> Emissions
- › CO<sub>2</sub> Intensity
- › Electricity Statistics
- › Generation System Performance
- › System Demand
- › System Records
- › Weekly Peak Demand
- › Wind Generation
- › Download Centre

› Transmission System Disturbance Map

› Outage Information

› Billing and Metering

› Grid Code

› Ancillary Services & Other System Charges

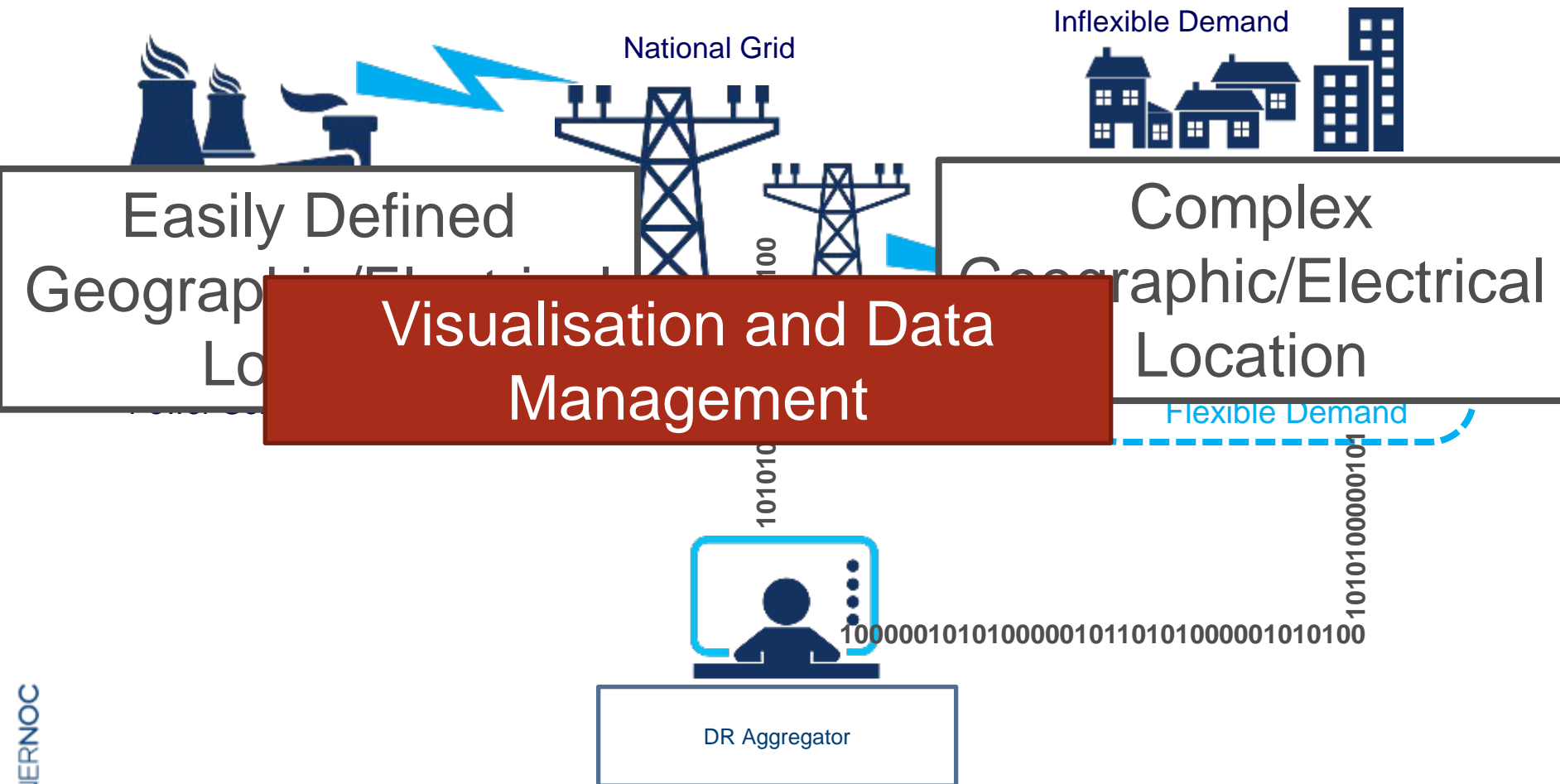
› DS3

› Demonstration Projects

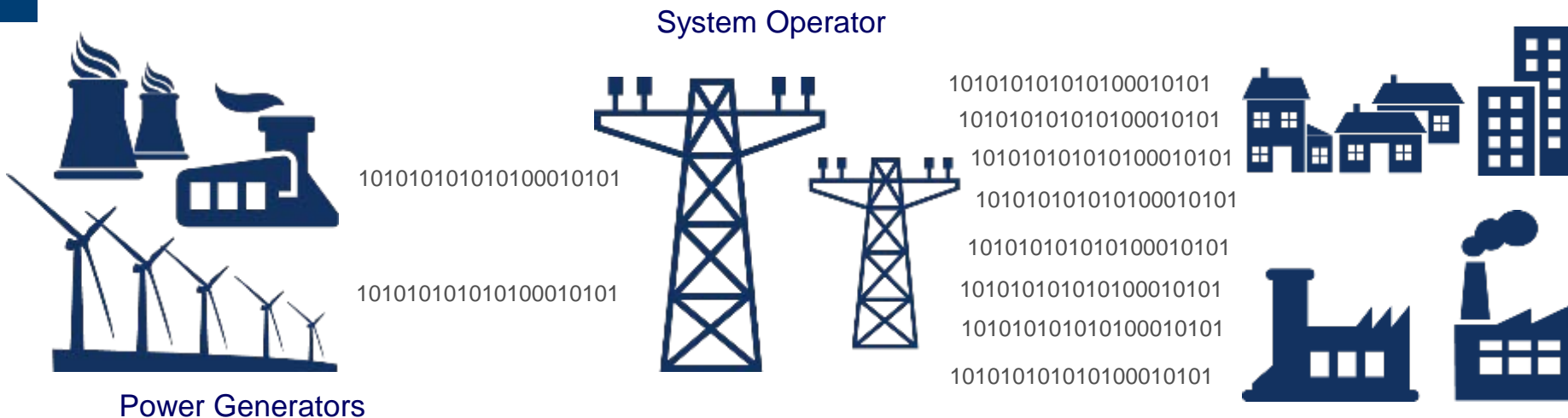
› Reports

› Smart Grid Innovation Hub

# Geographic/Electrical Location



# Data Management



Small number of extremely quick and accurate data feeds

Large number of data feeds  
How Accurate?  
What update Frequency?  
How Quick?

# Summary

- Visualization
- Data
- Visualization of Data



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