



## Distributed Resource Integration – Demand Response Solutions

Electricity Advisory Committee – March 12, 2014

# EnerNOC Overview

## Company Facts & Figures

- Founded in 2001, IPO in 2007
- 700+ employees in 5 countries
- 24-27 GW of peak load under management, with 9 GW of dispatchable DR, across 14,000+ C&I buildings in five countries
- \$278MM in FY2012 revenue; FY2013 revenue estimate \$360-400MM

## Commercial Solutions

- 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 DR solutions: reliability, peak management, network support, ancillary services
- SaaS energy management technology: data visualization, benchmarking, analytics, reporting



# EnerNOC DR

A Multi-Purpose Resource

## Capacity

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

## Energy

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

## Ancillary Services

- Spinning and non-spinning reserves
- Frequency responsive reserves (sub-second response)
- Renewable resource integration (bi-directional)

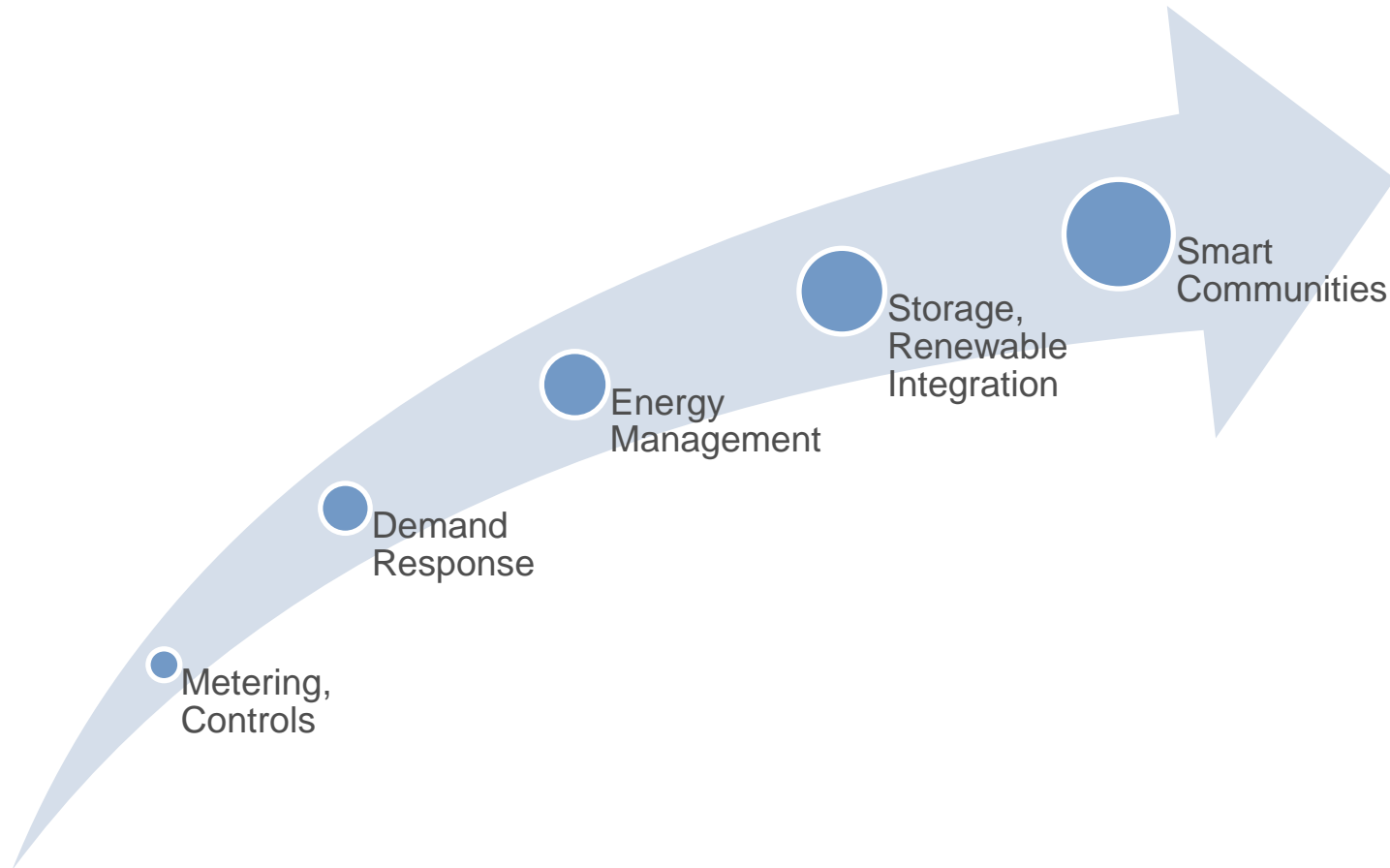
# Energy Management in the Cloud

EnerNOC's focus is on the software layer of the smart-grid, with a cloud-based platform that streams over 1.3 billion data points per month



# The Smart Grid Roadmap

Buildings are just one element of a network of distributed energy resources



# Case Study: AESO Load Shed Service for Import (LSSi)

Increasing transmission capacity via DR



*EnerNOC is the sole aggregator in this program designed to provide protection against the single largest contingency in the Province and increase transfer capability of the BC-Alberta Intertie.*

EnerNOC manages a portfolio capable of responding to grid signals within 0.2 seconds.

## Technology Requirements

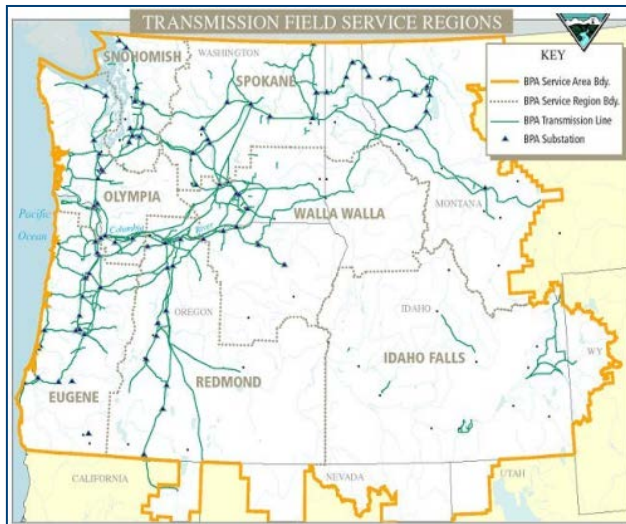
- Under-frequency Relays (UFRs) at each site to detect if grid frequency drops below 59.50 Hz
- Real-time interval metering w/ SCADA connectivity to AESO
- Self-scheduling online platform

## Program Details

- 150 MW contract
- 24/7/365 resource availability; no dispatch limit
- Load must disconnect within 0.2 seconds of system frequency of 59.5Hz; 20ms data capture at trip event.
- 3 categories of participation – Available, Armed, and Tripped. Once armed, loads must stay within 95%-120% band of dispatched volume once armed.

# Case Study: Bonneville Power Administration

Bidirectional DR resource to balance wind



- Pace of wind power development in the Pacific Northwest is dramatically exceeding expectations, with 3,000 MW online today and another 6,000 MW 'in-process'.

BONNEVILLE  
POWER ADMINISTRATION



## Demand Response to Balance Wind

### Technology Requirements

- Automated remote load control
- Real-time interval metering

### Resource Details

- Capability to provide both INCs (load decreases) and DECs (load increases)
- Sub 10-minute notice
- 24/7/365 resource availability

### Participant Types

- Refrigerated Warehouses
- Municipal Water Pumps
- Industrial Processes
- Irrigation Pumps



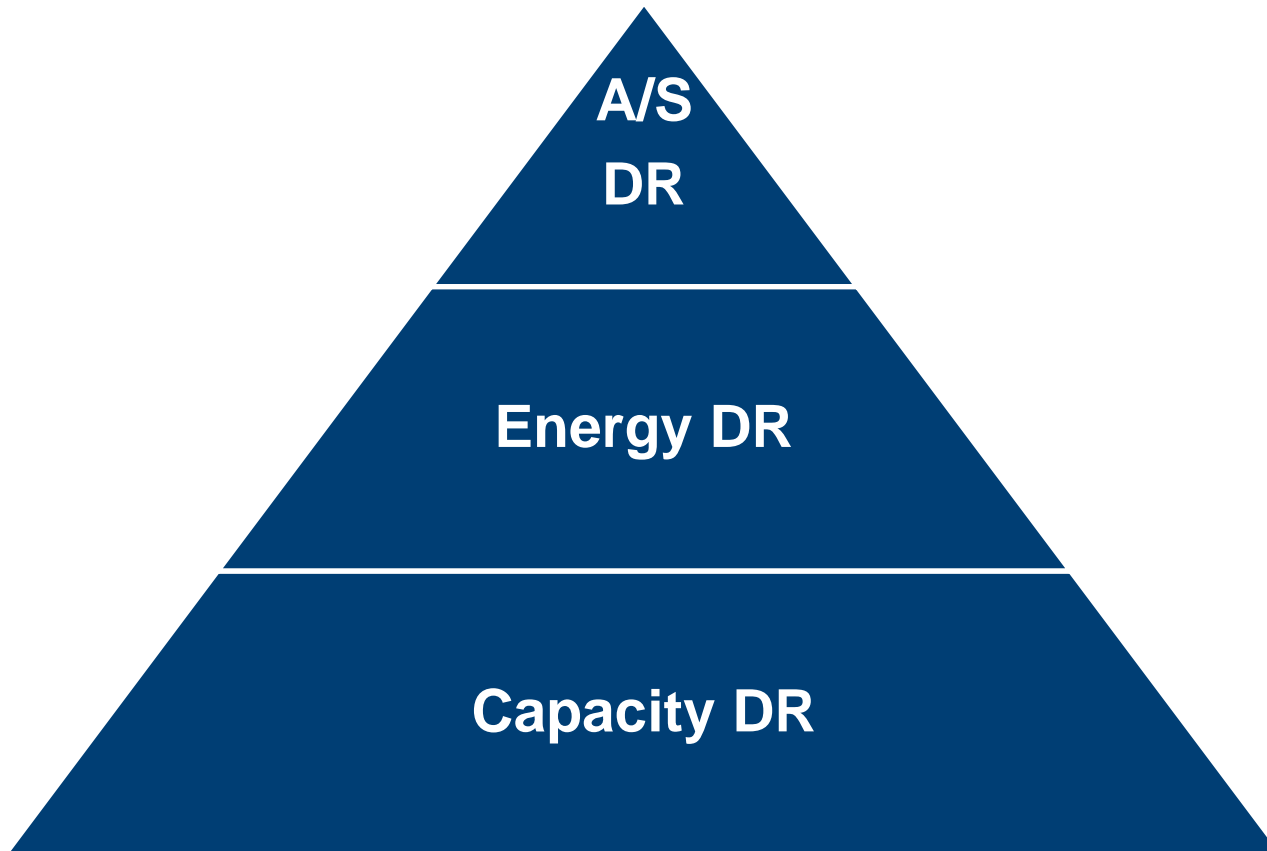
# Guiding Principles

DR should have access to the same markets, and be compensated at the same level, as supply-side resources

**ACCESS**  **VALUE**

# Build a DR Base

Capacity and energy-based programs engage customers in demand response, and open the door for more advanced demand-side capabilities and ancillary services



# Focus on the Challenges AND the Opportunities

There is tremendous value and flexibility to be gained if we invest in building remotely managed networks of distributed resources



*Curtailment*



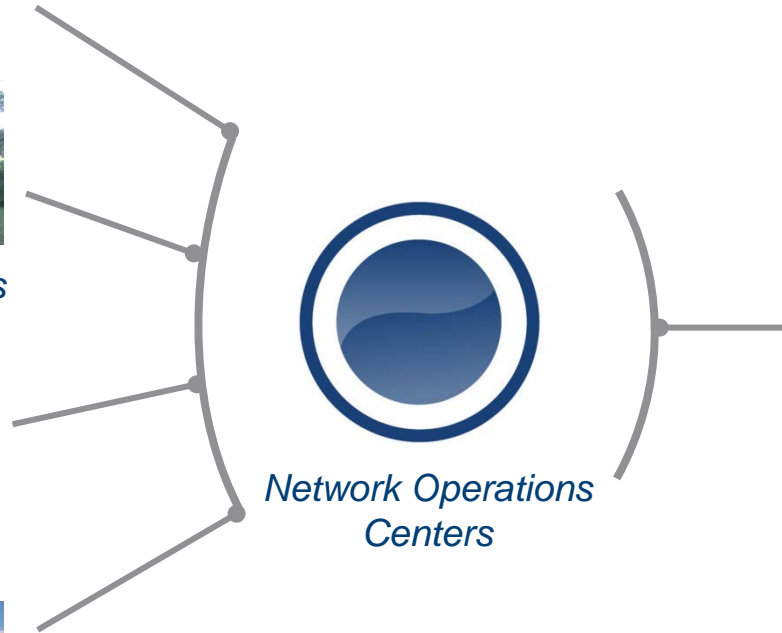
*Backup Gens*



*Solar PV*



*Storage*



*Network Operations  
Centers*



*Remotely Managed  
Networks*