Demand Response in the USA

Vienna Global Energy Workshop

April 1, 2009

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Demand Response Resource Center

Schneider Electric

Agenda

- Introductions
- Demand Response Overview
- ISO DR Experience
- Schneider DR Experience

Introductions

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Introduction

RETX formed in 1999 to pursue opportunities in deregulated energy markets

Provide DR systems to firms in New England, New York, PJM, and Ontario

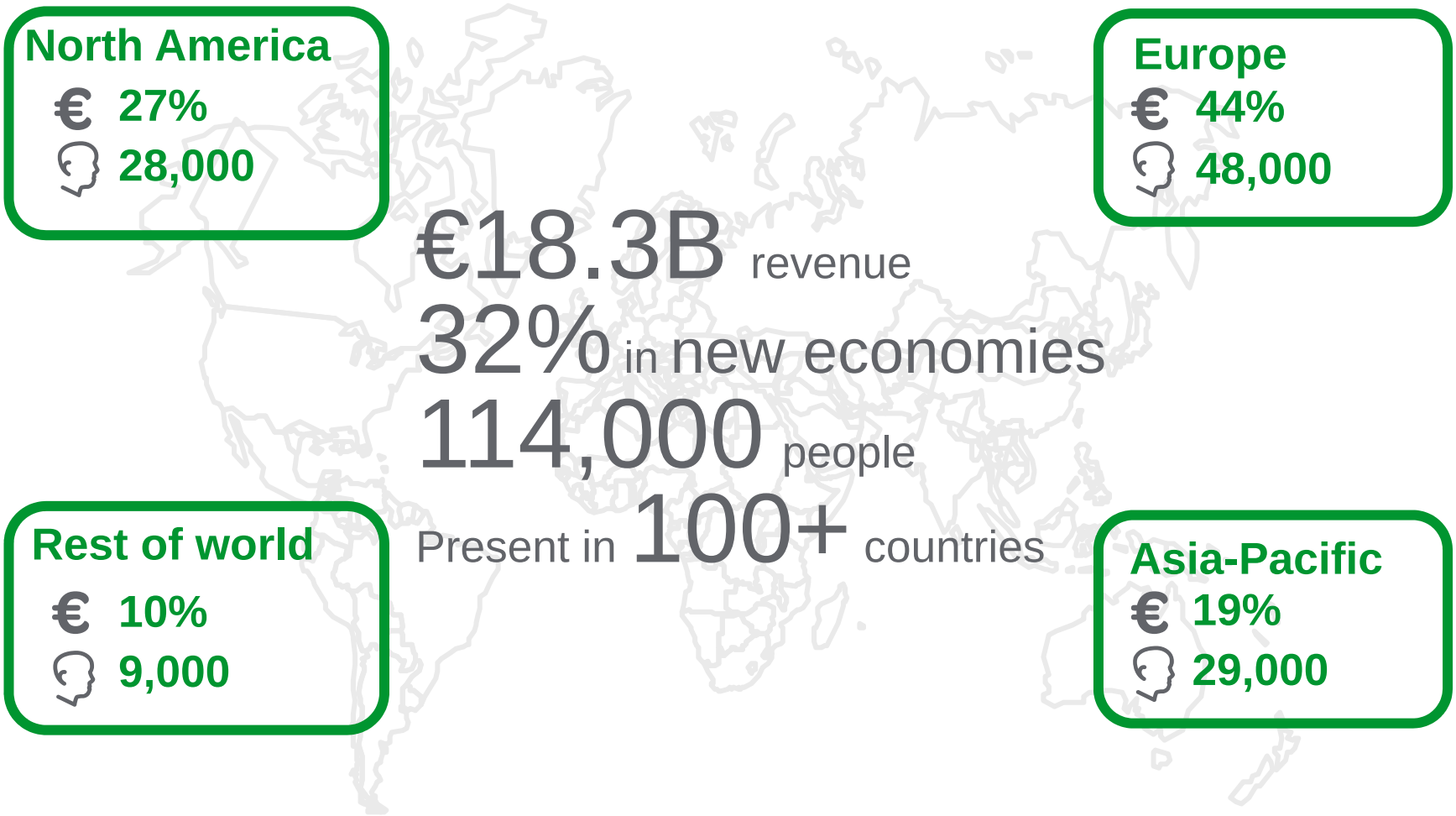
Implemented a 2-year, 12 nation demand response research project for the International Energy Agency DSM Programme

Acquired by Schneider Electric in July 2008

Pete Scarpelli

- 15 years of energy industry experience
- Original RETX team member
- Led IEA project activities

Intro to Schneider Electric:
A global company



North America
€ 27%
28,000

Europe
€ 44%
48,000

€18.3B revenue
32% in new economies
114,000 people
Present in 100+ countries

Rest of world
€ 10%
9,000

Asia-Pacific
€ 19%
29,000

Intro to Schneider Electric:

From plant to plug™, helping customers make the most of their energy

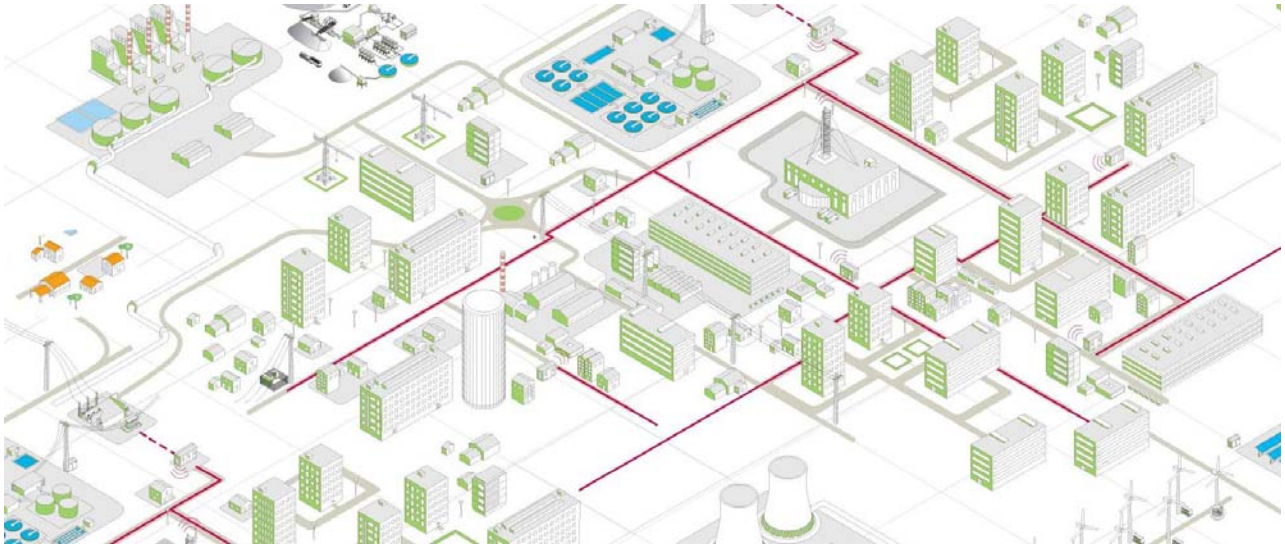
5 end markets

- Energy and infrastructure
- Industry
- Data centres & networks
- Buildings
- Residential

72%

part of the worldwide energy consumption of these five markets

up to 30% energy saving



Offering integrated solutions for segments like…

- Electric utilities
- Water & waste water
- Oil & gas
- Marine
- Mining, mineral, metals
- Machine builders
- Data centres/IT
- Hospitals
- Hotels
- Office buildings
- Retail
- Residential

Demand Response Overview

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Bombardier CRJ-700
Only Seats 70 People

80 People Show
Up for the Flight

Airline Pays (e.g. ticket vouchers) 10 people to take a later flight

Power Grid only has 70 MW

Power Grid needs
80 MW

Power Grid pays consumers to reduce 10 MW to balance supply & demand

What is “demand response”?

US DOE Demand Response Definition:

- *Changes in electric usage by end-use customers from their normal consumption patterns in response to changes in the price of electricity over time, or to incentive payments designed to induce lower electricity use at times of high wholesale market prices or when system reliability is jeopardized.*

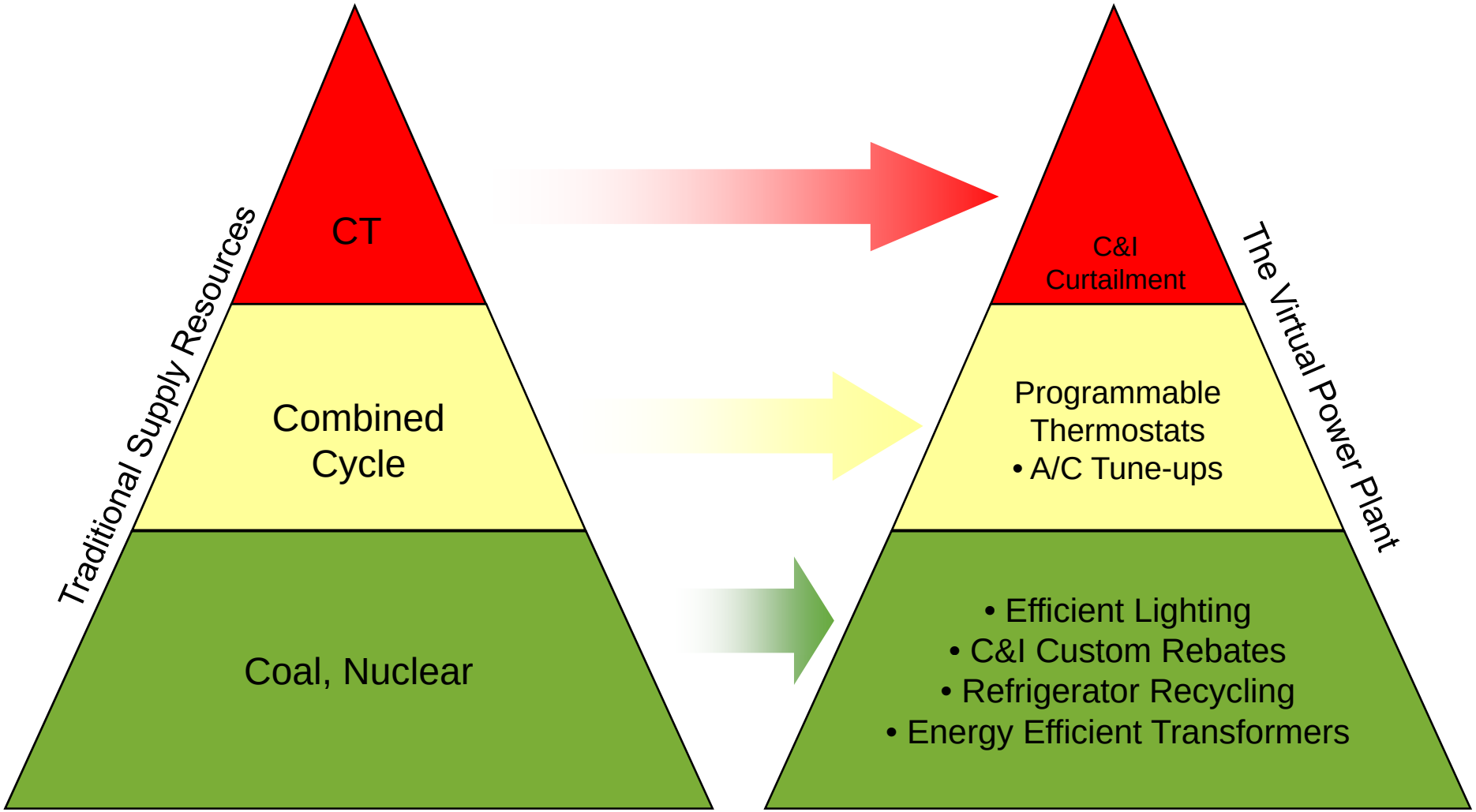
- Encompasses traditional programs and ISO programs

US Federal Position:

“**It is the policy of the United States** that time-based pricing and other forms of demand response….shall be encouraged, the deployment of such technology and devices….shall be facilitated, and unnecessary barriers to demand response participation in energy, capacity and ancillary service markets shall be eliminated.”

– US Energy Policy Act of 2005, Sec. 1252(f)

DR + EE + Smart Grid = Virtual Power Plant



Source: PLMA/KCP&L 10/28/08

Wholesale Competition in Regions with Organized Electric Markets, Final Rule, Order No. 719

- On October 17, 2008, FERC issued a Rule that would require all RTOs and ISOs to (abridged):
  - Accept bids from demand response resources in their markets for certain ancillary services, unless the laws or regulations do not permit a retail customer to participate;
  - Eliminate during a system emergency a charge to a buyer in the energy market for taking less electric energy in the real-time market than purchased in the day-ahead market;
  - Permit aggregators of retail customers to bid demand response on behalf of retail customers directly into the organized energy market, unless the laws or regulations of the relevant electric retail regulatory authority do not permit a retail customer to participate;
  - Modify their market rules to allow the market-clearing price during periods of operating-reserve shortage to reach a level that rebalances supply and demand so as to maintain reliability while providing sufficient provisions for mitigating market power; and
  - Study whether further reforms are necessary to eliminate barriers to demand response in organized markets.

Source: PLMA/FERC 10/28/08

FERC Demand Response Assessment

FEDERAL ENERGY REGULATORY COMMISSION STAFF REPORT

- ***"2008 Assessment of Demand Response & Smart Metering"***

- **Key Findings:**
  - The potential demand response resource contribution from all U.S. demand response programs is estimated to be close to **41,000 MW**, or **about 5.8 percent of U.S. peak demands**.
  - This represents an **increase of about 3,400 MW** from the 2006 estimate.
  - The regions of the country with the largest demand response resource contributions as a percent of the national total are the **Mid-Atlantic, Midwestern, and Southeastern United States**.

Source: PLMA/FERC 10/28/08

ISO DR Experience

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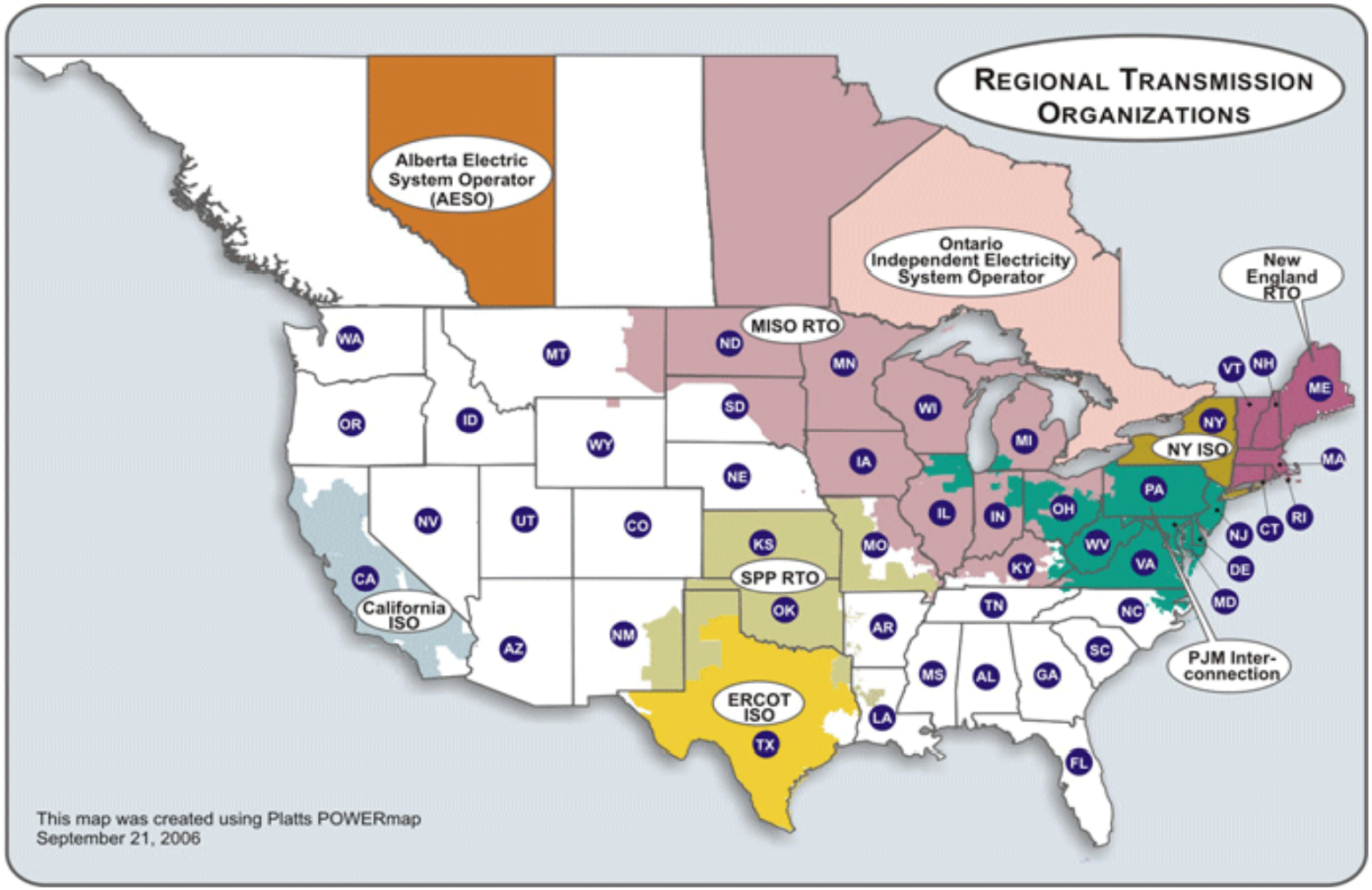
Major US Markets



Source: Federal Energy Regulatory Commission website – updated September 26, 2006

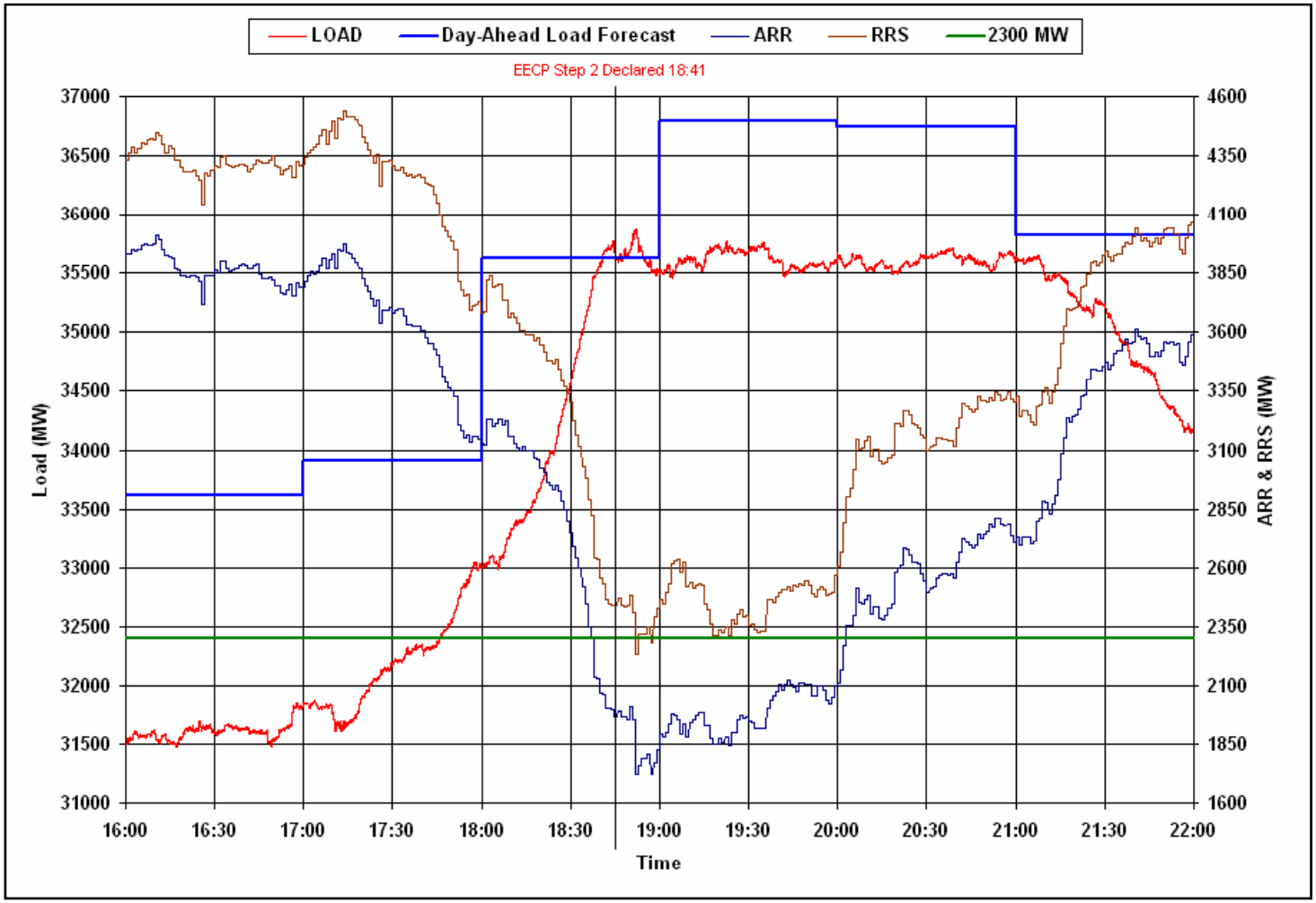
DR Economic Snapshot

MARKET	TOTAL DR PAYMENTS*	DR VALUE / MW-YR
ISO-NE	$134,000,000	$15,500 - $54,000
NYISO	$127,440,000	$27,480 – $79,920
PJM	$55,562,919	$20,000 – $70,000
ERCOT	$200,000,000	$90,000 - $180,000
CAISO	$150,000,000	$84,000
MISO	Not Available	Not Available
TOTAL	$667,000,000 * Estimated	

- DR value is dependent on the asset's location.

Wind Event: Feb. 26, 2008 (3 to 9 p.m.)

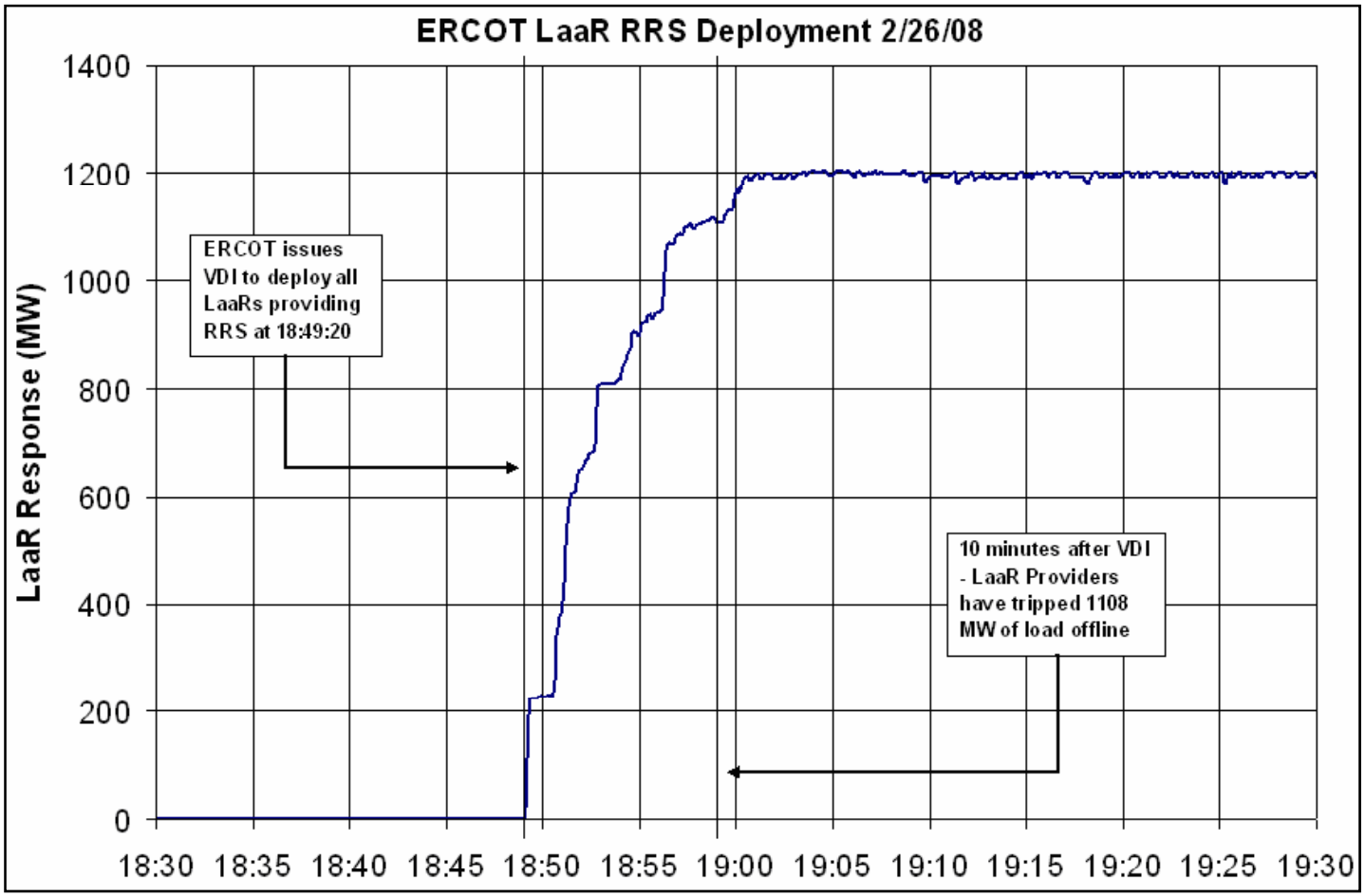
- Load increased by 400 MW between 5:30 and 6:30 pm (evening peak)



Source: PLMA/ERCOT 10/28/08

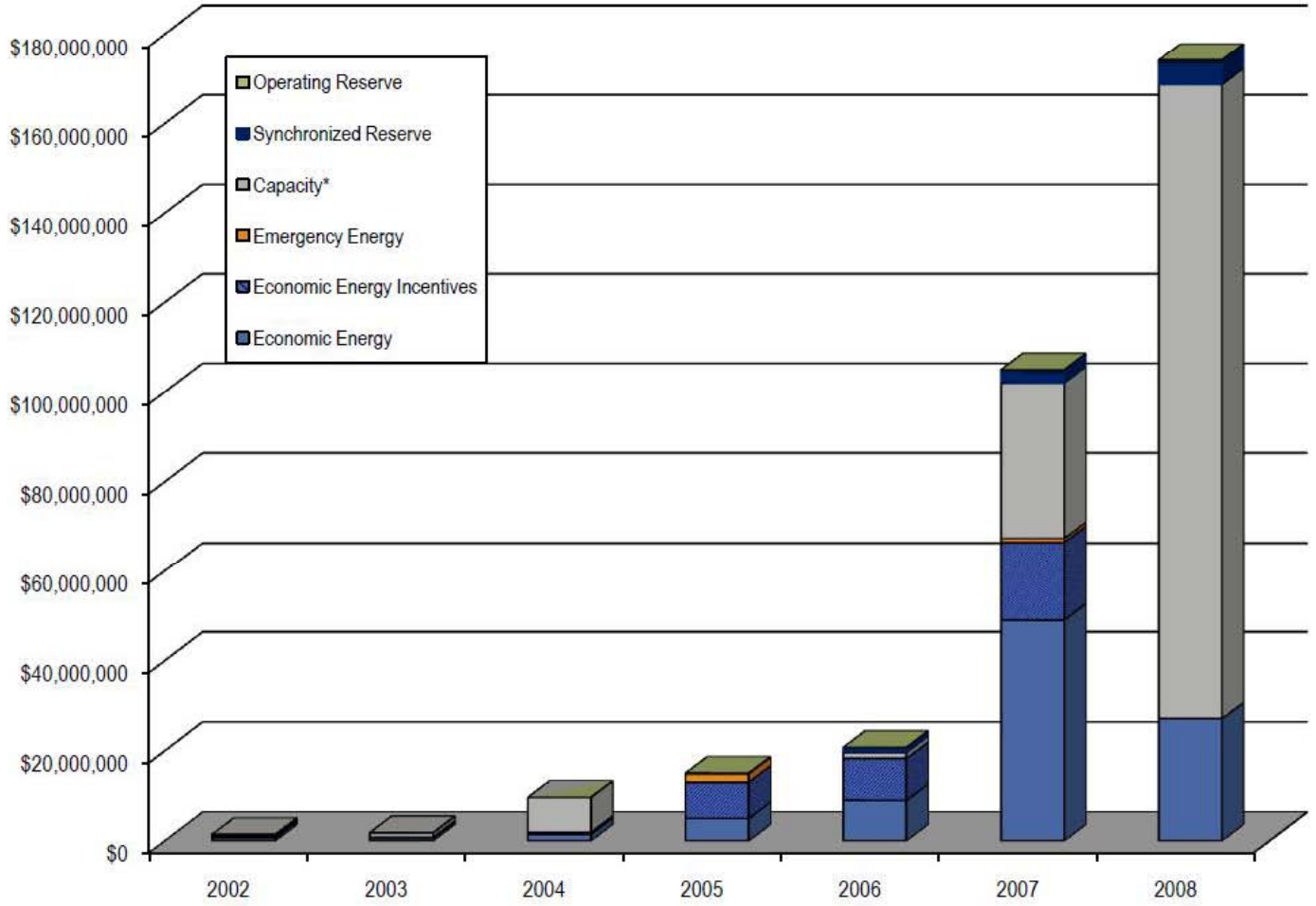
Wind Event: Feb. 26, 2008 (3 to 9 p.m.)

- 'It appears to be the deployment of LaaRs which halted frequency decline and restored ERCOT to stable operation.' -- ERCOT EECP Event Report



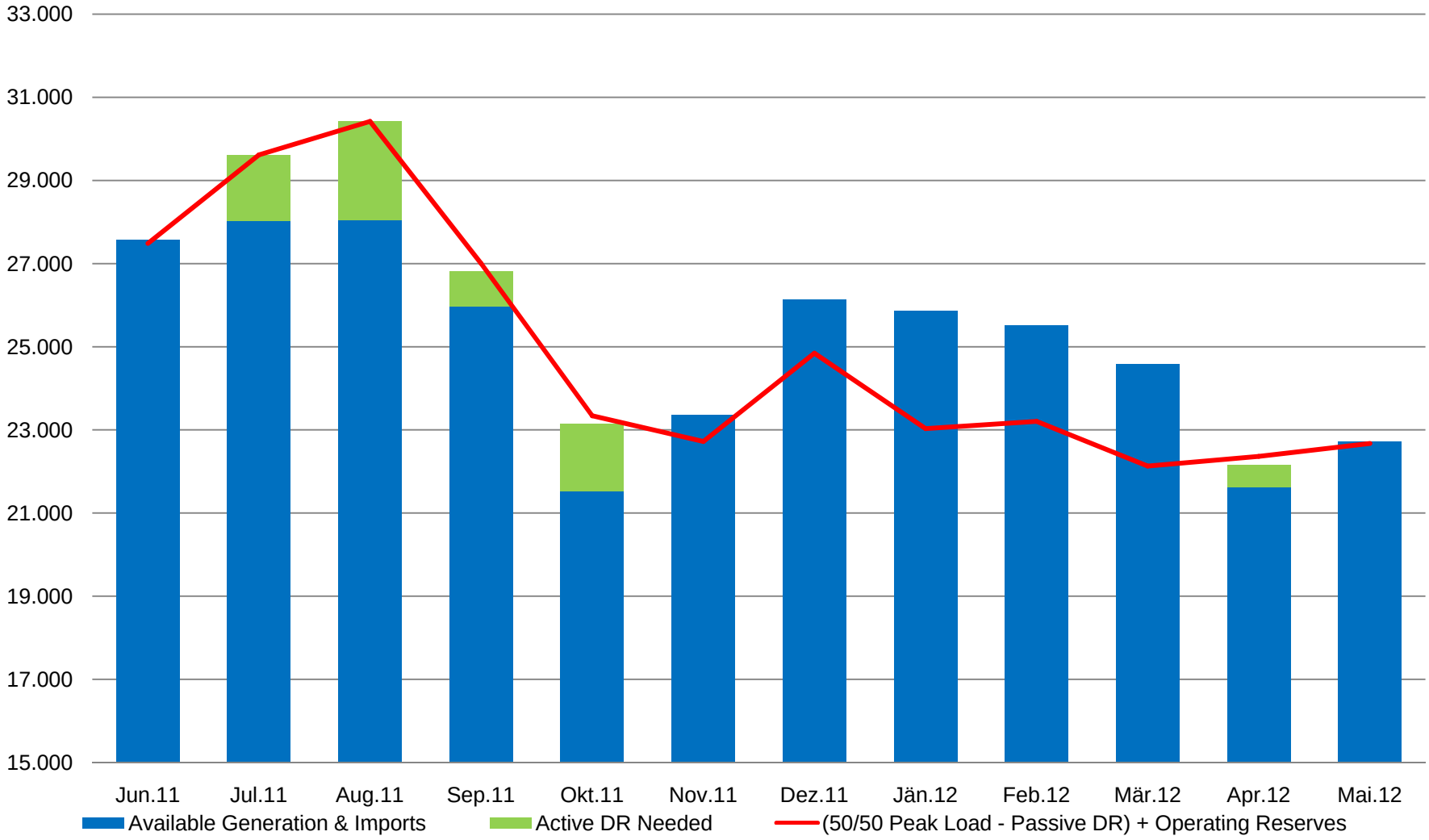
Source: PLMA/ERCOT 10/28/08

PJM Demand Side Response Estimated Revenue



*Capacity revenue prior RPM implementation on 6/1/07 estimated based on average daily ALM capacity credits and weighted average daily PJM capacity market clearing price.

Operable Capacity Analysis: Intermediate Case



Source: PLMA/ISO-NE 10/28/08

Schneider DR Experience

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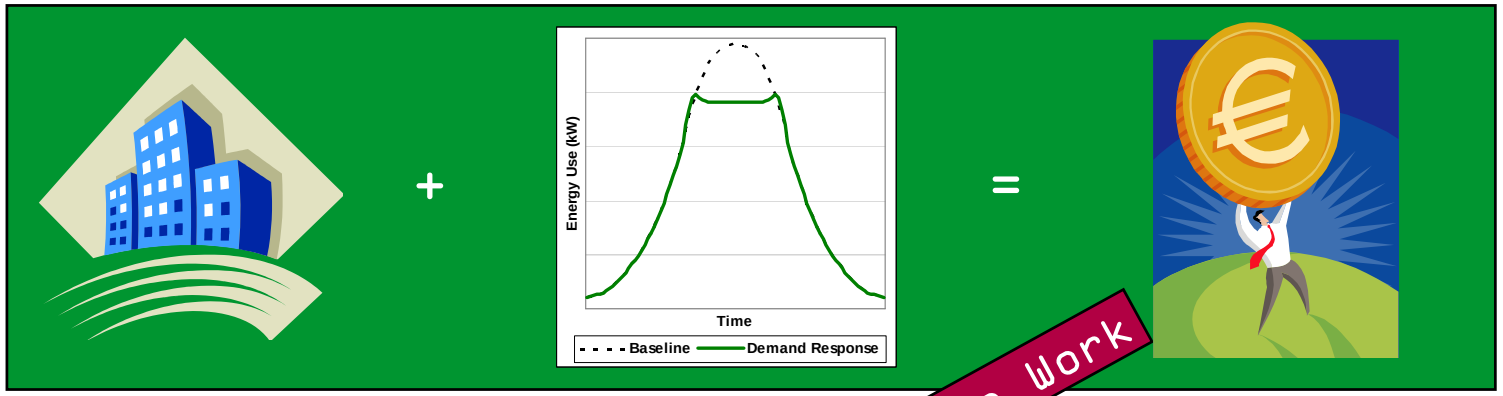
“Power Your Profit”

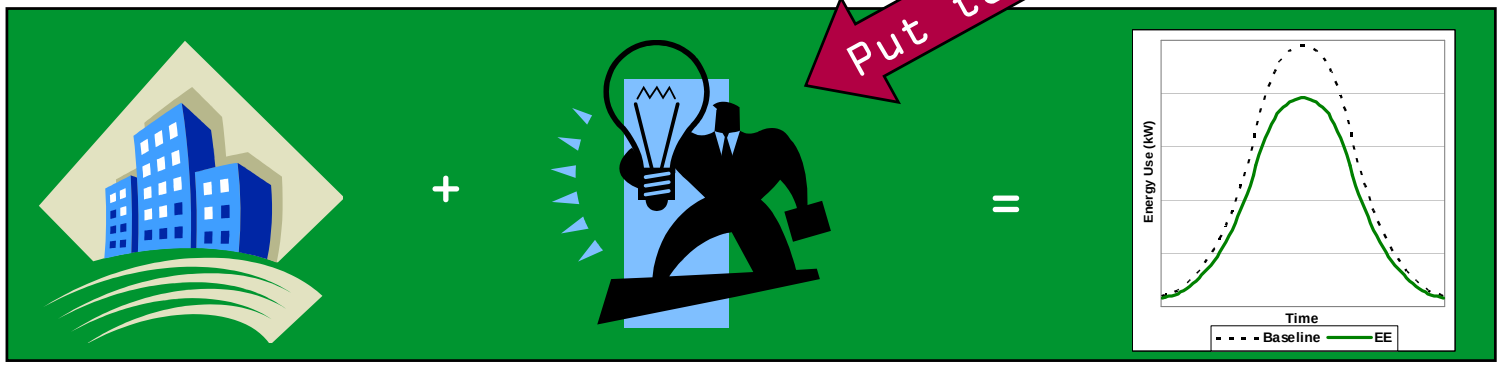
Multiply the Value of Your Energy Management Funds

Demand Response



Put to Work

Energy Efficiency



- Using demand response revenue to fund energy efficiency projects leverages short-run opportunities into long-term savings!

Rockefeller Center Project

Building Facts:

- Location: Mid Manhattan
- Peak Load: 14.5+ MW
- Size: 49 stories plus 4 sub floors

Project Goals:

✓ Double existing demand response capacity
✓ Automate building response to DR events
✓ Use DR techniques to prepare for RTP contracts
✓ Lower carbon emissions
✓ “LEEDS” Gold + Certification
✓ Integrate multiple systems to single control platform

Case Study: Durham College, Canada

- Over their long relationship, Schneider has executed multiple projects including efficiency and control
  - Electrical Distribution
  - 200+ VFDs
  - Building Automation System
- September 2008: Schneider & CPower contracted to represent the Oshawa campus in the DR3 program
- Schneider's first DR3 demand response client
- CPower Engineering site-visit yielded a curtailment plan of 400kW – 600kW; roughly 10% of their 5MW peak load
- To avoid losing $45,000 of annual demand response revenue to the general fund, Durham's Facilities Department has **directed the revenue to be paid directly to Schneider to apply to their future projects** (including an expansive solar panel project)

DURHAM COLLEGE
SUCCESS MATTERS

- Founded in 1967
- Regional college with campuses in:
  - Oshawa
  - Whitby
  - Uxbridge
- 6,100 students, 759 full time staff

A DR3 FIRST!

Thank You!

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