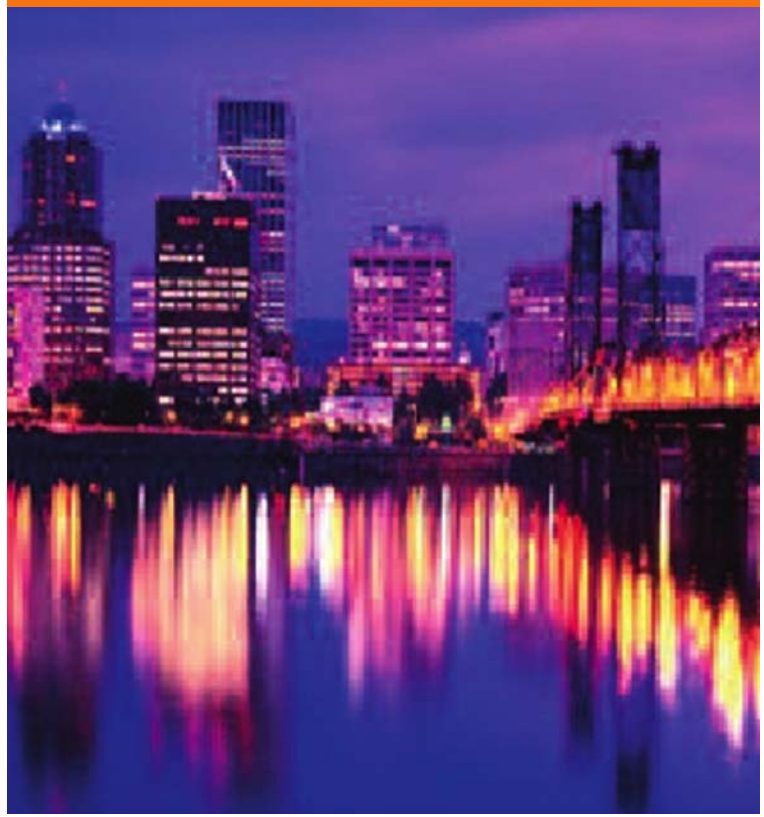
Automated Demand Response



Goal Net Zero Interest Group

November 14th, 2011

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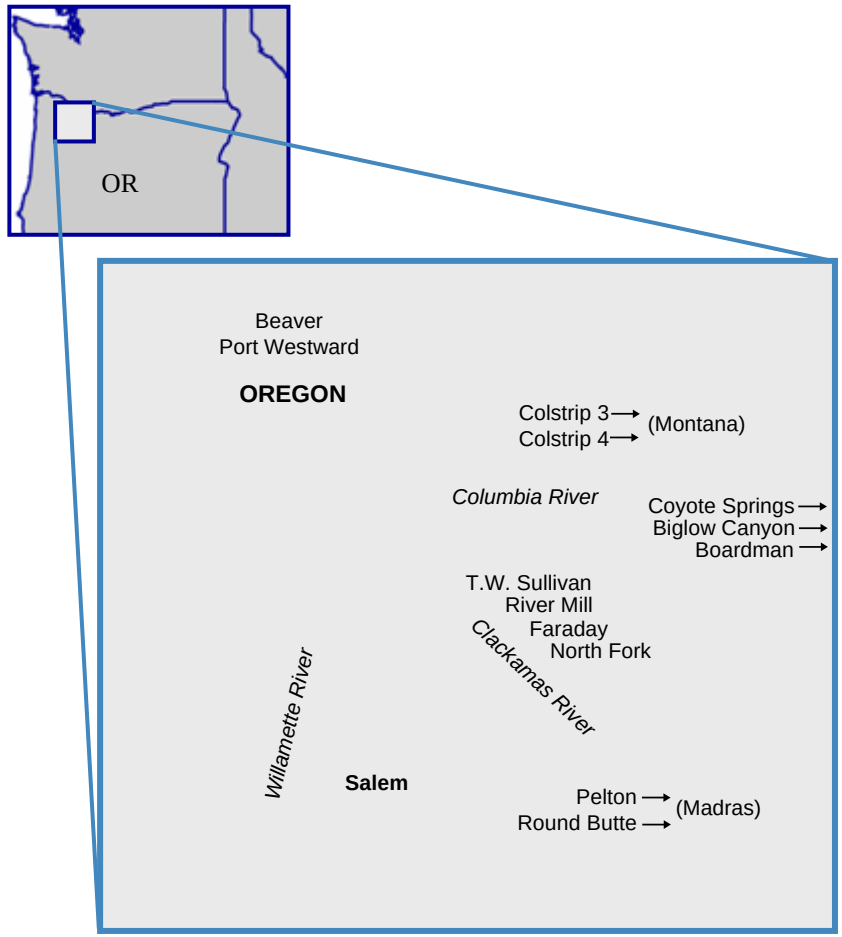
Portland General Electric

- 825,000 customers
- 2,671 employees
- Service territory population 1.6 million,
  43% of state's population
- 52 cities served
- 4,000-square-mile service area
- 25,600 circuit miles of T&D lines
- Transmission 1,600 miles
- Distribution 24,000 miles
- 2,766 MW of generation
- Summer peak load of 3,950 MW (2009)
- Winter peak load of 4,073 MW (1998)

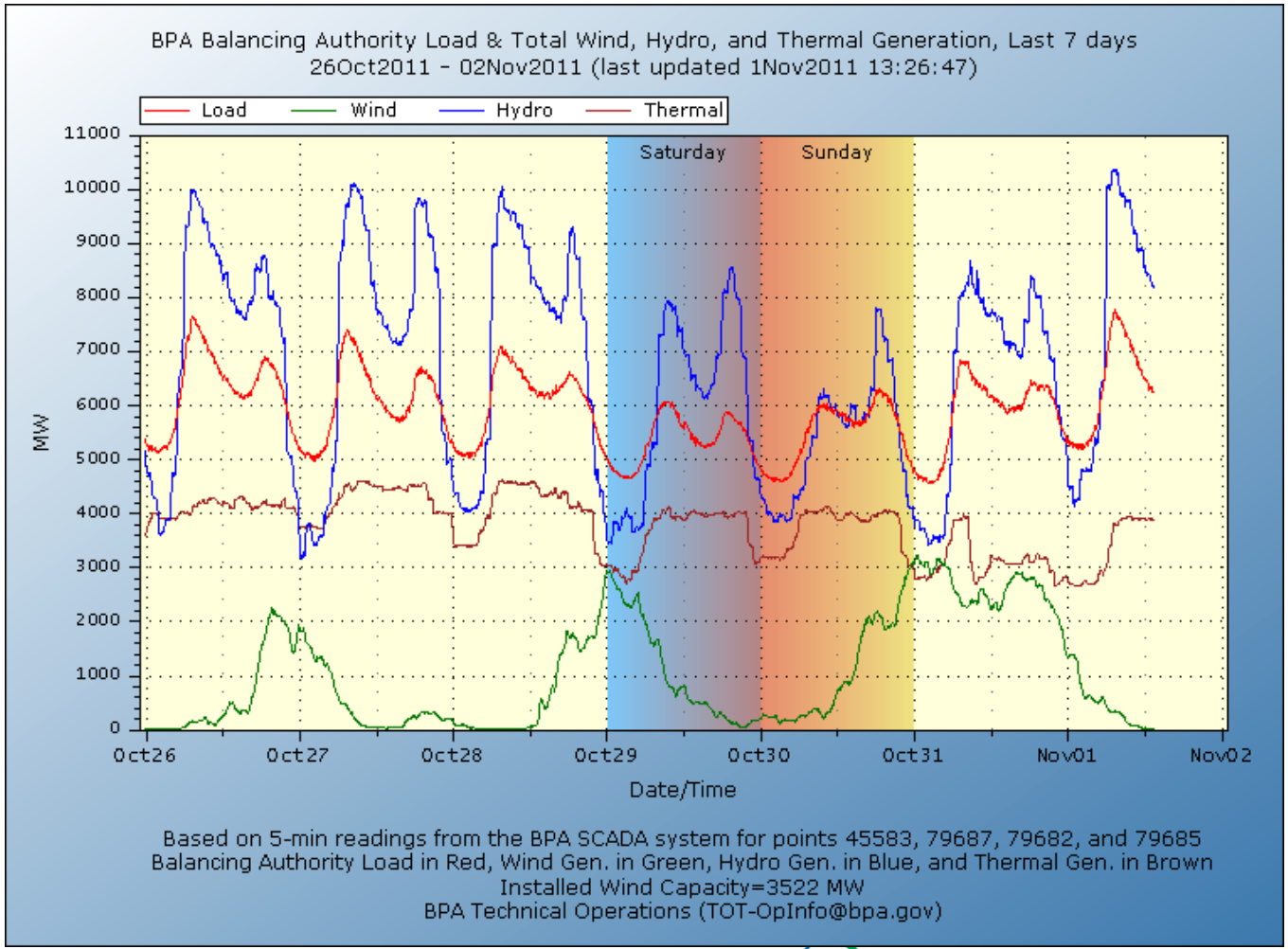


Demand Response - Presentation Overview

- Introduce Need
- Introduce Demand Response
- How Demand Response Can Enable Renewable Resources
- Description of Automated Demand Response
- Background to this Program
- Description of Energy Parner^{sm}
- Status of the Program
- RTP Background
- Customer Benefits
- Other Notable DR in Northwest
- Conclusion

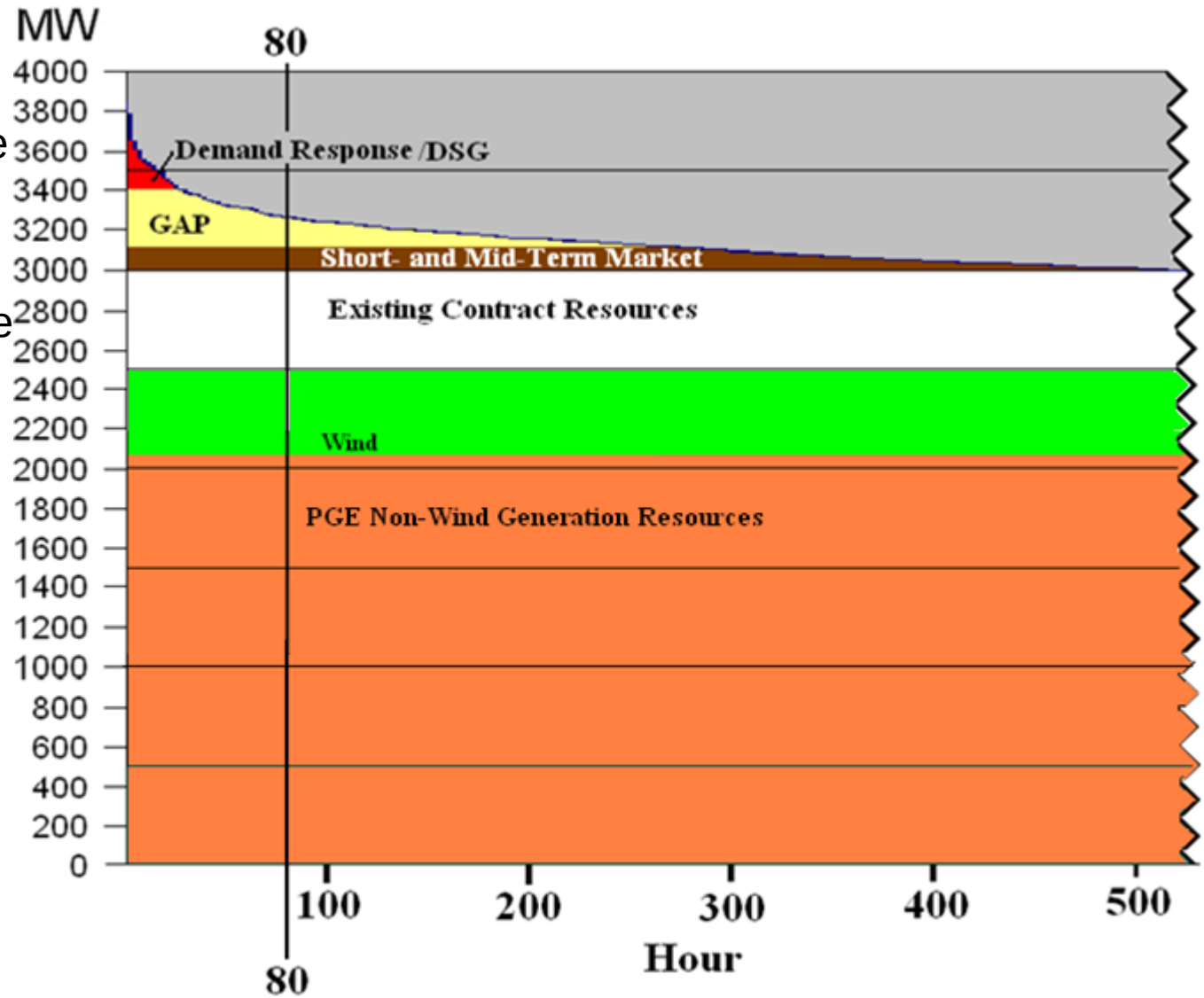
Situation: Variable Renewable Resources

- Utility is expected to provide power at all times.
- Solar and Wind output vary based on circumstances
- Utility's typical peaking load hours do not align with the output of renewables.
- Utilities are looking for ways to shift their discretionary loads to times when renewables could cover the load; moving customer peaking load is an effective method of achieving that goal.



Situation: Forecasted Capacity Gap (graph for example purposes only)

- The region is expected to experience a resource gap in the next 5 years.
- Customer energy use reductions at peak usage times are needed even with added generation.
- The PGE action plan includes adding an additional 60 MWs of customer peaking reductions between 2012 and 2015.



Solution – Demand Response (and Resource Portfolio)

- Demand Response is when customers respond to an incentive to reduce load during times when the utility finds it beneficial (cheaper forms of generation are approaching capacity); typically peak load days or days when a significant form of generation fails.
- Both Demand Response and Supply Side capacity resources are needed to meet PGE's full range of capacity requirements.
- Demand Response makes more sense for meeting extreme load peaks due to its lower cost over the last few load hours as compared to a gas turbine.

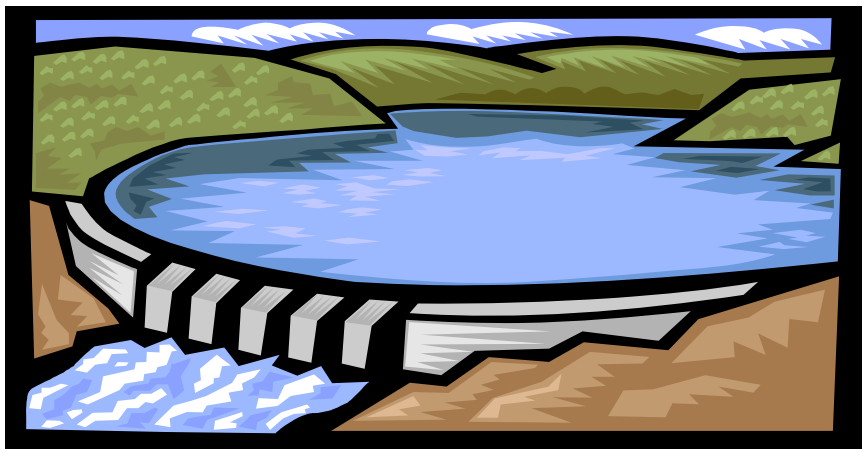
Benefits

Pros

- Demand Response is often available for peak load conditions because that's often when customers are operating heating or air conditioning.
- Demand Response also helps diversify PGE's portfolio, and can help mitigate risk (e.g. fuel volatility and operating risk).

Cons

- However, Demand Response does not provide the additional 24 hours a day benefits some other resources can provide.

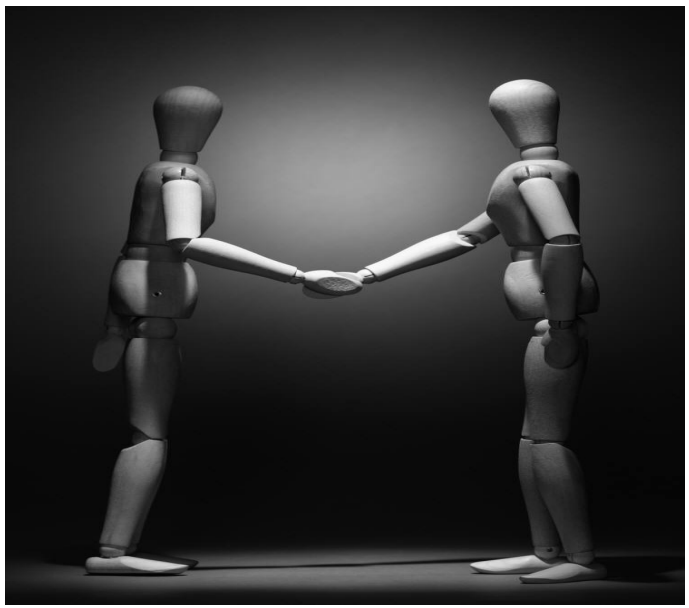


What is Automated Demand Response?

- Demand Response that is automated from the point of origin (Power Operations) through to the customer side reduction.
- Automated Demand Response is valuable because:
  - Customers don't have to take action
  - It's set and forget (if a customer so desires)
  - Responses are often faster than when human interaction is required.
    - Certified reserves are held to a 10-minute response time.
  - Often easiest to achieve with your commercial customers (industrial is too process driven and residential doesn't have the load impact to make up for the cost of automation).

PGE's Response to Situation

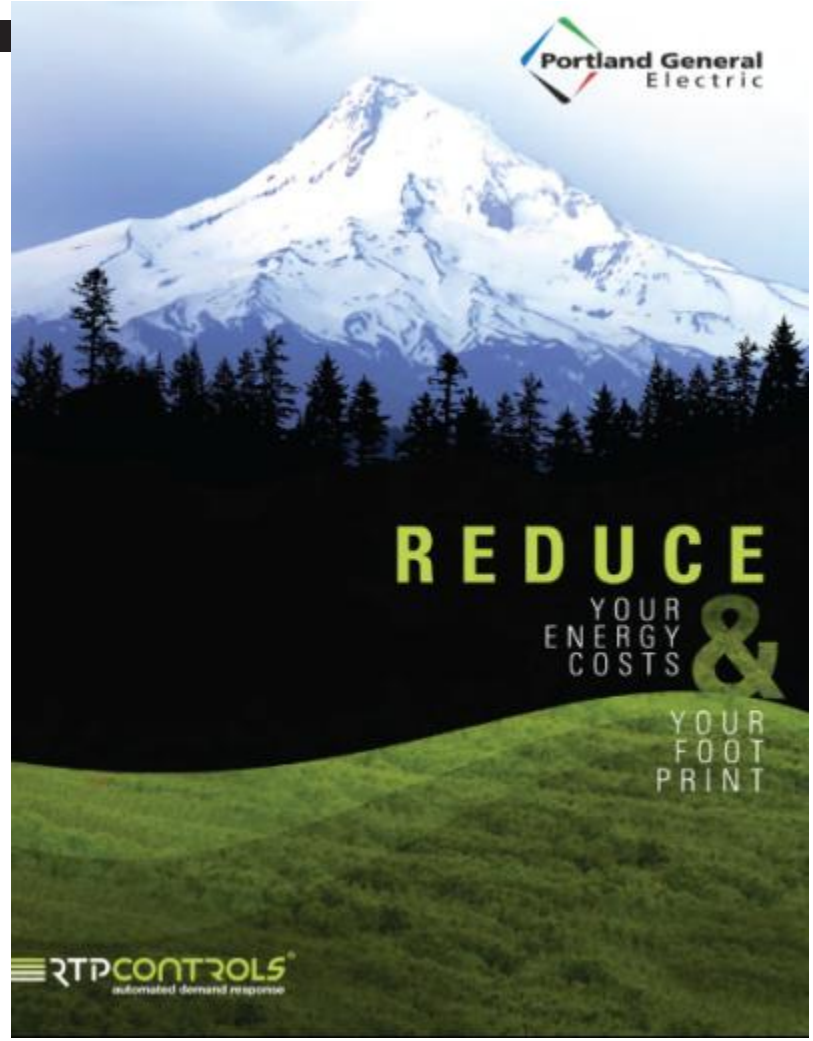
- PGE issued a Request-For-Proposal for Automated Demand Response in 2008.
- PGE sent requests to 19 known demand response providers.
- PGE selected RTP Controls (Atlanta, GA) from the responses as the best option.



PGE's Energy Partner^{sm} Program

Energy Partner^{sm} Automated Demand Response

- PGE's Automated DR program is designed to contract with an Automated DR provider (RTP Controls) ramping up to 50 MW of peaking capacity in aggregate among our large customers (30+ kW of demand).
- RTP Controls is responsible for marketing, infrastructure, and payments; from PGE's perspective this is similar to a capacity purchase.

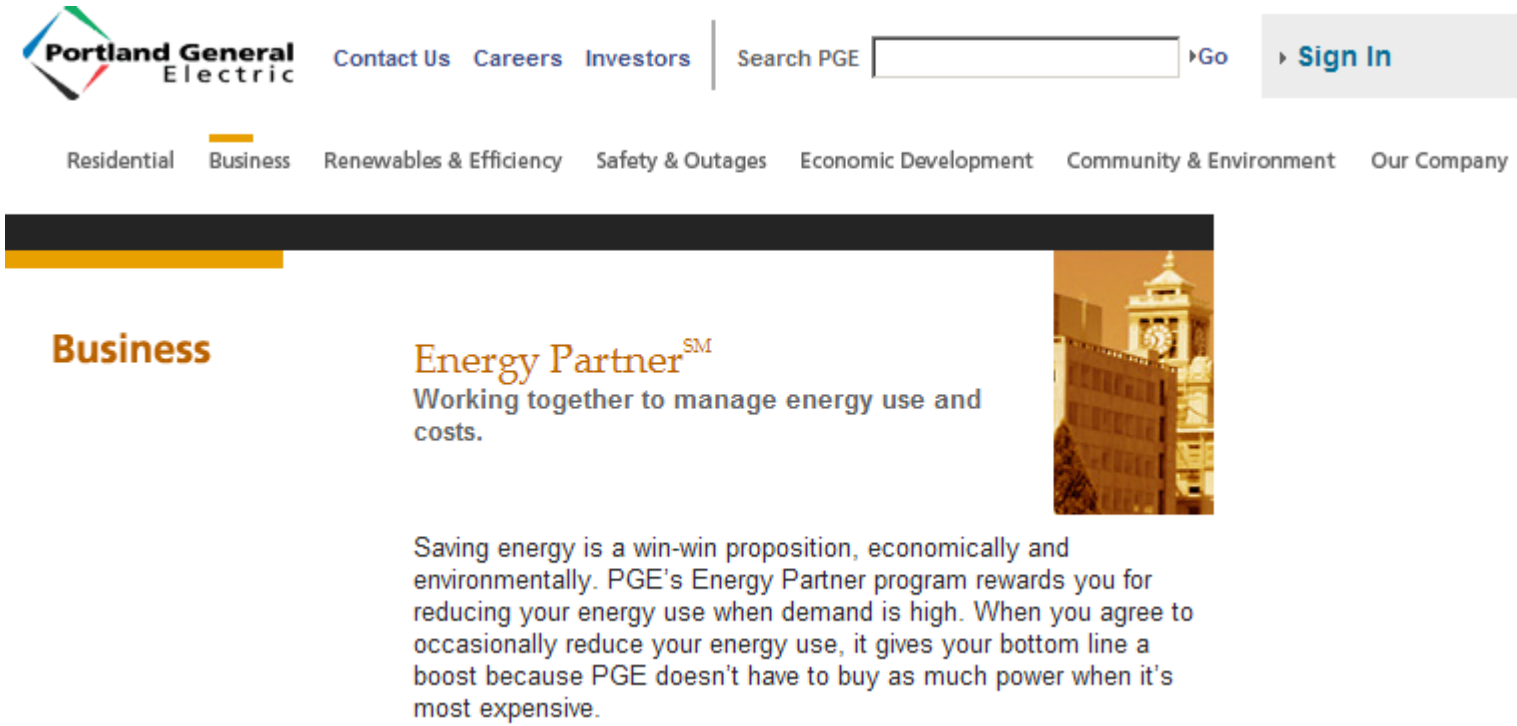


Dispatch

- Designed to address those peaking hours shown on slide 5.
- PGE may dispatch Automated Demand Response:
  - Weekdays (Non-Holiday)
  - Increments of one hour (up to four)
  - Winter – These hours are when typical winter peaks occur.
    - 6 a.m. to 10 a.m., and 5 p.m. to 9 p.m.
  - Summer – These hours are when typical summer peaks occur.
    - 3 p.m. to 7 p.m.
  - Up to15 times per season
  - No more than 2 days in a row
  - No more than 40 hours per season
  - Seasons consist of:
    - Winter – December, January, and February
    - Summer – July, August and September

Status of the Automated DR Program

- PGE is actively marketing the Energy Partner[sm] Automated Demand Response program
  - Go to www.portlandgeneral.com/energypartner for more information



Eligible Customers

- Eligible commercial and industrial participants include big box stores, supermarkets, large office buildings, etc.
- The Automated DR provider may not use Distributed Standby Generation to achieve load reductions.
  - This program is not designed to address distributed standby generation. PGE will offer other programs as it sees fit to fill those needs as this program does not address:
    - Emission Rules
    - Paralleling the Grid
    - Maintenance
    - Etc.

RTP Controls – Experience

Industrial

Con Agra

GSE

Institutional

St. Luke's

The Church of The Apostles

Retail

Superstore

zehrs

A&P

waldbaum's

superfresh

Pathmark

Price Chopper

ShopRite

Loblaws

weis

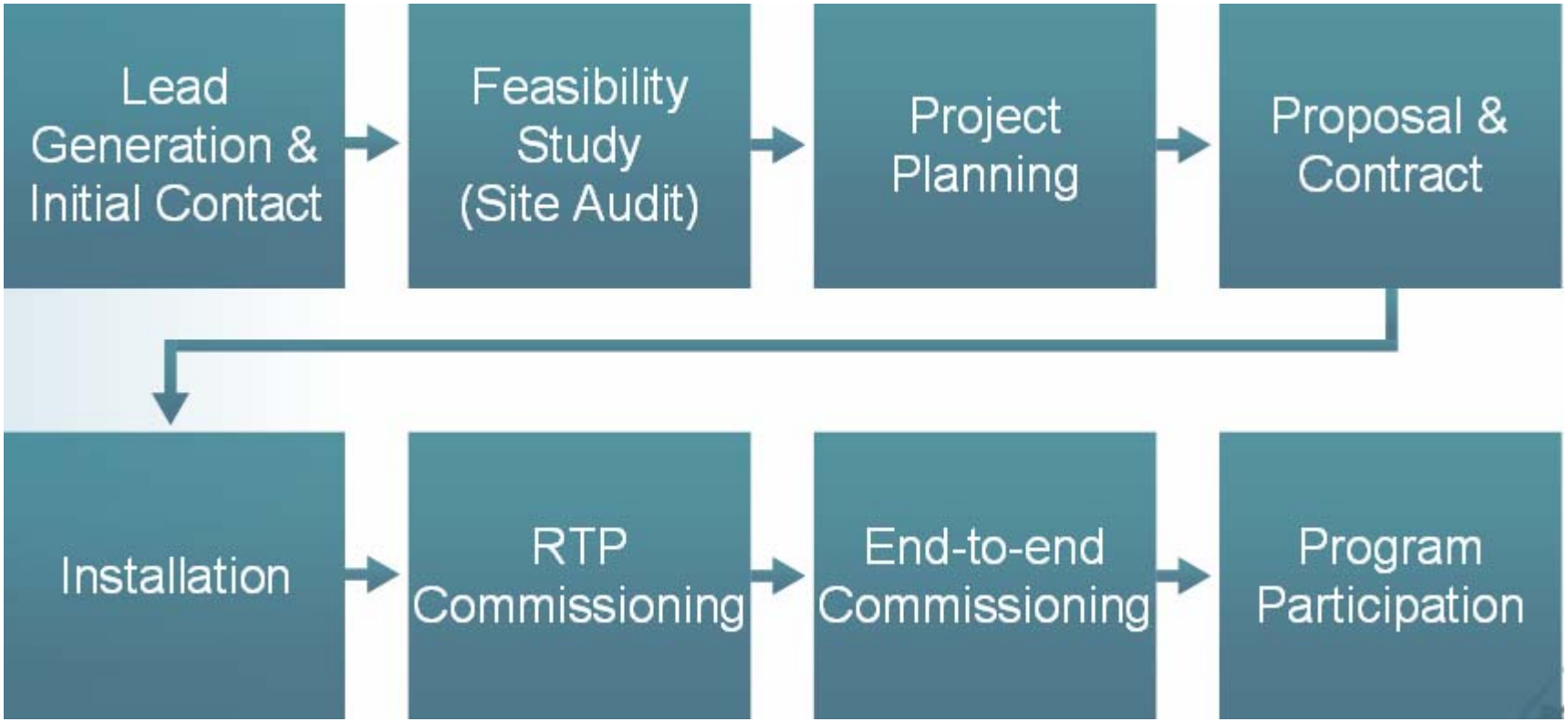
KOHL'S

Best Buy

Stater Bros. Markets

macy's

RTP Implementation Process



Participant Benefits

- Fully Automated Participation
- Energy Management Tools
- Environmental Initiative
- Marketing Tools
- Financial Compensation

Other Notable Demand Response Activity in NW

Water Heaters can act as a battery, allowing the utility to heat (re-charge) the water heater (battery) when optimal (Solar or Wind production high?)

- Portland General is piloting a residential water heater pilot in the Salem area. The water heaters will respond to dynamic signals from PGE indicative of system status (cost, capacity, renewables influx, etc.).
- The BPA is also testing numerous water heater control technologies and in one of their pilots the water heaters are responding directly to a wind farms signal (wind blowing – H2O heat on, no wind, no H2O heating).

Vision for Smart Grid

- Align with PGE's Strategic Intent : Powering our customers' potential as the region's trusted energy partner
- Deliver innovative solutions
- Keep it simple and sustainable
- Connect generation, transmission and distribution of energy with customers' changing needs

- The Energy Partner^{sm} program is designed to help meet growing energy demand and reduce environmental impact while helping build a stronger, more reliable and smarter energy grid for the future.

Summary

- Automated Demand Response enables PGE to deliver electricity in an effective and responsible way, mitigating (but not eliminating) the need for peaking resources and developing strategies for responding to and enabling variable generation (i.e. wind, solar, etc.)
- Customers take advantage of cost saving opportunities
- Customers can participate in an environmentally friendly energy initiative
- By using a third party provider, PGE leverages the expertise of an experienced DR provider

Questions?