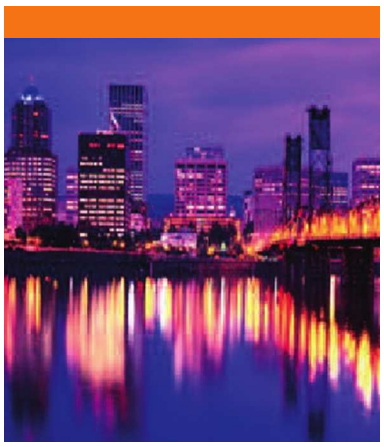
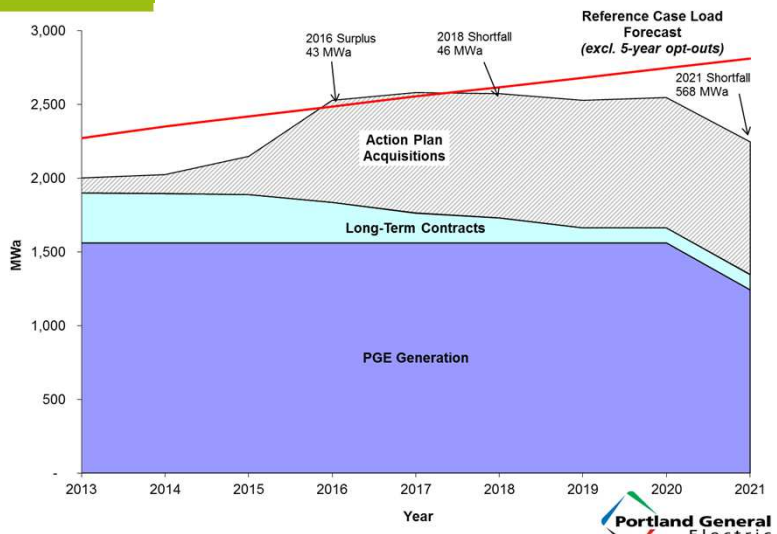
Planning for Demand Response in PGE's IRP

Pacific Northwest Demand Response Project Meeting
February 14, 2013



Portland General Electric

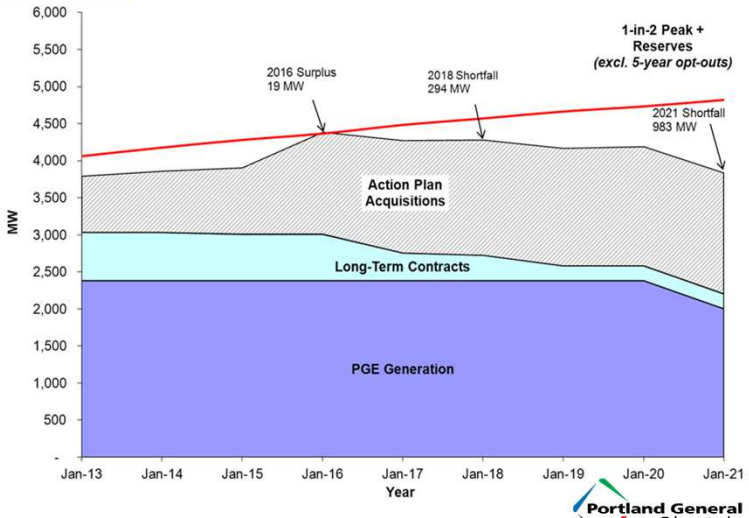
PGE Load – Resource Balance: Energy



Portland General Electric

2

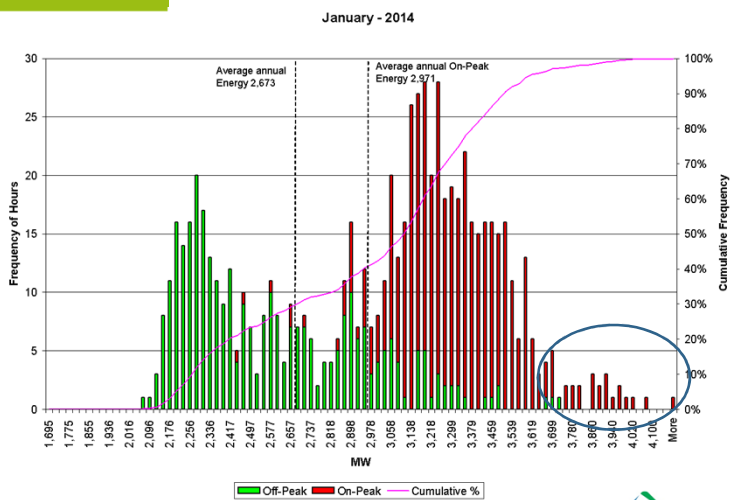
PGE Load – Resource Balance: Winter Capacity



Portland General Electric

3

Traditional Role for Demand Response – to maintain reliability in the highest 40 hours of the year



Portland General Electric

4

Why PGE Has Increased Interest in Demand Response

- Historically, due to the large hydro base in comparison to load (where hydro capacity is approximately double the annual average energy), PGE (and the region) was constrained by energy, not capacity.
- PGE has lost in the last decade, and will continue to lose in the next decade, access to a material portion of its legacy hydro resources.
- Meanwhile, PGE (and other IOU's) are rapidly adding significant quantities of variable energy resources (primarily wind) which have relatively low contributions to system capacity, particularly during winter cold events.
- PGE currently has 550 MW of wind resources. This total could reach 800 – 900 MW by 2015.
- In short, PGE is now more constrained by capacity than by energy; flexibility is increasingly valuable.

Portland General Electric

PGE Approach to Acquiring DR

- PGE first updates a DR market potential study to understand what the technical potential is within our specific service territory given our customers and their end use patterns.
- This study is used to help inform a DR RFP.
- An RFP is issued requesting DR products and pricing.
- Upon review of vendor proposals and delivery capabilities and costs, we perform economic analysis using the cost of an alternative comparable resource.
- For ADR proposals, the capital and fixed O&M costs of a new SCCT (an LMS 100) are used as the alternative cost benchmark. (Adjustments are made for line losses, environmental attributes, etc.)

Portland General Electric

PGE Approach to Acquiring DR (cont.)

- Other capacity response alternatives are also judged against the same avoided cost standard and against each other: DSG, pumped hydro storage, battery storage, CCCT, etc.
- Value considerations are made for firmness, response time, number of allowed strikes per season, etc.
- To the extent a DR program is found to be economic, it is incorporated in the IRP as an acquisition target.
- Because TOU (and similar) tariffs aren't "firm" demand response, the estimated impact of such behavioral-based demand-shifting tariffs is embedded within the load forecast.

Portland General Electric

2009 IRP: Acknowledged Action Plan

New Energy & Capacity Resource Actions:

- Acquire new demand-side resources by 2016:
  - All ETO-targeted EE (current forecast is 183 MWa)
  - 60 MW of demand response [revised to 45 MW in PGE's 2012 IRP Update, see slide 10]
  - 67 MW of additional dispatchable standby generation
- Acquire new renewables to meet the 2015 Oregon RPS with physical resources
  - Approximately 101 MWa of new renewable resources
- Acquire new baseload energy and peaking capacity
  - 300-500 MW high-efficiency combined cycle gas plant
  - Approximately 200 MW of flexible gas capacity resources
  - Peak season capacity resources of up to 350 MW

Portland General Electric

Demand Response – PGE Current Status

Progress in procurement since November 2011

- *Schedule 77 Curtailment Tariff* - PGE has 17 MW participating and is on track to achieve the target of 20 MW of curtailable load by 2015.
- *Water Heater Direct Load Control Pilot* - Operational in August 2012 with 20 water heaters (in conjunction with Salem Smart Power Project).
- *Critical Peak Pricing (CPP)* - Pilot launched in November 2011: over 1,000 residential customers signed. PGE called 11 events. Greater attrition than expected: ~370 customers have terminated, but one-third were move-outs. (Attrition has stabilized.) A third-party evaluator will report on this project in the spring of 2013.
- *Energy TrackerSM* - Energy information tool launched in December 2011 providing graphical data to critical peak pricing and time of use of customers help them better manage their usage.

Portland General Electric

Demand Response – PGE Current Status (continued)

Automated Demand Response (ADR) Pilot Program

- Original pilot project expected to start with 5 MW and, if successful, increase up to 50 MW.
- PGE's ADR contractor was unable to meet the terms of its agreement, therefore the contract was terminated.
- A new RFP was issued in October 2012 with target implementation Q3 2013.
- A new study of Demand Response potential was completed in December 2012 - PGE is still assessing study results.

Portland General Electric

DR Implementation Considerations

- PGE is winter peaking. Most material DR programs have leveraged summer end uses (e.g., A/C, irrigation).
- PGE cost spreads between peak, super-peak, and off-peak are typically modest.
- Currently, market prices are well below the fully allocated cost of a new resource.
- Market transformation (Smart Appliances) and standardization of communications and control equipment will likely be required to make residential DR more economically attractive in the Northwest.

Portland General Electric