



**Comments of Portland General Electric  
USDOE Quadrennial Energy Review  
October 10, 2014**

Portland General Electric appreciates the opportunity to comment as part of the USDOE Quadrennial Energy Review. PGE's president and CEO, Jim Piro, offered oral comments during the QER public meeting in Portland, Oregon on July 11, 2014. Our written comments are intended to incorporate Mr. Piro's oral comments by reference. In addition, PGE supports comments submitted as part of this review by the Edison Electric Institute, of which PGE is a member.

## **Background**

PGE is a fully integrated electric utility that serves almost half of all Oregon homes and businesses – more than 842,000 residential, commercial and industrial customers in the Portland metro region and the northern Willamette Valley. Our voluntary green power program is first in the nation both for number of customers enrolled and the amount of renewable energy sold, and we regularly rank among the top investor owned utilities for customer satisfaction and capturing energy efficiency.

Through a variety of initiatives, PGE and its customers are pursuing a resource strategy that will decrease the company's total carbon emissions associated with meeting customer demand for power. We forecast that in 2025 PGE will decrease annual emissions 17 percent below 2005 levels and avoid 5.5 million tons of CO<sub>2</sub> annually, despite continued growth in our region and service territory.

Today, PGE has more than 2,870 megawatts of generating capacity from hydroelectric, natural gas, wind, solar and coal-fired electric generating facilities in Oregon and Montana. We currently also have a new wind farm under construction in southeastern Washington, as well as two new natural gas-fired facilities – a baseload generating plant and a flexible/peaking resource intended in part to help integrate variable renewable resources.

The company's Boardman Generating Station near Boardman, Oregon is slated to cease coal-fired operation at the end of 2020, at least 20 years earlier than previously planned, under a precedent-setting agreement reached with stakeholders as well as state and federal regulators in 2010. The Boardman Plant is the only coal-fired generating facility in Oregon. PGE is actively engaged in a research project to evaluate the potential for Boardman's boiler to be fired with renewable biomass fuel after 2020.

## **Overview**

Like the Edison Electric Institute, we want to emphasize several key themes:

- The nation's electric power grid will continue to provide the platform for a comprehensive energy strategy to assure reliable, cost-effective electric service

- Reliability is the electric power industry's mission number one; securing and protecting our nation's electric grid is critical to that mission
- Reliability and resilience requires investment in transmission and distribution systems and proper integration of the power supply portfolio into the grid

PGE is actively engaged in efforts to reduce the environmental footprint of the power generation, transmission and distribution system, including carbon emissions. As part of those efforts we continue to diversify our generating portfolio and explore new technologies, including smart grid initiatives, renewable power development, and customer-side resources. At the same time, we realize that new technologies may hold significant promise as we address grid resilience and reliability issues, but only in conjunction with significant continued investments in the basic infrastructure underlying the power system.

In addition, it's important to emphasize that none of the work we're doing is sustainable unless we also keep the price of electricity affordable for our customers. Our economy and our society require reliable, affordable electric power. Our current system serves this need exceptionally well. As the system evolves we must evaluate every change, every policy and every innovation to assure they will help us continue to meet that need.

### **Smart grid initiatives**

PGE is continuing its tradition of technological innovation as we enter the smart grid era by testing and deploying new technologies, potential resources, and grid management tools while improving our existing resources. A few of these efforts include:

*Smart meter deployment* – We've successfully transitioned our system with installation of 850,000 meters as a foundation for future smart grid functionality. We have an ongoing program to enhance our IT and other systems to more fully develop and share with customers the potential benefits of this system.

*Salem Smart Power Center* – Within the USDOE's Pacific NW Smart Grid Demonstration Project we are testing a five megawatt, two megawatt-hour battery/inverter system, demand response, locational marginal pricing, and a high reliability zone. We're also applying and integrating our experience with PGE's dispatchable standby generation program, under which PGE manages 100 MW (and growing) of customer-owned standby generation capacity in return for access to generators that can help with system reserves and peak demand needs.

*Water heater load control* – This is part of the Salem Smart Power Center project, but it's also the most substantial untapped demand response option for the Northwest, with about 18 gigawatt-hours of potential storage in the region (3.4 million electric water heaters times 5.3 kWh per tank = 18 GWh; 120 GWh nationally) that could be an important resource for load control, storage, and balancing renewables.

We're working with EPRI, vendors and other utilities to explore this potential, but need federal support for 1) a funding opportunity toward a substantial demonstration project with a consortium of utilities, water heater manufacturers and communication providers,

followed by 2) mandatory adoption of a standardized communication interface on all water heaters.

We believe this may be the single most cost effective action USDOE could take in the near term to achieve, at scale, energy savings, peak demand reduction, energy storage, and carbon reduction.

*EV infrastructure* – PGE has been an industry leader in helping develop the infrastructure to support electric vehicles, working with vehicle manufacturers and communities to create a network of charging stations throughout our service area. We're also actively engaged with EEI's EV initiative.

We see potential in EVs for load control and storage, which could include second-life use of EV batteries for other home or office storage applications, but basic research and demonstration projects must still be conducted to address safety and reliability questions, scope and size potential, and integration into programs such as critical peak pricing.

The bottom line, however, is that before EVs can become a significant resource we will need to build the infrastructure with a sustainable business model and foster the market – a process that will necessarily take many years if not decades. Without enough people driving EVs none of the other potential can be realized.

Our smart grid efforts are an important priority and we're gathering valuable experience and data that will position us for future progress as we build our toolbox for service to customers – but we're still in the early stages with each of these initiatives. It will be a long haul to get these research and development initiatives and technologies to the point where they have broad, real-time applications. They may become important components of the system down the road, but they will take a while to mature and deploy and they are not necessarily cost effective or functionally competitive with other tools we have available in the near term.

The Salem Smart Power Center, for instance, is a great project and we have demonstrated important capabilities, potential and strengths there, but we have also demonstrated that it is still very expensive and has less ability to sustain most targeted functions than our flexible peaking facility under construction at Port Westward.

Our customers value innovation, but they also demand affordability and reliability. Utilities like PGE are working to accomplish transformation in the ways we generate and distribute power and respond to our customers' needs – but we know we have to do this while keeping the lights on and keeping the bills we send out every month manageable.

If we do not meet those core responsibilities then our customers – and our regulators – are not going to be satisfied and will not support the work and the investments needed to take full advantage of the opportunities new technologies can offer.

## **Grid security**

Like most utilities, PGE is actively engaged in protecting against cyber and physical threats, with numerous initiatives and collaborative efforts underway. Naturally, it would be inappropriate to offer detail regarding specific efforts in public testimony.

Generally, we believe the safety, security and reliability of the grid are best addressed through coordinated industry actions, industry-government partnerships, and recognition of federal and state authorities.

We are concerned that new regulation or mandates might not provide enough flexibility for the industry to achieve the desired security outcomes, and could be counterproductive. In this context we believe USDOE could have a role in helping to set appropriate standards for cyber and physical grid security and providing guidance to state commissions on cost recovery mechanisms to support needed investments.

## **Climate change**

PGE is actively engaged on many fronts, working to support our customers' efforts to use energy more efficiently, integrating more non-emitting renewable power into our system, and reducing our reliance on coal while expanding our natural gas-fired generating capacity. We're making important progress reducing actual carbon emissions and also carbon intensity.

The company has submitted initial comments to the U.S. Environmental Protection Agency as part of that organization's proposed 111(d) rulemaking under the federal Clean Air Act, regarding carbon emissions from existing power plants, and plans to offer more detailed recommendations before the close of the comment period in December.

We believe climate change must be addressed consistently and on an economy-wide basis at the federal level in order to achieve meaningful progress in reducing emissions of carbon dioxide and other greenhouse gases. The electricity sector and power generation are part of that effort and have made important gains, but efforts in our industry must be coordinated with broader efforts to achieve the desired results while maintaining a reliable, affordable supply of electric power for our customers.

## **Regulation and incentives**

In all of these areas utilities like PGE need a reliable regulatory framework that recognizes the risks industry needs to take as we integrate new technologies and transform our generating portfolios.

Preservation of policies that encourage investment, mitigate risk, and provide regulatory certainty is critical to the continued evolution and security of the grid while also helping attract capital.

This is true at the state level, as we work with utility commissions to recover investments made to continue providing reliable, affordable power to our customers while meeting all applicable regulatory requirements.

It's also true at the federal level, where regulatory, research and development and policy initiatives need to be coordinated carefully. They need to promote and support utility investments to maintain reliability and affordability while at the same time encouraging innovation, flexibility, and prudent risk-taking where recovery of investments must be achieved over decades.

## Research and development priorities

We have referenced specific areas above, such as water heater storage, where we believe USDOE can leverage support for industry research and development efforts to promote progress in commercialization and broad utilization of new technologies by electric utilities nationwide.

It is important to remember that PGE and most other utilities plan extensively, over the long term, to meet their customers' current and future energy needs. We use an integrated resource planning process based on projection of future needs, evaluation of commercially available technologies to meet those needs, and modeling of resource portfolios to provide the best available balance of cost and risk in meeting those needs over time.

In order to take advantage of new technologies as part of this planning process, we need more tools in our toolbox. This includes better data and analytics to support planning and implementation of energy efficiency, peak demand and demand-response programs.

USDOE can help by supporting utility efforts to develop and implement pilot projects where new technologies, programs and processes can be tested and proven in the real world – along the lines of what PGE is doing with our Salem Smart Power Center. This helps us learn how these technologies work and will affect and benefit our customers. It is also an effective way to engage stakeholder groups and build a business case for broader implementation by demonstrating operational and cost effectiveness.

USDOE can also help by setting uniform standards for adoption of new technologies (e.g. communication protocols enabling use of water heaters as distributed storage).

Some additional examples of priorities USDOE should consider as it evaluates research and development opportunities include:

**Generation technologies:** A smarter grid will still need power generation. As we see greater emphasis on efforts to restrict the growth of traditional thermal resources powered by coal and natural gas, we need greater research into reliable alternatives. These could include baseload renewables such as next-generation hydroelectric and biomass as well as other generating options and technologies like small modular nuclear, wave/hydrokinetic, and solar updraft towers. Carbon sequestration should also remain a priority.

With respect to bioenergy USDOE needs to broaden its focus from liquid fuels to include a greater share of research dollars in support of biomass as a renewable, baseload and potentially carbon-neutral generating technology. PGE's current research to determine if it could be cost effective and beneficial to customers to fuel the existing Boardman Generating Station on torrefied biomass once coal-fired operations cease at the end of 2020 is an example of this kind of project. Additional research and support should go to solid biomass fuels and fuel-enhancement processes such as torrefaction, because breakthroughs in biomass research could play a significant role in expanding options for renewable power in the national generating portfolio.

**Technology and data support for Energy Imbalance Markets.** EIM exploration and development is underway in the northwest and elsewhere around the country. It is

important for the utilities engaged to have the flexibility to approach EIM development in ways that meet differing regional needs, so care should be taken to avoid any overly prescriptive federal rules governing these efforts. At the same time, greater federal support is needed for the research, analysis, and technological developments necessary to evaluate and implement EIM proposals on a regional basis and share lessons learned between regions.

**Demand-response to provide real-time load shifting for renewables integration.**

There are many areas of potential development in demand-response, including thermal storage in HVAC systems.

**More research and development to reduce cost of EV batteries.** We also need to ensure common standards for battery-to-grid communication, and explore the potential for EVs to function as grid assets as their market penetration expands.

**Research into co-located renewables, microgrids, district energy and EVs.** The utility industry needs a pilot project at scale to gather and analyze data with a local electric utility and municipality.

**Large scale analytics for intelligent transmission and distribution devices and grid integration for small energy storage systems.** The smart grid can only be smart if we have the data and analytics to make wise technological choices and then take full advantage of those technologies in real world applications.

**SEGIS – Solar Energy Grid Integration Systems.** Smart inverters can turn solar into a grid asset instead of a liability. PGE has supported and participated in USDOE-funded research, and believes more research and development is necessary.

**Conservation voltage reduction.** PGE conducted a study with simulated results in 2012 followed by a pilot project at two substations in 2013. Our results for customer savings or peak shaving were promising, but more research on a broader scale is needed.

## **Conclusion**

PGE would like to emphasize again that we see great potential in the evolution of our power generation, transmission and distribution system as part of a smarter grid. We're active participants in efforts to foster and expand the scope of that evolution. We understand, however, that this process must be managed in a way that preserves reliability and affordability for our customers and retains the benefits of the existing system through continued investment and maintenance.

We encourage USDOE to remain actively engaged in support for research and development, with an emphasis on the use of appropriately-scaled pilot projects to test, prove, and lay the groundwork for expansion of new technologies where they can be applied in a cost efficient manner.

In addition, we emphasize the importance of coordination among federal agencies on energy issues, working with industry and key stakeholders, to establish and continue policies that encourage investment, mitigate risk, and provide regulatory certainty.