

PGE and the environment



2010



Every day, Portland General Electric employees work to supply Oregonians with reliable, affordable electricity while reducing environmental impacts. It's our mandate, our responsibility and our goal.

This report highlights a number of environmental achievements we accomplished this past year: PGE is No. 1 in green power — we have more renewable power customers than any other utility in the nation according to the Department of Energy's annual rankings. We've teamed up with many organizations on a number of green initiatives, including our sustainability alliance with Portland State University, partnership with Nissan and ECOTality for our EV Project, (which will bring thousands of electric vehicle charging stations to Oregon), and a regional smart grid demonstration project in Salem.

We've also made fish migration from the upper Deschutes River basin possible for the first time in 40 years with our ground-breaking Selective Water Withdrawal Project at Pelton Round Butte. And the final phase of the 450 megawatt Biglow Canyon Wind Farm was just completed, with 217 turbines now generating electricity for Oregon homes and businesses.

The biggest step we took in planning for Oregon's energy future was to create a strategy — our Integrated Resource Plan. Filed with the Oregon Public Utility Commission (OPUC) in November 2009 and amended in April, the plan contains our recommendations for the best mix of resources to generate the electricity our customers need. It integrates input from stakeholders while balancing environmental impact, cost and reliability.

Aggressive energy-efficiency measures and new renewable resources play big roles in the plan, accompanying new baseload resources and transmission capabilities as we face the challenge of meeting our regions' growing energy needs. We are also continuing to advocate for the Boardman Plant's 2020 Plan, which would eliminate the use of coal at that facility 20 years ahead of schedule while installing new equipment to reduce emissions over the next decade.

Ultimately, the OPUC process seeks to develop a "least-cost" and "least-risk" plan. I believe our plan achieves the right balance between economic impacts and environmental benefits and demonstrates our commitment to making the right thing happen. It reflects Oregonians' values and finds the sweet spot that embraces both the need for affordable, reliable power and environmental protection.

Jim Piro
Portland General Electric
President and CEO



Improved fish passage on the Deschutes

This year, PGE took environmental stewardship to a new level with completion of our new Selective Water Withdrawal Project. This trailblazing engineering project allows migrating fish to pass our hydro facilities on the Deschutes River, making it possible to restore historic salmon and steelhead runs. The Edison Electrical Institute recognized the achievement by honoring PGE with the 2010 Edison Award — the industry's highest

honor — for "distinguished leadership, innovation and contribution to the advancement of the electric industry for the benefit of all."

Just as exciting as the award was the sight of a four-inch Chinook salmon smolt dubbed "Speedy." In December 2009, Speedy was the first fish to travel through the system as he migrated from the upper Metolius River, down

the Deschutes and out to the Pacific Ocean.

This journey is once again possible thanks to this innovative fish collection facility and 273-foot tall underwater tower, located within the forebay of Round Butte Dam in Lake Billy Chinook, where Speedy was tagged before continuing on his way.

continued on page 2

Plan targets **sustainable, affordable resources**

During the next 20 years, the demand for electricity is expected to continue rising at a faster rate in our area than the nation as a whole. Existing resources are not enough to meet that demand. Our Integrated Resource Plan, filed with the Oregon Public Utility Commission in 2009 and amended in April 2010, outlines an energy supply strategy for the next 20 years to fill that resource gap while sustainably meeting the electricity needs of 1.5 million Oregonians.

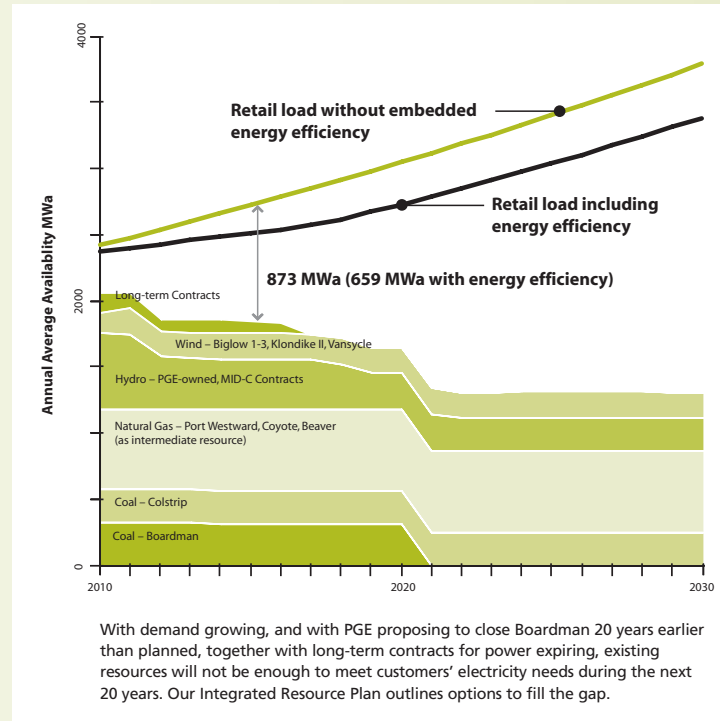
The plan allows us to provide affordable electricity to our customers in a way that minimizes our impact on the environment, maintains the reliability of our system, and reduces our dependence on wholesale energy purchases. PGE's plan lays a solid foundation for Oregon's energy future, reflecting our customers' priorities while making the most of existing resources.

The proposal outlines expectations for our generation resource needs and energy portfolio performance, including a four-year strategy for acquisition of new resources.

The plan recommends these components be in place and operating by 2015:

- **Energy-efficiency measures** (214 MWa) developed in collaboration with Energy Trust of Oregon, which would meet almost half of our future load growth
- **Demand-side programs** (112 MW) to reduce peak loads
- **New renewable resources** (122 MWa) to meet Oregon's renewable energy standard requirements of 25 percent by 2025
- **New, efficient natural gas-fired generation** with state-of-the-art turbines and emissions controls
 - 300 to 500 MW base load
 - 100 to 200 MW flexible peak load
- **Short-term and mid-term market purchases**
- Early closure of our **Boardman** coal plant in 2020, with major emissions reductions in the meantime (*see page 7*)
- Proposed **new Cascade Crossing 500 kV transmission resource** to help meet growing energy needs, enable development of more renewable power projects east of the Cascade Mountains, and enhance reliability of the electrical grid

Learn more at PortlandGeneral.com/IRP.



safe passage: *continued from page 1*

Helping the journey

The project was designed to implement engineering solutions that reflect extensive scientific research into fish migration patterns, river currents, and the challenges these fish face in making their downstream journey to the Pacific Ocean. Now, for the first time in more than 40 years, salmon and steelhead are expected to migrate from and back to the Metolius, Crooked and upper Deschutes rivers. Speedy was just the first of many fish — and many generations of fish — to come.

mimic natural conditions. It helps juvenile fish find their way out of the huge reservoir so they can continue their journey downstream.

Certified green energy

The Selective Water Withdrawal Project is part of the Pelton Round Butte federal relicensing process, which allows us to continue to produce low-cost hydroelectric power at the site. This is also a major environmental initiative for PGE. With the new structure and our efforts to restore fish passage, Pelton Round Butte has been certified by the Low Impact Hydropower Institute as a source of green, renewable energy.

Learn more at DeschutesPassage.com.



The Selective Water Withdrawal Project was constructed by PGE and the Confederated Tribes of Warm Springs, co-owners of the Pelton Round Butte Hydro Project, and involved the collaborative support of more than 22 organizations and agencies. Partners included the National Oceanic and Atmospheric Administration, the Oregon Department of Environmental Quality, the Oregon Department of Fish and Wildlife and the U.S. Department of the Interior as well as numerous non-governmental environmental organizations.

Jump starting electric vehicles

Carbon-reducing hybrid and carbon-free all-electric vehicles are proving popular with Oregon drivers. So it's only natural that as Oregon's largest electric utility, PGE is helping pave the way on electric vehicle (EV) adoption.

We have partnered with state and local governments, universities and businesses to expand the electric vehicle infrastructure in Oregon, bring the newest electric vehicles to market here and develop new business opportunities that benefit the environment. Here's some of what we've worked on during the last year:

- **Charging stations:** PGE has already partnered with cities and local businesses to install more than 20 plug-in charging stations in our operating area, with hundreds on the way. Now, PGE, along with Nissan and ECotality, Inc., is a strategic

participant in "The EV Project." This largest-ever rollout of electric vehicle infrastructure in the nation is funded by a U.S. Department of Energy grant. The EV Project will bring thousands of charging stations to homes, businesses and municipalities in five states, including Oregon. Nissan LEAF buyers will participate in the project and provide valuable information to help build EV charging station infrastructure.

- **Vehicle introduction:** PGE and the State of Oregon are working with Nissan, Mitsubishi, Ford and many other vehicle manufacturers planning to introduce new plug-in electric passenger vehicles. Most recently, Portland State University and its Oregon partners, including PGE, have been selected by Toyota as one of six groups nationally to demonstrate and evaluate the next-generation Prius Plug-in Hybrid Vehicle.
- **Planning and education:** As part of our Sustainability Alliance, (see page 4)



PGE and Portland State University are focused on urban mobility and planning for the introduction of electric vehicles. We sponsored the EV Roadmap conferences in 2009 and 2010, and we're working on other events convening industry, government and academic leaders.

Learn more at PortlandGeneral.com/PlugIn.

Biglow Canyon generating more wind power

The final 76 turbines assembled for Phase 3 of our Biglow Canyon Wind Farm have begun generating electricity and supplying power to the Pacific Northwest's electricity grid. The 450-megawatt wind farm near Wasco in Sherman County, is now online.

The \$1 billion Biglow Canyon Wind Farm is PGE's first fully owned wind power facility. Phase 1 of the project began producing power in December 2007 with 76 turbines and Phase 2 in August 2009 with 65 turbines, with a combined generating capacity of 275 megawatts. The addition of the final phase brings the total installed capacity to 450 megawatts.

Given the variability of wind power, the plant is producing an average

of around 150 megawatts — enough to power the homes of about 125,000 average PGE residential customers.

Biglow Canyon is not only PGE's largest renewable energy project, it is also one of the largest wind power facilities in the Pacific Northwest.

In addition to providing carbon-free and emissions-free generation of electric power, the wind farm is creating jobs, providing income for local businesses, generating tax revenues for local government, and providing easement payments to landowners.

Learn more, and see a video showing what it's like inside a wind turbine, at PortlandGeneral.com/Biglow.



Getting the most out of wind power

Wind power is not without its challenges. It is only available when the wind is blowing and is often not available when we need it most — during winter cold snaps, summer heat waves and when the wind is blowing too fast to safely operate our turbines. This is why we need backup resources to fill the gap when needed.

Delivering new, renewable wind power from Eastern Oregon to homes and businesses west of the Cascades is also a challenge. PGE is proposing construction of Cascade Crossing, a new transmission project to help meet Oregon's growing energy needs, enable development of more renewable power projects, and enhance reliability of the region's electrical grid. To minimize the impact of this critical transmission resource, PGE plans to follow existing transmission and energy corridors as much as possible. Learn more about this project at CascadeCrossingProject.com.

PGE and PSU form sustainability alliance



PGE President Jim Piro and PSU President Wim Wiewel in March, 2010.

As the region's major urban utility, we've formed a long-term strategic partnership with Portland State University, the region's major urban university, to promote the economic, environmental and social sustainability of the Portland metro area.

PGE and PSU are working together on research, economic development, community projects and professional training in two areas with a green focus:

- **Urban Mobility** – This will strengthen the Portland metro area's profile as the leading launch market for electric vehicles (EVs). Work includes leading EV planning and education events, studying charging station infrastructure issues, rolling out test vehicle fleets, analyzing consumer response and developing policy.
- **Integration of Energy and Sustainable Design in the Built Environment** – The focus here is on supporting a regionwide vision that propels us to leadership in the sustainably built environment. This includes working on such issues as smart grid technologies, solar panels, eco-roofs and other connections between energy and sustainable design.

In addition, the PGE Foundation is supporting this partnership by committing \$50,000 to PSU over two years to establish the PGE Foundation Renewable Energy Research Laboratory for the development of renewable energy solutions.

"Working together with Portland State, we will train tomorrow's energy leaders and develop smart, sustainable solutions for powering our region," said Jim Piro, president and CEO of PGE.

Learn more at PortlandGeneral.com/PSU.

PGE pitches in to help the environment

PGE is deeply involved in the community, and one area we focus our community investments on is the environment. Through employee and corporate contributions, as well as a robust PGE volunteer program, we support sustainable programs and initiatives that foster a healthy environment. Here are some of the ways we helped in 2009:

- Our employee giving campaign raised a record-breaking \$1.62 million for community causes, including many environmental groups.
- PGE employees and volunteers volunteered 55,000 hours in the community.
- Thousands of new trees were planted, tons of trash and invasive species were

removed and wildlife habitat was restored thanks to our support and hands-on work with Friends of Trees, SOLV, Oregon Wildlife Heritage and other earth-friendly organizations.

- The PGE/SOLV Starlight Parade was again recognized as the "Cleanest Parade in America" because of PGE volunteers who distribute and collect trash bags along the parade route.
- In support of clean air, we again sponsored the Reach the Beach bike ride, a fundraiser for the American Lung Association of Oregon.

Learn more at PortlandGeneral.com/Community.



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Energy-efficiency efforts pay off

In 2009, PGE continued efforts to help our customers use less electricity. As called for in our Integrated Resource Plan, together with Energy Trust of Oregon, we expect to capture 214 MWh through our customers' energy-saving measures by 2015. We believe energy efficiency can go a long way toward helping close the gap between electricity supplies and anticipated demand. Using less power is not only the lowest-cost option, it also helps reduce our region's carbon footprint.

PGE works closely with Energy Trust to promote programs and incentives. In addition, PGE provides a wealth of energy-efficiency information on our website, in our customer newsletters and via our Energy Expert phone representatives and Customer Technical Services group.

We offered special sweepstakes and promotions for residential customers in 2009, highlighting energy-efficient lighting, water heaters, heat pumps and high-performance showerheads.

For business customers, we organized our second Save More, Matter More™ energy pledge campaign.

In addition, our energy-efficiency seminar series for businesses, co-sponsored by Energy Trust, the Northwest Energy Efficiency Alliance and Better Bricks, saw an almost 600 percent jump in attendance in 2009.

Learn more at PortlandGeneral.com/Classes.

A snapshot of PGE environmental performance

PGE's operations are subject to a wide range of environmental protection laws, including those related to air and water quality, climate change, noise, endangered species, and waste disposal. Various state and federal agencies have jurisdiction over environmental matters that include the siting and operation of generation, transmission and substation facilities and the accumulation, cleanup and disposal of toxic and hazardous substances. In addition, some hydroelectric projects and transmission system facilities are located on property under the jurisdiction of federal, tribal and/or state agencies which have authority in environmental protection matters.

As we work within these guidelines and prioritize our customers' need for reliable and reasonably priced electricity, PGE faces challenges in continuing to balance delivery and environmental stewardship. We strive to maintain clean air and water standards; protect fish, birds and other wildlife; and reduce or eliminate hazardous waste from our operations. Every day, we are faced with thousands of compliance standards established by law and our regulatory agencies.

Environmental compliance reviews

To meet these rigorous compliance standards, PGE's Environmental Services department conducts dozens of internal audits throughout the year at multiple sites. Facilities are audited for compliance with federal and state regulatory requirements for air, water, hazardous and solid waste, oil spill prevention and toxic material handling practices.

Hazardous waste reduction

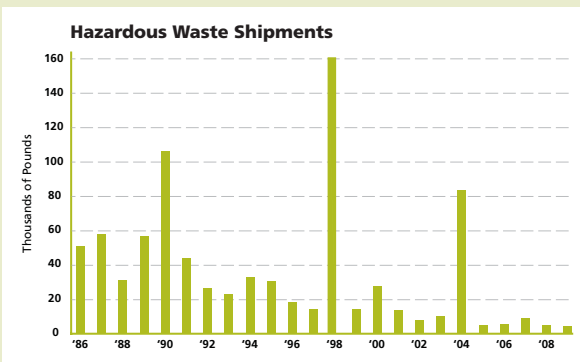
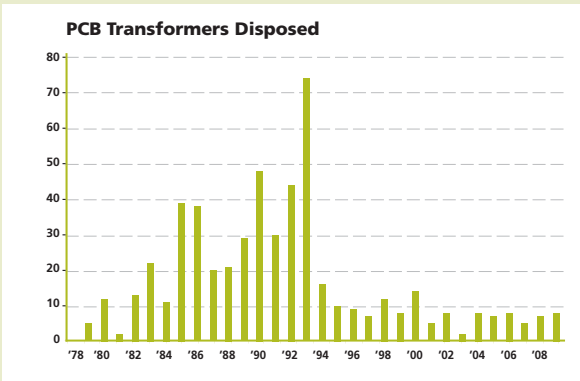
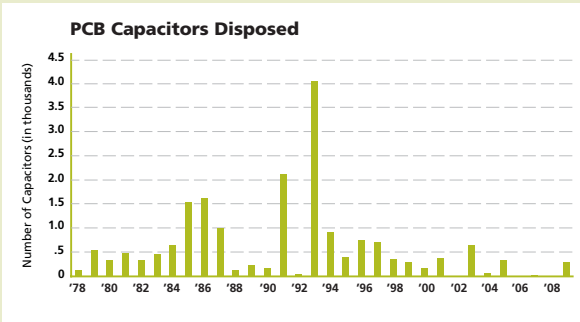
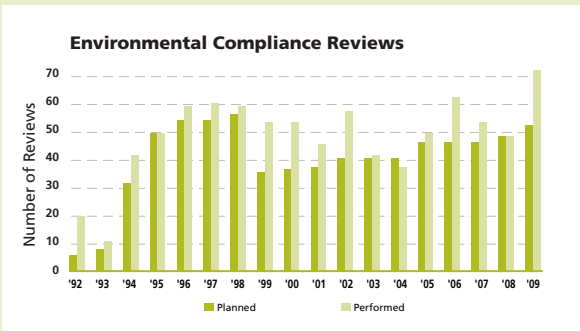
PGE has a comprehensive program to comply with requirements of both federal and state regulations related to hazardous waste storage, handling and disposal. The handling and disposal of hazardous waste from PGE facilities is subject to regulation under the federal Resource Conservation and Recovery Act. In addition, the use, disposal and clean up of polychlorinated biphenyls (PCBs), contained in certain electrical equipment, are regulated by the federal Toxic Substances Control Act.

PCB reduction

PCBs are chemicals once favored for their insulating qualities in electrical equipment but are no longer viable. For more than a decade, PGE has consistently worked to remove PCBs from our operating area. As transformers and capacitors fail or are routinely replaced, PCBs are removed properly and replaced with PCB-free mineral oil.

Hazardous waste shipments

While special projects, including building upgrades and building/dam decommissioning often create large amounts of hazardous waste for disposal, PGE also tracks routine hazardous waste disposal associated with its normal operations. We continue to find ways to reduce the amount of routine hazardous waste generated.



Carbon footprint

PGE continues to make progress in understanding and managing our own carbon footprint as part of our corporate sustainability effort. Although PGE has been publicly reporting CO₂ emissions from our power operations to EPA's Clean Air Markets Division for some time, new federal and state greenhouse gas (GHG) reporting requirements will take this to a new level for all GHGs. In addition to reporting our emissions from power operations as required by the new regulations, we are looking beyond these requirements to emissions stemming from our fleet and facilities. PGE is considering alternatives for managing our GHG footprint not just for our power operations, but for these other areas as well.



Smart meters bringing **energy savings, carbon reductions**

PGE began installing new smart meters in 2009. The digital meters, which provide two-way communication between a customer's location and PGE, allow us to read the meter remotely over a private, secure wireless network.

In addition to enabling us to improve customer service, reduce costs and eventually speed power restoration, the smart meters benefit the environment in several ways:

- **Reduce carbon emissions:** Fewer meter-reading vehicles will cut 1.2 million miles of driving, save 80,000 gallons of gasoline and reduce CO₂ emissions by 1.5 million pounds every year.
- **Help customers save energy:** Down the road, customers will be able to access detailed information about their power consumption thanks to smart meters. Armed with that

information, PGE can help customers plan energy-saving strategies.

- **Enable smart grid technology:** Smart metering is the foundation for future "smart grid" and "smart home" technology that will help PGE optimize services and help customers better conserve energy.

Smart meter installation is on schedule to be completed later in 2010. Learn more at PortlandGeneral.com/SmartMeter.

PGE selected for **smart grid demo**

For a greener world, the electrical grid needs to get smarter. And PGE is going to help it get there.

In November 2009, the Department of Energy announced that PGE had been selected as part of a Pacific Northwest team tapped to conduct a regional smart grid demonstration project. The project is designed to expand upon existing electric infrastructure and test new smart grid technology with up to 60,000 customers in five states.

Smart grid technology, with real-time, two-way communication capabilities, can help the environment by encouraging energy efficiency and making it easier to incorporate new renewable resources and tap distributed generation resources.

Using smart grid technologies, the study will test new combinations of devices, software and advanced analytical tools that enhance the power grid's reliability and performance.

For our part of the study, PGE will develop a demonstration project in Salem serving residential and business customers to document how smart grid technologies can help maintain and improve the electrical system's reliability. The project integrates variable renewable power resources with battery storage, peaking distributed generation and customer-sited equipment that can kick in to manage peak-demand periods.

Largest NW **rooftop solar project**

PGE is continuing to steadily grow solar energy resources for our customers. We are partnering with U.S. Bank, ProLogis, Northwest Solar Solutions and several Oregon companies on the largest rooftop solar project in the Pacific Northwest

In July 2010, we completed a new 2.4-megawatt rooftop project. With this new project PGE has more than 13 megawatts of solar capacity installed within our operating area — making PGE one of the Northwest's leading solar utilities.

The rooftop solar project is the second with ProLogis, a distribution facilities company, bringing PGE's total partnership with ProLogis to

3.5 megawatts of solar energy, enough to power approximately 350 households annually. The roughly 900,000-square-foot project will cover the roofs of seven ProLogis distribution warehouses in Portland, Gresham, and Clackamas. The new project will use UNI-SOLAR innovative "thin-film" solar panels that are similar to the ones used on the 1.1 megawatt rooftop project PGE and ProLogis brought online in 2008.

The renewable energy generated from the solar project will be included in the energy resource mix PGE provides to all its customers and further help the utility meet the state's renewable energy standard of providing 25 percent renewable energy by the year 2025.



Other recent solar developments

- The PGE Net Metering program continues to grow, now supporting 10 megawatts of customer-owned solar energy projects.
- In July 2010, PGE launched the "Solar Payment Option" pilot program aimed at encouraging more solar power in the state. The four-year solar incentive program created by Oregon Legislature in 2009 aims to bring 25 megawatts of solar power online in the state — enough to power 2,500 homes — among customers of PGE, Pacific Power and Idaho Power.
- The PGE Economic Development team continues to work closely with state and regional representatives to make Oregon a solar industry hot spot. In recent years, with help from PGE, solar manufacturers Solaicx, SolarWorld AG, and Sanyo have moved or expanded to Oregon.

Changes at Boardman part of resource plan

In April 2010, Portland General Electric asked the Oregon Public Utility Commission (OPUC) to approve a plan to cease using coal as a fuel at the Boardman Power Plant in 2020, 20 years ahead of schedule. The request was made as part of our revised Integrated Resource Plan to meet PGE customers' future energy needs (*see page 2*).

Under the new proposal, we proposed installation of new, state-of-the-art burners in 2011 to reduce emissions of nitrogen oxides, operational changes to reduce emissions of sulfur dioxide, and a sorbent injection system to eliminate most mercury emissions. Total cost was estimated at approximately \$41 million, with aggregate emissions from the plant projected to be less than those allowed under existing rules that would require more extensive controls but enable continued operation of the plant until at least 2040.

In June, however, the Oregon Environmental Quality Commission denied PGE's petition to develop new rules allowing the 2020 plan to be implemented, instead instructing staff at the Department of Environmental Quality to proceed with rulemaking to develop its own early closure options for the Boardman Plant. DEQ then

issued a draft on June 28 with several potential emissions control scenarios for the plant.

Best balance of cost and risk

"We put forward a plan for Boardman that we believe reached a good balance between cost, risk and environmental benefits," said Jim Piro, PGE president and CEO. "We're disappointed that DEQ didn't allow that plan to proceed. We want to continue working with DEQ to find a better way to transition this resource around the 2020 timeframe."

PGE has proposed a third plan to the Department of Environmental Quality in an ongoing, good-faith attempt to make 2020 closure of the Boardman coal-fired plant possible. Our latest plan would significantly reduce emissions through the use of a NO_x and SO₂ control package consisting of low-NO_x burners, modified over-fire air, selective non-catalytic reduction, and reduced sulfur coal through 2020. The plan also proposes a strategy for achieving additional SO₂ reductions from the use of a dry sorbent injection system.

We continue to believe that the 2020 timeframe provides the best path for customers, the environment and the state. Advantages of 2020 include:

- **Transition time:** The 2020 plan gives PGE enough time to develop reliable replacement power resources, including the potential of converting the Boardman Plant to operate on

biofuel. Earlier closure options would likely mean that natural gas would be the only viable replacement resource. This plan also allows time for employees to migrate to other jobs and for the Boardman and Morrow County community to prepare for the economic transition to new resources.

- **Cost savings:** Options that increase capital investment costs and/or reduce the plant's operating life could increase costs to customers substantially while threatening system reliability and limiting replacement options. PGE's 2020 plan would save customers millions during the next decade compared to earlier shutdown proposals.
- **Greater emissions reductions:** The 2020 timeframe would reduce Boardman's emissions to zero, 20 years ahead of schedule. Combined with significant emissions reductions in the interim period, we believe this strikes the right balance of cost, risk and environmental benefit for our customers.

PGE has completed analysis of additional early closure options this summer and is presenting recommendations to both the Environmental Quality Commission and the Public Utility Commission. Decisions from both regulators are expected by the end of this year.

Learn more at PortlandGeneral.com/Issues.

Recent awards for PGE

Edison Award for fish passage project: The Edison Electric Institute honored PGE with the 2010 Edison Award — the industry's highest honor — in recognition of our Selective Water Withdrawal Project to improve fish passage at the Pelton Round Butte hydroelectric project.

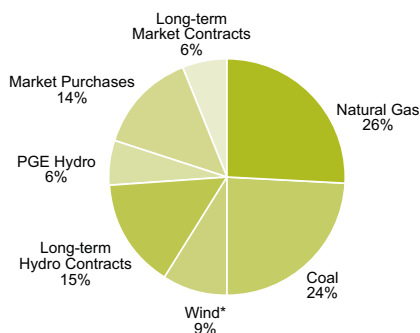
No. 1 in green energy: PGE was recognized by the U.S. Department of Energy's National Renewable Energy Laboratory as the top utility in the country for number of customers participating in renewable energy programs in 2009.

National solar business achievement: The Solar Electric Power Association recognized PGE with a 2009 Solar Business Achievement Award in the category of Partnering for Success. We received the national solar award in partnership with U.S. Bank, the Oregon Department of Transportation and ProLogis for being the first utility in the nation to develop a unique third-party ownership model to help develop large-scale solar projects in our operating area.

Fish support: The Oregon Department of Fish and Wildlife Salmon and Trout Enhancement Program (STEP) Advisory Committee selected PGE in 2009 to receive a STEP Volunteer Recognition for outstanding contribution to natural resource education, the goals of STEP and the fish resources of Oregon.

Energy-efficiency leadership: The nation's leading chain and multi-site businesses named PGE one of the winners of the Edison Electric Institute's 2009 National Key Accounts Customer Service Awards. PGE was recognized for our outstanding work helping customers with energy-efficiency projects and connecting them with Energy Trust programs.

PGE Energy Source Mix



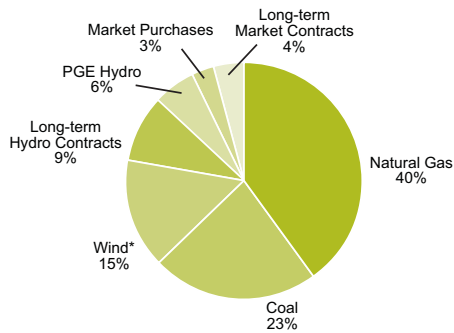
2010

PGE relies on a broad mix of generation resources to provide our customers with reliable, responsibly generated power at a reasonable cost. The 2010 chart shows our current energy sources, while the 2015 chart details what this mix will look like after implementation of our Integrated Resource Plan.

Energy-Efficiency Gains

From 2010 to 2015, customer energy-efficiency measures are expected to reduce PGE's projected power growth by 214 MWa.

* Wind includes 50 MWa of low-impact hydro and 9 MWa of hydro plant upgrades that count as renewables under Oregon's Renewable Energy Standard.



2015

Notable numbers

>20: Electric vehicle charging stations PGE and our customers have installed in the Portland and Salem areas

>73,000: PGE renewable power customers

35: Renewable energy kilowatts generated daily at PGE's biogas plant at the Cal-Gon Dairy Farm

45 percent: Expected growth in electricity demand in PGE operating area during the next 20 years

275 megawatts: Current combined installed capacity at our Biglow Canyon Wind Farm

1.5 million: Anticipated annual CO₂ emission reductions, in pounds, achieved with reduced vehicle usage resulting from smart meter installations

13,500 square feet: Size of floating intake structure, at our new Selective Water Withdrawal Project, designed to assist fish migrating downstream

120,387: Fish that have passed through our new Selective Water Withdrawal Project at Round Butte Dam as of July 31, 2010

554: Number of whole trees and logs placed along the Metolius River to restore favorable habitat for juvenile salmon

