

# Powering Oregon's energy future


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PGE

Portland General Electric

# Powering Oregon's energy future

- PGE serves 818,000 customers
- 52 cities over 4,100 square miles
- 43 percent of Oregon's population and 70 percent of the state's economic output
- Electricity touches most every aspect of our personal and professional life – *a "necessity"*
- Electricity demand is expected to grow by 45 percent by 2030

# Environmental & sustainability roles

**Develop and implement a strategy that reflects PGE's commitment to sustainability**

**Ensure that the company is informed, at all levels, about public policy developments that impact environmental management and protection**

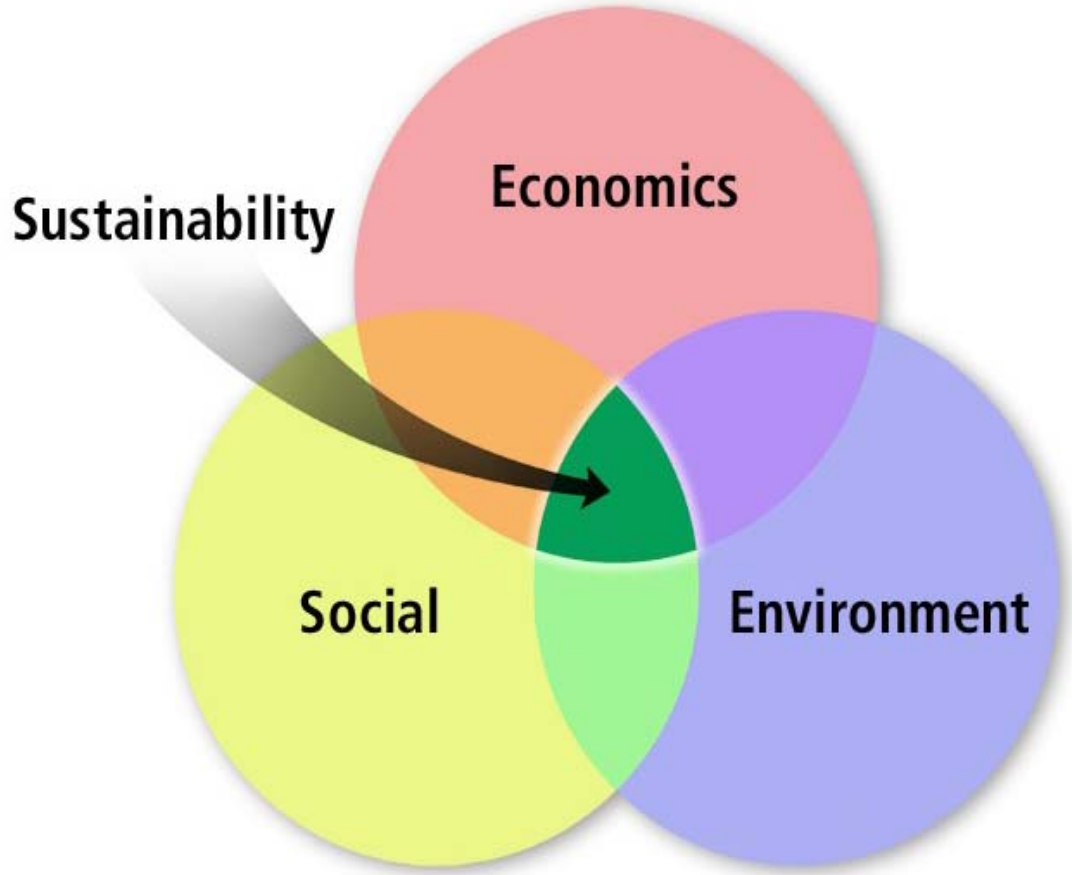
**Develop corporate positions that consider the effects of public policy proposals on our customers, shareholders and other stakeholders**

# PGE's Sustainability Policy

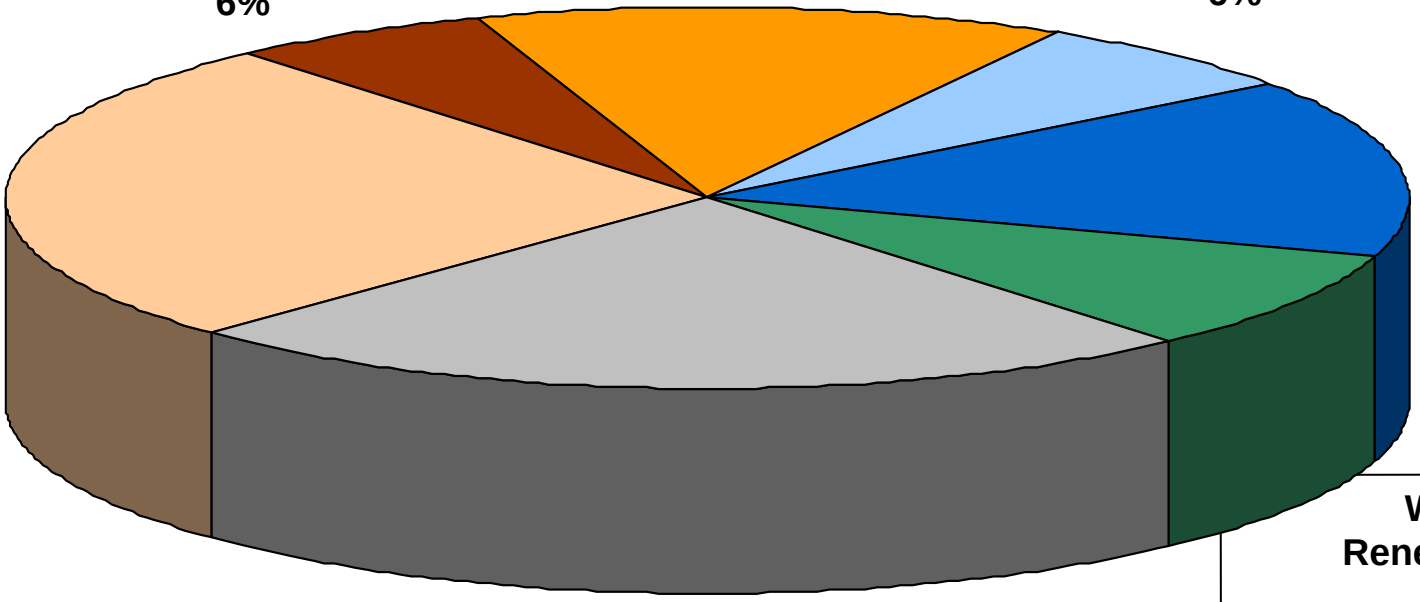
With the adoption of a policy, PGE has officially made a commitment to sustainability

- We view sustainability as a **long-term approach to business planning and decision-making that balances our economic, environmental and social responsibilities.**

# Sustainability Model ("Triple bottom line")



# 2010 PGE energy mix




**Wind/ Renewables 9%**

Includes 50 MWa of low-impact hydro, and 9 MWa of hydro plant upgrades that will count as renewables under Oregon's RES.

# Hydro (21% of mix)

## Sandy River Basin

- **Two dams removed 2007-2008**
- **Sandy and Little Sandy Rivers restored to "natural" free flowing state within months**

## Pelton Round Butte Project (Deschutes)

- **First fish passage since 1968 (2009)**
- **Certified Low Impact Hydro**
- **298 MW (PGE share)**

# Hydro (21% of mix)

## Willamette Falls

**Inflatable berm on top of falls direct fish to “soft landing”**

- **Fish survival through plant > 97%**
- **Certified Low Impact Hydro**
- **16 MW**

## Clackamas River

- **Fish ladder & spillway improvements**
- **Habitat improvement**
- **142 MW**

# Wind (9% of mix)

**PGE-owned Biglow wind farm one of largest  in U.S.**

- 217 wind towers
- Complete in November
- $1 billion investment
- 450 MW (125,000 homes)

**PGE buys 100% Kondike II and Vancycle Ridge output**

- PGE made Vancycle possible 1998

**PGE retail Renewable Power Program**

- #1 in U.S. for sales of residential renewable power for the fourth year in a row

# Solar power

## Solar Generation

- PGE ranks 8th in nation in solar power generation (~10 MW installed)
- ProLogis: 1.1 MW thin-film project
- ODOT Solar Highway: 104 kW system
- Seeking options for additional solar generating resources
- Developing strategies supporting customers who invest in solar

## Solar manufacturing

- High potential for economic development
- Recognition as solar “hub”

# Natural gas (26% of mix)

**Port Westward Plant (2008)**
- Most efficient in West
- PGE's 2nd  largest plant
- 425 MW

**Coyote Springs I (1980)**
- Multiple upgrades
- 245 MW

**Beaver Plant (1976)**
- 521 MW

# Coal (26% of mix)

**Boardman (Boardman, Ore.)**

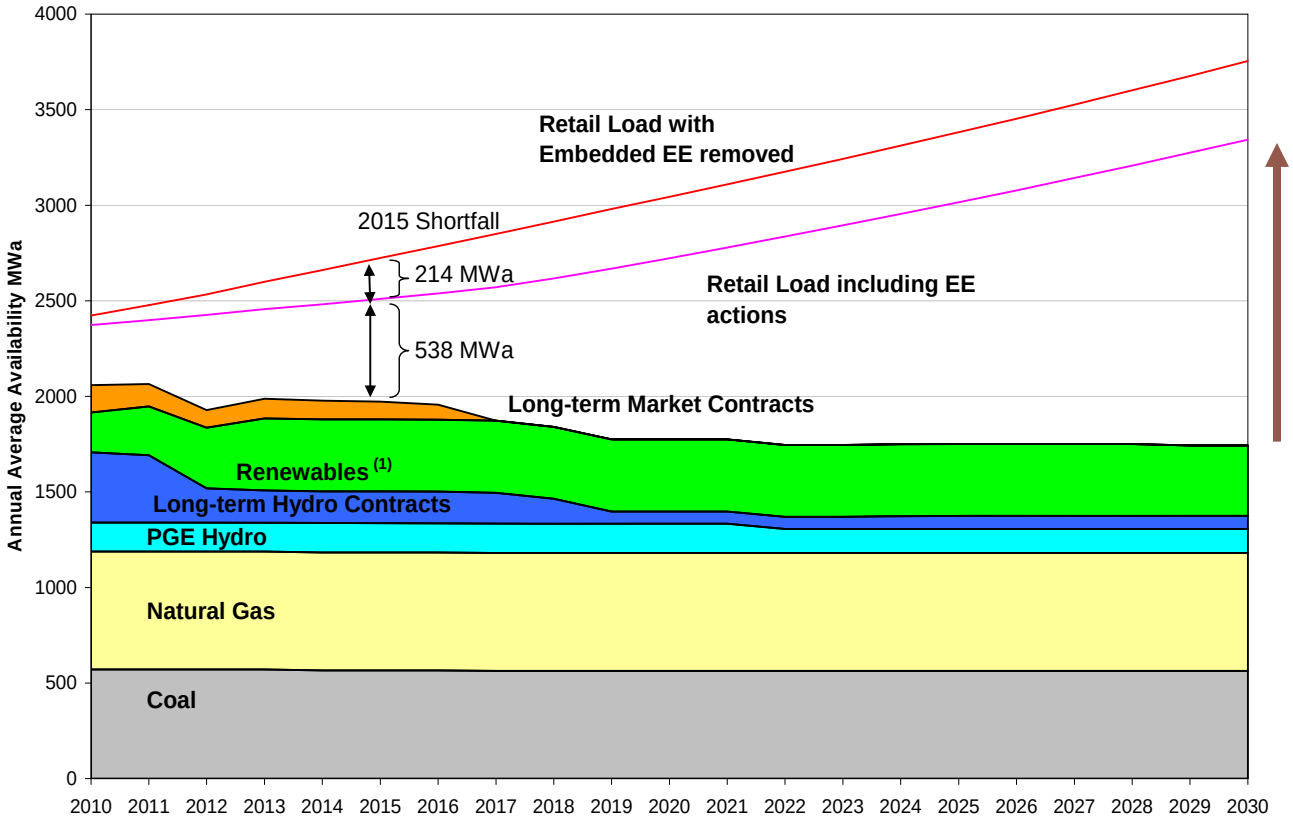
- Started 1980
- 585 MW:  PGE's largest plant.
- Runs 24-7. Low cost.
- PGE's largest single emission source
- Burns low-sulfur coal
- Proposed for closure or conversion: 2020 (more on that later)
- PGE owns 65% – operates entire facility

**Colstrip III & IV (Montana)**

- PGE owns 20% – does not operate plant
- 296 MW (PGE share)

# Long-term load forecast

PGE's long-term retail load is expected to **grow nearly 45% by 2030**, while certain long-term power purchase contracts expire, driving the need for additional generation capacity




**Energy Gap: 1,600 Average Megawatts**

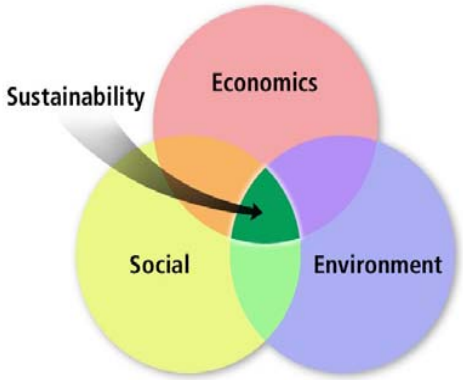
Note: Assumes 1.9% load growth through 2030 and energy supply based on plant capabilities under normal hydro and operating conditions.
(1) Includes 122 MWa needed to meet 2015 Renewable Portfolio Standard

# Integrated Resource Planning

**Builds on a diverse, portfolio to meet Oregon's future energy needs**

- Public process to examine best options to meet customer resource needs over 20 years
- Least expected cost and lowest risk (including environment)
- Extensive research
- **OPUC must acknowledge plan**

# IRP Power supply priorities

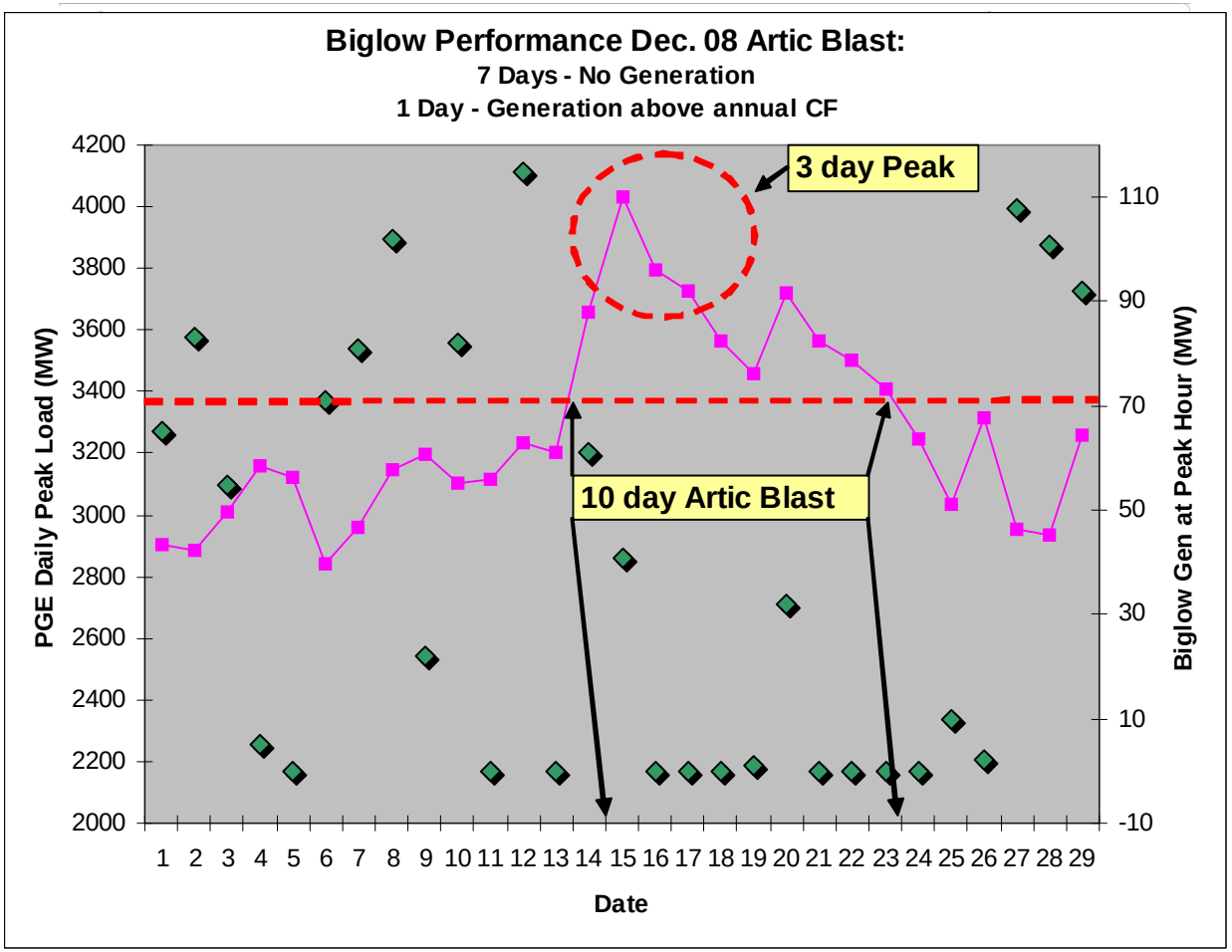



- **Reliablity** *(Social, Economic)*
- **Cost** *(Economic, Social – including employment)*
- **Fuel Supply** *(Economic)*
- **Fuel Diversity** *(Economic, Environmental)*
- **Environmental Regulations** *(Social, Environmental)*
- **Transmission availability** *(Economic, Social Environmental)*
- **Safety** *(Social, Economic)*

# Resource planning challenges

1) Wind Power:

- Intermittent
- New environmental concerns
- Availability



# Resource Planning Challenges

1) Wind Power:
   - Intermittent
   - New environmental concerns
   - Availability
2) Carbon regulation
   - Congress
   - EPA
   - Regional
   - Neighboring states
   - Oregon
   - Locally

## CO2/year produced

***in million metric tons (MMT)***

| | |
|---|---|
| **United States:** | **6,000 MMT** |
| **Transportation** | **1,900 MMT** |
| **Electricity Gen** | **2,400 MMT** |
| **Oregon** | **43.5 MMT** |
| **Boardman** | **4.2 MMT** |

# Resource planning challenges

**1) Wind power:**

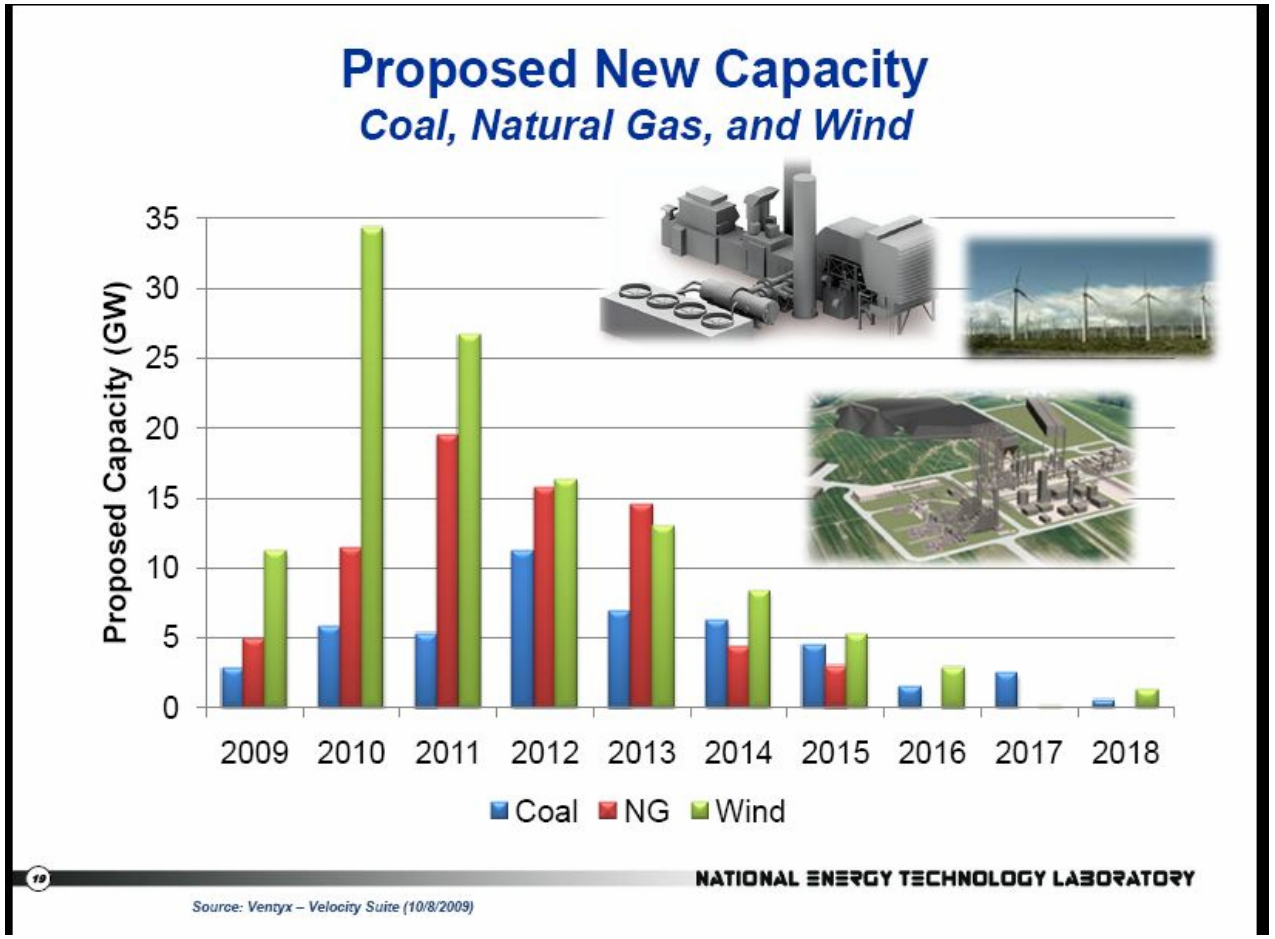
- Intermittent
- New environmental concerns
- Availability

**2) Carbon regulation**

- Congress
- EPA
- Regional
- Neighboring states
- Oregon
- Locally

**3) Bridging fuel needed (Natural Gas)**

- Carty 300-500 MW
- Port Westward II
- 100-200 MW



# Resource planning challenges - Boardman

- **Haze**
  - Best Available Retrofit Technology standard not met. Plant reduces visibility in national parks, wilderness, etc.
  - 80% reduction in haze causing emissions needed (Sulfur dioxide – SO2, Nitrogen oxides, NOx)
- **Mercury (Hg)**
  - PGE voluntarily agreed to highest standards in nation – 90% reduction
- **Carbon (GHG)**
  - CO2: Largest point source in Oregon (though still behind transportation sector)
  - Carbon emission controls not available
  - Cap & trade or tax coming – big cost

# Revised IRP envisions alternative plan for Boardman

**Revised IRP seeks to cease operations at Boardman in 2020 or discontinue the use of coal as a fuel source**

**Signifcant benefits to customers:**

- Ends *all* emissions from the plant 20 years earlier than planned
- Smooth transition to an alternate resource ensures reliability isn't harmed
- Reduced cost for customers (spread over time)
- 10-year time frame allows opportunity for technological advances that might make an alternative fuel source at Boardman viable
- Ensures time to build new plants, opening up replacement jobs for dedicated PGE employees (although natural gas plants require smaller operating staffs)
- Retains new controls to cut NOx emissions and reduce the plant's emissions of airborne mercury by an estimated 90 percent

# Revised IRP envisions alternative plan for Boardman

**Challenges ahead**

Requires stakeholder support, regulatory approvals and possibly changes to regulation/legislation to make it possible

Benefits to customers so strong, PGE felt like we had an obligation to pursue

Absent agreement, PGE will continue with original plan to operate through 2040 with additional emission controls

# Other key IRP elements: Energy efficiency

**Meets nearly half of load growth thru 2020**

- 238 million kwh per year saved
- ~22,000 homes could be supplied

**High environmental and economical benefits**

**Includes all energy efficiency measures identified as achievable by the Energy Trust of Oregon**

**Exceeds what has been identified by the NWPPC as cost effective for the region**

# Other key IRP elements: Renewables

**New renewable resources to meet Oregon's renewable energy standard requirements on or ahead of schedule.**

**Meets state renewable power goals on or ahead of schedule**

- 25% Renewable by 2025
- Already ahead of schedule for first goal – 5% by 2011

# Other key IRP element: Demand resources

Short- and mid-term **market purchases**.

**New transmission capacity** to help meet growing energy needs, enable development of more renewable power projects, and enhance reliability of the electrical grid.

# Economic stimulus: Plug-in electric vehicles

- Transportation #1 GHG source in state
- Electric motors 90% efficient
- Oregon ideal proving ground:
  - #1 in per capita hybrid sales
  - Portland is Greenest City in U.S.
- PGE leadership role:
  - Network of charging stations
  - Partnerships with auto manufacturers:

# Summary

**We hope you'll conclude we're balancing the triple bottom line:**

- Economic:  Cost to our customers and overall economy
- Environmental: SOx, NOx, Hg and GHGs (carbon)
- Social: Our employees, the presence of this operation in E. Oregon, "necessity of life": safe, reliable power