Washington accounts for half of regional sales and the largest proportion of COU providers.
The Northwest electric power system

[Map of the Northwest electric power system]
Complementary Northwest and Southwest loads drove construction of the interties.
Northwest generating resource mix

Capability 33,400 aMW >

< Capacity 55800 MW
The nuclear resource (Columbia Generating Station) and a small amount of wind and biomass is marketed by Bonneville as part of Federal Base System.
The hydropower system – upstream storage; downstream generation

Projects 100 MW or larger
Storage projects regulate river flows to align generation with load
Annual hydro output can range from 11,000 to 20,000 average megawatts
Most coal for Northwest plants originates from Montana and Wyoming.
Natural gas is sourced from western Canada and the Rockies
Wind power resources and projects

- Operating
- Under construction
- Expected to be constructed in near-term
- 100 MW (area proportional to installed capacity)
Wind integration process

Raw wind plant output >

Output following within-hour regulation (<10 min) & load-following (10 – 60 min) >

Output following hour-to-hour storage and shaping >
Operation of dispatchable plants is a function of variable cost

Plants with largest variable costs (oranges) are first to be curtailed
Actual generation is function of hydropower conditions and economics

Energy (aMW)

- Natural gas
- Coal
- Nuclear
- Biomass
- Petroleum
- Other
- Hydro
- Wind

Year: 1996 to 2005

August 2007
Conflict between economics of plant dispatch and sources of CO2

- New gas
- Existing gas
- New Coal
- Existing coal
- Other

Est. 1990 level
Roles of the major resources

**Conservation** – Load reduction

**Wind** – Intermittent non-dispatchable energy supply

**Nuclear** – Baseload capacity and energy supply

**Coal** – Baseload capacity and energy supply

**Natural Gas Combined-cycle** – Intermediate capacity and energy supply, supplemental peaking capacity, load following

**Natural Gas Simple-cycle and Recips** – Peaking capacity

**Hydro** – Capacity and energy supply, frequency regulation & wind integration, load following and storage
Current development cycle is dominated by natural gas and wind power

Average water and maximum thermal plant availability.
Northwest conservation achievements
1978 – 2005

![Graph showing conservation achievements from 1978 to 2005]

- BPA and Utility Programs
- Alliance Programs
- State Codes
- Federal Standards
Looking to the future, the Council’s recommended resource additions
For more information:

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