

# APPENDIX P: GLOSSARY

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## COMMON ACRONYMS

<b>Acronym</b>	<b>Meaning</b>
aMW	Average megawatt
ARM	Adequacy Reserve Margin
ASCC	Associated System Capacity Contribution
Btu	British thermal unit
CHP	Combined heat and power
CCCT	Combined cycle combustion turbine
DHP	Ductless heat pumps
DOE	Department of Energy
DSI	Direct Service Industry
EPA	Environmental Protection Agency
ETO	Energy Trust of Oregon
FERC	Federal Energy Regulatory Commission
GWh	Gigawatt-hour
HRSG	Heat recovery steam generator
IECC	International Energy Conservation Code
IOU	Investor-owned utility
IPP	Independent power producer
ITC	Investment tax credit
kWh	Kilowatt-hour



LCOE	Levelized cost of energy
LED lighting	Light-emitting diode - solid state lighting
MCS	Model Conservation Standards
MWh	Megawatt-hour
NEEA	Northwest Energy Efficiency Alliance
NEI	Non-energy impacts
NERC	North American Electric Reliability Corporation
NPV	Net present value
NREL	National Renewable Energy Lab
NTTG	Northern Tier Transmission Group
O&M	Operation and Maintenance
PTC	Production Tax Credit
PUD	Public Utility District
PURPA	Public Utility Regulatory Policies Act of 1978
PV	Photovoltaics
REC	Renewable energy credit
RPM	Regional Portfolio Model
RPS	Renewable portfolio standards
RTF	Regional Technical Forum
SHGC	Solar heat gain coefficient
SMR	Small modular reactor
TEPPC	Transmission Expansion Planning Policy Committee
TRC	Total resource cost
VRF	Variable refrigerant flow
WECC	Western Electricity Coordinating Council
WEPT	Web-enabled programmable thermostats



## Glossary of Terms

### adequacy

To be considered adequate under the NERC definition, “the electric system [must be able to] supply the aggregate electrical demand and energy requirements of the customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements.”

### adequacy reserve margins

A multiplier to peak or average load in the Regional Portfolio Model that reflects if more or less resources are required, in comparison to load resource balance, to meet the Council’s adequacy standard.

### administrative costs

Certain overhead costs related to conservation or generating resources, such as project management and accounting costs incurred by utility or contractor staff.

### alternating current (AC)

An electric current in which the electrons flow in alternate directions. In North American electrical grids, this reversal of flow is governed at 60 cycles per second (Hertz). With some exceptions (see “direct current”), commercial electric generation, transmission and distribution systems operate on alternating current.

### anadromous fish

Fish that hatch in freshwater, migrate to the ocean, mature there, and return to freshwater to spawn. For example, salmon or steelhead trout.

### associated system capacity contribution

The percent of a new resource’s capacity that contributes toward meeting the Council’s adequacy standard.

### available technology

In the Power Plan, the term “available technology” refers to equipment or facilities for generating and conservation resources, including electrical appliances, that currently are available and are expected to be generally available in the marketplace during the 20-year planning period.

### average cost pricing

A concept used in pricing electricity. The average cost price is derived by dividing the total cost of production by the total number of units sold in the same period to obtain an average unit cost. This unit cost is then directly applied as a price.



## average megawatt (aMW) or average annual megawatt

Equivalent to the energy produced by the continuous operation of one megawatt of capacity over a period of one year. (Equivalent to 8.76 gigawatt-hours, 8,760 megawatt-hours, or 8,760,000 kilowatt-hours.)

## avoided cost

An investment guideline, describing the value of conservation and generation resource investments in terms of the cost of more expensive resources that would otherwise have to be acquired.

## balancing reserve

Balancing reserves are provided by resources with sufficiently fast ramp rates to meet the second-to-second and minute-to-minute variations between load and generation left over after providing regulation and scheduled operations.

## baseline efficiency

The energy use of the baseline equipment, process, or practice that is being replaced by a more efficient approach to providing the same energy service. It is used to determine the energy savings obtained by the more efficient approach.

## base-loaded resources

Base-loaded electricity generating resources are those that generally are operated continually except for maintenance and unscheduled outages. For example, hydroelectric, natural gas combined cycle combustion turbines, and coal plants.

## billing credit

Under the Northwest Power Act, a payment by Bonneville to a customer (in cash or offsets against billings) for actions taken by that customer to reduce Bonneville's obligations to acquire new resources.

## Bonneville Power Administration (Bonneville)

A federal agency that markets the power produced by Federal Base System resources and resources acquired under the provisions of the Northwest Power Act of 1980. Bonneville sells power to public and private utilities, direct-service industrial customers and various public agencies. The Northwest Power Act charges Bonneville with other duties, including pursuing conservation, acquiring sufficient resources to meet its contract obligations, funding certain fish and wildlife recovery efforts, and implementing the Council's Power Plan and Fish and Wildlife Program.

## Btu (British thermal unit)

The amount of heat energy necessary to raise the temperature of one pound of water one degree Fahrenheit (3,413 Btus are equal to one kilowatt-hour).



## busbar

The physical electrical connection between the generator and transmission system. Typically load on the system is measured at busbar.

## callback

A power sale contract provision that gives the seller the right to stop delivery of power to the buyer when it is needed to meet other specified obligations of the seller.

## capacity

The maximum power that a machine or system can produce or carry under specified conditions. The capacity of generating equipment is generally expressed in kilowatts or megawatts. In terms of transmission lines, capacity refers to the maximum load a line is capable of carrying under specified conditions.

## capacity factor

An estimate of the ratio of the actual annual output to the potential annual output of a generating plant if operating at full capacity.

## climate zone

As part of its model conservation standards, the Council has established climate zones for the region based on the number of heating degree days, as follows: Zone 1: 4,000 to 6,000 heating degree days (the mild maritime climate west of the Cascades and other temperate areas); Zone 2: 6,000 to 7,500 heating degree days (the somewhat harsher eastern parts of the region); and Zone 3: more than 7,500 heating degree days (western Montana and higher elevations throughout the region).

## coal gasification

The process of converting coal to a synthetic gaseous fuel.

## cogeneration

The sequential production of electricity and useful thermal energy. This is frequently accomplished by the recovery of excess heat from an electric generating plant for use in industrial processes, space or water heating applications. Conversely, cogeneration can be accomplished by using excess heat from industrial processes to power an electricity generator.

## combined-cycle combustion turbine

The combination of a gas turbine and a steam turbine in an electric generation plant. The waste heat from the gas turbine provides the heat energy for the steam turbine.



## conductor

Wire or cable for transferring electric power.

## conservation

According to the Northwest Power Act, any reduction in electric power consumption as a result of increases in the efficiency of energy use, production or distribution.

## conservation program

An activity, strategy, or course of action undertaken by an implementer or program administrator. Each program is defined by a unique combination of the program strategy, market segment, marketing approach, and energy-efficiency measure(s) included.

## construction lead time

The length of time between a decision to construct a resource and when the resource is expected to deliver power to the grid. Generally defined for purposes of this plan as the interval between detailed engineering and equipment order to completion of start-up testing.

## cost-effective

According to the Northwest Power Act, a cost-effective measure or resource must be forecast to be reliable and available within the time it is needed, and to meet or reduce electrical power demand of consumers at an estimated incremental system cost no greater than that of the least-costly, similarly reliable and available alternative or combination of alternatives.

## cost of debt

The amount paid to the holders of debt (bonds and other securities) for use of their money. Generally expressed as an annual percentage in the Power Plan.

## cost of equity

Earnings expected by a shareholder on an investment in a company. Generally expressed as an annual percentage in this plan.

## critical period

The sequence of historical low-water conditions during which the regional hydropower system's lowest amount of energy can be generated (see "critical water") while drafting storage reservoirs from full to empty to meet the Northwest's loads. Under the Pacific Northwest Coordination Agreement, critical period is based on the lowest multi-month streamflow observed since 1928. The current critical period begins in October of 1936 and ends in September of 1937. A repeat of this historical water condition would generate about 11,600 average megawatts of hydroelectric energy.



### **current practice baseline**

The baseline is defined by the typical choices of eligible end users in purchasing new equipment and services.

### **curtailment**

An externally imposed reduction of energy consumption due to a shortage of resources.

### **debt**

Investment funds raised through the sale of securities having fixed rates of interest.

### **debt/equity ratio**

The ratio of debt financing to equity financing used for capital investment.

### **demand forecast**

An estimate of the level of energy that is likely to be needed at some time in the future. The Council's demand forecast contains a range of estimated consumption based on various assumptions about demographics and the state of the economy.

### **demand response**

A voluntary and temporary change in consumers' use of electricity when the power system is stressed.

### **direct application renewable resource**

Technologies that use renewable energy sources to perform a task without converting the energy into electricity. These sources and their functions may include wood for space heat, solar for space heat and drying, geothermal space and water heating, and wind machines used for mechanical drive (such as pumping).

### **direct current (DC)**

An electrical current in which the electrons flow continuously in one direction. Direct current is used in specialized applications in commercial electric generation and in transmission and distribution systems.

### **direct-service industry (DSI)**

An industrial customer that buys power directly from the Bonneville Power Administration. Most direct-service industries are aluminum smelting plants.

### **discount rate**

The rate used in a formula to convert future costs or benefits to their present value.



## dispatch

Operating control of an integrated electrical system involving operations such as control of the operation of high-voltage lines, substations or other equipment.

## distribution

The transfer of electricity from the transmission network to the consumer. Distribution systems generally include the equipment to transfer power from the substation to the customer's meter.

## drawdown

Release of water from a reservoir for purposes of power generation, flood control, irrigation, or other water-management activity.

## economic feasibility

The Northwest Power Act requires all conservation measures to be “economically feasible” for consumers. The Act does not define this concept. In this plan, the Council considers a program or measure to be economically feasible if the measure or program results in the minimum life-cycle costs to the consumer, taking into account financial assistance, such as loans, grants, or other incentives, made available pursuant to other provisions of the Act.

## end-use

A term referring to the final use of energy; it often refers to the specific energy services (for example, space heating), or the type of energy-consuming equipment (for example, motors).

## energy

Energy is defined as a quantity of work, commonly measured in units of kilowatt-hours or megawatt-hours. In the Northwest, energy is also measured in units of average megawatts, where one average megawatt is equal to 8,760 megawatt-hours.

## energy efficiency

See *conservation*

## energy-efficiency measure

Refers to either an individual project conducted or technology implemented to reduce the consumption of energy at the same or an improved level of service. Often referred to as simply a “measure”.

## energy services

The actual service energy is used to provide (for example, space heat, refrigeration, transportation).





## equity

Investment funds raised through the sale of shares of company ownership.

## equivalent availability

The ratio of the maximum amount of energy a generating unit can produce in a fixed period of time, after adjustment for expected maintenance and forced outage, to the maximum energy it could produce if it ran continuously over the fixed time period. This represents an upper limit for a long-run (annual or longer) capacity factor for a generating unit. For example, a unit with an equivalent availability of 70 percent and a capacity of 500 megawatts could be relied on to produce 350 average megawatts of energy over the long term, if required.

## externality

Any costs or benefits of goods or services that are not accounted for in the price of the goods or services. Specifically, the term given to the effects of pollution and other environmental effects from power plants or conservation measures.

## Federal Base System

The system includes the Federal Columbia River Power System hydroelectric projects, resources acquired by the Bonneville Power Administration under long-term contracts prior to the Northwest Power Act, and resources acquired to replace reductions in the capability of existing resources subsequent to the Act.

## Federal Energy Regulatory Commission (FERC)

A federal agency that regulates interstate aspects of electric power and natural gas industries. It has jurisdiction over licensing of hydropower projects and setting rates for electricity sold between states. FERC formerly was the Federal Power Commission.

## firm capacity

That portion of a customer's capacity requirements for which service is assured by the utility provider.

## firm energy

That portion of a customer's energy load for which service is assured by the utility provider. That portion for which service is not assured is referred to as "interruptible."

## firm energy load carrying capability (FELCC)

The amount of firm energy that can be produced from a hydropower system based on the system's lowest recorded sequence of streamflows and the maximum amount of reservoir storage currently available to the system.



## firm surplus

Firm energy in excess of the firm load.

## first year cost of saved energy

The initial cost of implementing an energy-efficiency measure divided by the annual savings

## fixed O&M cost

An estimate of the fixed operation and maintenance cost for the reference plant, including operating and maintenance, labor and materials, and administrative overhead. Both routine maintenance, and major maintenance and capital replacement are assumed to be included.

## flexibility

Flexibility often refers to the ability of a power system to provide balancing reserves.

## forecast of demand or load

Estimating future demand for electricity (measured at the customer meter site) or load (measured at busbar at the interconnection point of generation and transmission). The difference between demand and load forecasts are mainly transmission and distribution losses.

## fuel cycle

The series of steps required to produce electricity from power plants. The fuel cycle includes mining or otherwise acquiring the raw fuel source, processing and cleaning the fuel, transporting, generating, waste management, and plant decommissioning.

## futures

Circumstances over which the decision maker *has no control* that will affect the outcome of decisions. For example, futures consists of unique combinations of natural gas and electricity prices, population and economic growth, none of which are within the control of resource planners.

## gas turbine

A turbine engine generator, often fired by natural gas or fuel oil, used to generate electricity. The turbine generator is turned by combustion gases rather than heat-created steam.

## generation

The act or process of producing electricity from other forms of energy.



## geothermal energy

Thermal energy stored in the Earth's crust. Geothermal heat is caused by the convection and conduction of heat from the Earth's mantle and core, and from the decay of radioactive elements in the crust.

## head

The vertical height of water in a reservoir above the turbine.

## heat rate

The amount of input (fuel) energy required by a power plant to produce one kilowatt-hour of electrical output. Expressed as Btu/kWh.

## heating degree days

A measure of the amount of heat needed in a building over a fixed period of time, usually a year. Heating degree days per day are calculated by subtracting from a fixed temperature the average temperature over the day. Historically, the fixed temperature has been set at 65 degrees Fahrenheit, the outdoor temperature below which heat was typically needed. As an example, a day with an average temperature of 45 degrees Fahrenheit would have 20 heating degree days, assuming a base of 65 degrees Fahrenheit.

## higher heating value (HHV) / lower heating value (LHV)

Gas turbine heat rates and efficiency ratings may be based on the HHV or LHV value of natural gas fuels. The HHV value of natural gas fuel may be thought of as the Btu content which was paid for, and includes content that is not convertible into power. Depending on the hydrogen content of the fuel, a rule of thumb is that 11 % of natural gas HHV Btu-content is not useful for power generation. The LHV is the HHV minus the heat of vaporization of the water vapor combustion product.

## hydroelectric power (hydropower)

The generation of electricity using falling water to turn turbo-electric generators.

## incremental annual savings

The difference between the amount of energy savings acquired or planned to be acquired as a result of energy efficiency activities in one year, and the amount of energy savings acquired or planned to be acquired as a result of the energy efficiency activities in the prior year.

## incremental cost

The difference between the cost of baseline equipment or service and the cost of alternative energy-efficient equipment or service.



## **independent power producer (IPP)**

An independent power producer is a power-production facility that is not part of a regulated utility. Power-production facilities that qualify under PURPA (see “qualifying facility”) are considered independent power producers, together with other independent power production facilities such as independently owned coal-fired and wind generating plants.

## **infiltration control**

Conservation measures, such as caulking and weatherstripping, generally referred to as air sealing measures, which reduce the amount of cold air entering or warm air escaping from a building.

## **insolation**

The rate of energy from the sun falling on the earth’s surface, typically measured in watts per square meter.

## **integrated resource planning**

See “least-cost planning.”

## **interruptible power**

Power that, by contract, can be interrupted in the event of a power deficiency.

## **intertie**

A transmission line or system of lines permitting a flow of electricity between major power systems.

## **investor-owned utility (IOU)**

A utility that is organized under state law as a corporation to provide electric power service and earn a profit for its stockholders.

## **kilowatt (kW)**

The electrical unit of power that equals 1,000 watts.

## **kilowatt-hour (kWh)**

A basic unit of electrical energy that equals one kilowatt of power applied for one hour.

## **lead time**

The length of time it takes to move a resource from concept to completion.



## least-cost planning

Least-cost planning or, as it is often called, “integrated resource planning,” is a name given to the Power Planning strategy and philosophy adopted by the Council. This strategy recognizes load uncertainty, embodies an emphasis on risk management, and reviews all available and reliable resources to meet current and future loads. The term “least-cost” refers to all costs, including capital, labor, fuel, maintenance, decommissioning, known environmental impacts, and difficult-to-quantify ramifications of selecting one resource over another.

## levelized cost of energy (LCOE)

The present value of a resource’s cost (including capital, financing, and operating costs) converted into a stream of equal annual payments. This stream of payments can be converted to a unit cost of energy by dividing them by the number of kilowatt-hours produced or saved by the resource in associated years. By levelizing costs, resources with different lifetimes and generating capabilities can be compared.

## life-cycle costs

Estimate of all direct costs of a measure or resource over its effective life. See *system cost*.

## load

The amount of electric power required at a given point on a system. Load is typically measured at the busbar.

## load forecast

An estimate of the level of energy that must be generated to meet a need. This differs from a demand forecast in that transmission and distribution losses from the generator to the customer are included.

## load path

One future scenario for electric load growth, as opposed to a range that accommodates multiple forecasts of future load growth.

## lost-opportunity resources

Resources that, because of physical or institutional characteristics, can only be captured during a limited window of opportunity and are no longer available for development after that window at that given cost. For example, when a building is built or when a replacement refrigerator is purchased.

## major resource

According to the Northwest Power Act, a resource with a planned capability greater than 50 average megawatts and, if acquired by Bonneville, acquired for more than five years.



## manufactured home

A structure, such as a mobile home, that is transportable in one or more sections, and that is built on a permanent chassis and designed to be used as a dwelling, with or without a permanent foundation, when connected to the required utilities. These homes must comply with the Manufactured Home Construction and Safety Standards issued by the U.S. Department of Housing and Urban Development. This does not include other categories of homes whose components are manufactured, such as modular, sectional, panelized and pre-cut homes. These homes must comply with state and local building codes.

## marginal cost

The cost of producing the last unit of energy (the long-run incremental cost of production). In the plan, “regional marginal cost” means the long-run cost of additional consumption to the region due to additional resources being required. It does not include consideration of such additional costs to any specific utility due to its purchases from Bonneville at average cost.

## maximum achievable potential

The amount of energy or demand savings within a defined geographical area or population that can be achieved over the planning period assuming no financial barriers for the end-use customer.

## measure

See energy-efficiency measure.

## megawatt (MW)

The electrical unit of power that equals one million watts or one thousand kilowatts.

## megawatt-hour (MWh)

A basic unit of electrical energy that equals one megawatt of power applied for one hour.

## MicroFin

A financial revenue requirements model that calculates the levelized fixed cost and the full levelized cost of energy (LCOE) for each resource reference plant. MicroFin calculates the annual cash flows which will satisfy revenue requirements over the plant lifetime. The annual cash flows are compressed and discounted into a dollar value – net present value (NPV).

## Mid-C price/market price

The price of electricity traded on the wholesale spot market at the Mid-Columbia trading hub.

## mill

A tenth of a cent. The cost of electricity is often given in mills per kilowatt-hour.



## model conservation standards (MCS)

Any energy-efficiency program or standard adopted by the Council, including, but not limited to: 1) new and existing structures; 2) utility, customer, and governmental programs; and 3) other consumer actions for achieving conservation. The most well-known are the energy-efficient building standards developed by the Council for new electrically heated buildings.

## Monte Carlo simulation

The mathematical simulation of uncertain events having known probability characteristics by random sampling from a known probability distribution function.

## natural replacement

Equipment or systems that are replaced at the end of their life are considered a natural replacement opportunities. At this time, there is an opportunity to replace the equipment or system with a more efficient alternative, and are considered lost opportunities resources.

## net billed plants

Refers to the 30-percent share of the Trojan Nuclear Plant, all of Washington Public Power Supply System's nuclear project 1 (WNP-1) and WNP-2, and 70 percent of WNP-3.

## net billing

A financial arrangement that allowed Bonneville to underwrite the costs of electric generating projects. Utilities that owned shares in thermal projects, and paid a share of their costs, assigned to Bonneville all or part of the generating capability of these resources. Bonneville, in turn, credited and continues to credit the wholesale power bills of these utilities to cover the costs of their shares in the thermal resources. Bonneville then sells the output of the thermal plants, averaging the higher costs of the thermal power with lower-cost hydropower.

## nominal dollars

Dollars that include the effects of inflation. These are dollars that, at the time they are spent, have no adjustments made for the amount of inflation that has affected their value over time.

## non-energy impacts (NEI)

The quantifiable non-energy impacts associated with program implementation or participation; also referred to as *non-energy benefits (NEBs)* or *co-benefits*. Examples of NEIs include water savings, non-energy consumables and other quantifiable effects. The value is most often positive, but may also be negative (e.g., the cost of additional maintenance associated with a sophisticated, energy-efficient control system).



## non-firm energy

Energy produced by the hydropower system that is available with water conditions better than critical and after reservoir refill is assured. It is available in varying amounts depending upon season and weather conditions.

## non-utility generator

A generic term for non-utility Power Plan owners and operators. Non-utility generators include qualifying facilities, small power producers, and independent power producers.

## Northwest Power Act

Passed by Congress on December 5, 1980, the Pacific Northwest Electric Power Planning and Conservation Act authorized the four states of Idaho, Montana, Oregon and Washington to form the Northwest Power and Conservation Council. The Act directs the Council to assure the Pacific Northwest region an adequate, efficient, economical and reliable power supply while also protecting, mitigating and enhancing fish and wildlife affected by the construction and operation of hydroelectric dams in the Columbia River Basin. The Act requires the Council develop a 20-year Pacific Northwest conservation and electric power plan which the Council reviews at least every five years. The Act also requires the Council develop a fish and wildlife program to protect, mitigate and enhance fish and wildlife affected by the region's hydrosystem and to include that program in the Council's subsequently developed power plan.

## option

As used in the Power Plan, a project that has been sited, licensed and designed, but not yet constructed. Options are held in inventory until new resources are clearly needed.

## overnight capital cost

Total of all direct and indirect project construction costs, including engineering, overhead costs, fees, and contingency. Exclusive of costs attributable to interest and escalation incurred during construction.

## Pacific Northwest (the region)

According to the Northwest Power Act, the area consisting of Oregon, Washington, Idaho, and Montana west of the Continental Divide, and those portions of Nevada, Utah, and Wyoming that are within the Columbia River Basin. It also includes any contiguous areas not more than 75 miles from the above areas that are part of the service area of a rural electric cooperative served by Bonneville on the effective date of the Act and whose distribution system serves both within and outside of the region.





## Pacific Northwest Coordination Agreement

An agreement between federal and nonfederal owners of hydropower generation on the Columbia River system. It governs the seasonal release of stored water to obtain the maximum usable energy subject to other uses.

### peak (on, off, winter, summer)

WECC defines peak-load hours to be the 16 hours beginning at 6am and ending at 10pm. Off-peak hours are the remaining eight hours in the day. For Council analysis, the winter period is roughly defined as the months of October through March. The summer period runs from April through September. However, the most important months with respect to resource planning are December, January and February. Similarly, the most critical summer months for resource planning are July and August.

### peak capacity

The maximum capacity of a system to meet loads.

### peak demand

The highest demand for power during a stated period of time.

### penetration rate

One annual share of a potential market for conservation that is realized, as in “7 percent of the region’s homes have been weatherized this year.” Thus, a 7-percent penetration rate.

### photovoltaic (PV)

Direct conversion of sunlight to electric energy through the effects of solar radiation on semiconductor materials.

### potential assessments

Studies conducted to assess market baselines, future savings and costs that may be expected for different technologies and customer markets over a specified time horizon.

### power

Power is the rate of performing work, usually measured in units of kilowatts or megawatts.

### preference

Priority access to federal power by public bodies and cooperatives.



## present value

The worth of future returns or costs in terms of their current value. To obtain a present value, an interest rate is used to discount these future returns and costs.

## ProCost

A Council model used to estimate conservation costs and benefits; the hourly, daily, and seasonal savings; and capacity impact of efficiency measures.

## program administration cost

The cost incurred by the program administrator (often the utility) to deliver a conservation program. These costs include personnel, marketing, tracking systems, and any other *non-incentive* costs.

## public utility commissions (PUC)

State agencies that regulate, among others, investor-owned utilities operating in the state with a protected monopoly to supply power in assigned service territories.

## Public Utility Regulatory Policies Act of 1978 (PURPA)

Federal legislation that requires utilities to purchase electricity from qualified independent power producers at a price that reflects what the utilities would have to pay for the construction of new generating resources (see “avoided cost”). The Act was designed to encourage the development of small-scale cogeneration and renewable resources.

## qualifying facility (QF)

Qualifying facility is a power production facility that qualifies for special treatment under a 1978 federal law—Public Utility Regulatory Policies Act (PURPA). PURPA requires a utility to buy the power produced by the qualifying facility at a price equal to that which the utility would otherwise pay if it were to build its own Power Plant or buy the power from another source. A qualifying facility must generate its power using cogeneration, biomass, waste, geothermal energy, or renewable resources such as solar and wind, and, depending on the energy source and the time at which the facility is constructed, its size may be limited to 80 megawatts or smaller. PURPA prohibits utilities from owning majority interest in qualifying facilities.

## quantifiable environmental costs and benefits

Environmental costs and benefits capable of being expressed in numeric terms (for example, in dollars, deaths, reductions in crop yields).

## quartile

The direct-service industries load is divided into four quartiles. The top quartile is the portion of that load most susceptible to interruption.



## R-value

A measure of a material's resistance to heat flow. The higher the R-value, the higher the insulating value.

## ramp rate (energy efficiency)

The annual rate of acquisition for energy-efficiency resources over a period of time.

## real dollars

Dollars that do not include the effects of inflation. They represent constant purchasing power.

## reference plant

A collection of characteristics that describe a resource technology and its theoretical application in the region.

## region

See "Pacific Northwest."

## regional act credit

Used in the act to give economic preference to conservation resources. When estimating incremental cost of an energy-efficiency measure, this cost is reduced by 10% of the value of the energy system benefits.

## Regional Portfolio Model (RPM)

An agent based planning model that develops least cost or least risk resource strategies for the regional power system. The model uses embedded Monte Carlo simulations to generate load, peak demand, natural gas price, carbon tax, electricity price, and REC value distributions allow resource strategies to be tested over many potential futures.

## resource strategies

Actions and policies over which the decision maker *has control* that will affect the outcome of decisions. For example, the resource type, amount and potential timing of resource development.

## reliability

Under the NERC definition, a power system is **reliable** if it is adequate and secure.

- **adequate:** the electric system can supply the aggregate electrical demand and energy requirements of the customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements.
- **secure:** the electric system can withstand sudden disturbances, such as electric short circuits or unanticipated loss of system elements.



## renewable energy credit (REC)

Represent the “green” attribute of energy produced by a qualifying renewable resource. One REC is equal to one megawatt hour of generation. Also known as renewable energy certificate, or a tradeable renewable energy credit (TREC).

## renewable resource

Under the Northwest Power Act, a resource that uses solar, wind, water (hydropower), geothermal, biomass, or similar sources of energy, and that either is used for electric power generation or for reducing the electric power requirements of a customer.

## renewable portfolio standards

Regulatory mandates enacted by individual states to increase the development and generation of eligible renewable resources. An RPS requires a certain percentage of electricity sales be met with renewable energy resources. In the Pacific Northwest, Montana, Washington, and Oregon all enacted RPS in the mid-2000’s.

## reserve capacity

Generating capacity available to meet unanticipated demands for power, or to generate power in the event of outages in normal generating capacity. This includes delays in operations of new scheduled generation. Forced outage reserves apply to those reserves intended to replace power lost by accident or breakdown of equipment. Load growth reserves are those reserves intended for use as a cushion to meet unanticipated load growth.

## resource

Under the Northwest Power Act, electric power, including the actual or planned electric capability of generating facilities, or actual or planned load reduction resulting from direct application of a renewable resource by a consumer, or from a conservation measure.

## retrofit

To modify an existing generating plant, structure, or process. The modifications are done to improve energy efficiency, reduce environmental impacts, or to otherwise improve the facility.

## scenario

Combinations of *resource strategies* and *futures* that are used to “stress test” how well what resource strategies (what the region controls) performs in a futures that the region doesn’t.

## sectors

The economy is divided into four sectors for energy planning. These are the residential, commercial (e.g., retail stores, office and institutional buildings), industrial, and agriculture (e.g. dairy farms, irrigation) sectors.



## sensitivity study

A subset of *scenario* where a single input assumption is modified to assess the direction and magnitude of the impact of that parameter on the outcome. For example, fixing the range of natural gas prices to a lower or higher bound.

## simple payback

The time required before savings from a particular investment offset costs, calculated by investment cost divided by value of savings (in dollars). For example, an investment costing \$100 and resulting in a savings of \$25 each year would be said to have a simple payback of four years. Simple paybacks do not account for future cost escalation, nor other investment opportunities.

## siting agencies

State agencies with the authority for issuing permits to locate generating plants of defined types and sizes to utilities at specific locations.

## siting and licensing

The process of preparing a power plant and associated services, such as transmission lines, for construction and operation. Steps include locating a site, developing the design, conducting a feasibility study, preliminary engineering, meeting applicable regulatory requirements, and obtaining the necessary licenses and permits for construction of the facilities.

## space conditioning

Controlling the conditions inside a building in order to maintain human comfort and other desired environmental conditions through heating, cooling, humidification, dehumidification, and air-quality modifications.

## stock

The quantity and characteristics of existing equipment or buildings in the region.

## sunk cost

A cost already incurred and therefore not considered in making a current investment decision.

## supply curve

A traditional economic tool used to depict the amount of a product available across a range of prices.

## surcharge

Under the Northwest Power Act, an additional sum added to the usual wholesale power rate charged to a utility customer of Bonneville to recover costs incurred by Bonneville due to the failure of that customer (or of a state or local government served by that customer) to achieve conservation



savings comparable to those achievable under the Council's model conservation standards. Surcharges can range from 10 to 50 percent of a customer's bill.

## system cost

According to the Northwest Power Act, all direct costs of a measure or resource over its effective life. It includes, if applicable, distribution and transmission costs, waste disposal costs, end-of-cycle costs, fuel costs (including projected increases) and quantifiable environmental measures. The Council is also required to take into account projected resource operations based on appropriate historical experience with similar measures or resources.

## technical potential (energy efficiency)

An estimate of energy savings based on the assumption that all existing equipment or measures will be replaced with the most efficient equipment or measure that is both available and technically feasible over a defined time horizon, without regard to cost or market acceptance.

## thermal resource

A facility that produces electricity by using a heat engine to power an electric generator. The heat may be supplied by burning coal, oil, natural gas, biomass, or other fuel, by nuclear fission, or by solar or geothermal sources.

## tipping fee

The fee assessed for disposal of waste. This fee is used when estimating the cost of producing electricity from municipal solid waste.

## total resource cost (TRC) test

A cost-effectiveness test that assesses the impacts of a portfolio of energy-efficiency initiatives regardless of who pays the costs or who receives the benefits. The test compares the present value of costs of efficiency for all members of society (including all costs to participants and program administrators) compared to the present value of all quantifiable benefits, including avoided energy supply and demand costs and non-energy impacts.

## transformer

A device for transferring energy from one circuit to another in an alternating-current system. Its most frequent use in power systems is for changing voltage levels.

## transmission

The act or process of long-distance transport of electric energy, generally accomplished by elevating the electric current to high voltages. In the Pacific Northwest, Bonneville operates a majority of the high-voltage, long-distance transmission lines.



## turnover rate

The portion of existing units that will be naturally replaced each year due to failure, remodeling, or renovation. It is usually calculated as one divided by the equipment average service life. Under the assumption that if equipment lasts for 10 years, one-tenth of the units in existence will be replaced each year. This factor is not used in the retrofit market, where inefficient equipment is replaced before its natural life is over. Nor is it used for new construction analyses, where all new equipment is eligible for efficiency upgrade at the time of purchase.

## u-value

The measure of a material's ability to conduct heat, numerically equal to 1 divided by the R-value of the material.

## variable energy resource

A generating resource that is non-dispatchable due to the fluctuating nature of its energy production. For example, windpower and solar.

## variable O&M cost

An estimate of the variable operation and maintenance cost for the reference plant, including all costs that are a function of the amount of power produced. This includes consumables such as water, chemicals, lubricants, and catalysts, and waste disposal.

## watt

The electrical unit of power or rate of energy transfer. One horsepower is equivalent to approximately 746 watts.

## COUNCIL ADVISORY COMMITTEES

The Council utilizes advisory committees to assist in the review of technical analysis and strategies. All advisory committees, with the exception of the Regional Technical Forum, are chartered under the Federal Advisory Committee Act (FACA). Advisory committee members are appointed by the Council and make up a diverse group of subject experts. All advisory committee meetings are open to the public.

### **Conservation Resources Advisory Committee (CRAC)**

Reviews policies and programs to assess how much energy efficiency is available and cost-effective.

### **Demand Forecasting Advisory Committee (DFAC)**

Reviews the methods, demand forecasting tools, input assumptions, and forecast results, used in developing the Council's demand forecasts.

### **Generating Resources Advisory Committee (GRAC)**

Assists in the identification and review of generating resource and energy storage technologies, focusing on technical specifications, costs, and environmental effects.

### **Natural Gas Advisory Committee (NGAC)**

Reviews the Council's fuel price forecasting assumptions and models for natural gas, oil, and coal.

### **Regional Technical Forum (RTF)**

The RTF is an advisory committee to the Council established in 1999 to develop standards to verify, evaluate, and report conservation savings.

### **Resource Adequacy Advisory Committee (RAAC)**

Defines and assesses power supply adequacy and related issues.

### **Resource Strategies Advisory Committee (RSAC)**

Reviews the methods, key assumptions, and other major analytical inputs used in developing the resource plan.

### **System Analysis Advisory Committee (SAAC)**

Reviews the Council's computer models and provides advice on their development.

