

Overview

The facility

The Klamath Cogeneration Project, a natural gas-fired power plant, will provide low-cost and environmentally sound energy to the Pacific Northwest and Northern California while supplying economical steam to local industries.

Located in Klamath Falls, Ore., the Project will create jobs in southern Oregon, fuel economic development, and use advanced technology to make the plant one of the cleanest and most energy efficient in the country.

The Klamath Cogeneration Project sets a new standard for environmental mitigation. With support from Oregon's governor, private industry and environmental groups, the legislature passed a law in 1995 granting a one-time exemption from a state standard to a single 500-megawatt electricity plant. Instead of demonstrating need for a new facility, as state law requires, developers would compete for the exemption based on the project's environmental performance.

The Project also was selected because of its energy efficient generation process. Cogeneration uses one fuel source, such as natural gas, to produce two forms of energy, electricity and industrial steam.

The City of Klamath Falls has chosen the most cost-effective and efficient equipment available on the market to build a plant that will produce up to 500 megawatts — enough energy to serve about 400,000 homes. Public and private utilities will purchase the Project's output when the facility becomes operational in 2001.

The Klamath Cogeneration Project won the competition after developing the most innovative and aggressive environmental mitigation program of any proposed project in Oregon and in the nation. The Project will offset its emissions of carbon dioxide (CO₂) by about 30 percent — the lowest ever seen for a fossil-fueled electricity plant.

Project partners

The City of Klamath Falls and PacifiCorp, the third largest private utility in the West, have teamed up to develop the new facility. The City will own the Project, which PacifiCorp Power Marketing Inc., a non-regulated subsidiary of PacifiCorp, will manage and operate.

City of Klamath Falls

The City will finance the Project with the proceeds of up to \$300 million of its revenue bonds. The revenue bonds will pay for the Project's development and construction costs. As the cornerstone of the City's economic development plan,

the Klamath Cogeneration Project will generate revenues that allow the City to fund economic development efforts and improvements in community infrastructure.

PacifiCorp

Headquartered in Portland, Ore., PacifiCorp and its affiliates serve 1.4 million retail customers in the West through its Pacific Power and Utah Power divisions, and 550,000 customers in Australia. Additionally, over the last seven years PacifiCorp has been the largest private wholesaler of electric energy in the western U.S.

PacifiCorp in 1997 established a non-regulated wholesale business called PacifiCorp Power Marketing. While initially focusing on eastern U.S. markets, the business moved into the West in 1998. This expertise in marketing and trading will give the Klamath Cogeneration Project a competitive edge since PacifiCorp Power Marketing will broker for the City that portion of the plant's electrical output that it does not directly buy.

PacifiCorp also has national and international experience in developing and operating power plants. PacifiCorp's non-regulated business will oversee the construction and operation of the Klamath Cogeneration Project.

Plant description

The plant will have an overall fuel efficiency of about 62 percent, nearly twice the efficiency of a coal-fired plant. The facility will use advanced combustion turbine technology in a combined-cycle arrangement to generate electricity. Major plant components include two combustion turbines; two heat recovery boilers; a steam turbine; an evaporative cooling tower; and an electrical switchyard.

Local economic benefits

The Klamath Project will create about 250 jobs during construction and approximately 20 full-time permanent positions. The Project will diversify the local economy and spur further economic development in the region. Located within a mile of local wood products industries, whose steam needs are high, the Project will supply steam to Collins Products and other customers. Using this low-cost steam will improve the long-term competitiveness of these local industries.

Environmental impacts

The Klamath Cogeneration Project will use advanced technology to reduce air emissions and maximize energy efficiency. In addition, industries purchasing steam from the Project can curtail operation of their existing boilers, which

are typically fired by wood, oil or natural gas. This will reduce air emissions from these local industries.

The Project will preserve regional freshwater by using municipal wastewater effluent for the plant's cooling needs. This will reduce effluent discharges into the Klamath River by about 2.3 million gallons per day.

The Project's \$4.2 million CO₂ offset program will include reforestation about 6,250 acres in Oregon and providing households in developing countries with solar lighting panels.

Reliability

By adding this new source of generation, the Project will help stabilize the region's transmission grid, which moves power across the West. Sources of electric generation are limited in southern Oregon, so this new resource will provide additional voltage support to the regional transmission system.

Location

The Klamath Cogeneration Project is strategically located adjacent to PG&E Gas Transmission Northwest's new natural gas pipeline. The plant's output will be delivered to PacifiCorp's existing transmission system via an interconnection with an existing 500kV line.

The Project site, zoned for heavy industrial use, is located on property owned by Collins Products. The City and County have approved the Project's land use. The property does not serve as habitat for any threatened or endangered species, and the Project does not impact scenic vistas of Mt. Shasta.

Project timeline

The City of Klamath Falls received a site certificate to build the Project from Oregon's Energy Facility Siting Council in late 1997. The Site Certificate was amended for the current Project size and a 500 kV interconnect in 1998. The state permitting process included extensive public input and environmental reviews. Construction is scheduled to begin in the spring of 1999, and the plant will go into commercial operation in mid-2001.

Economic & Community Benefits

The Klamath Cogeneration Project will contribute significantly to the region's economy while positioning Oregon as a leader in providing cost-effective, environmentally friendly electricity generation. The Project will:

- **Create jobs for local community**

The Project will employ about 250 people during the plant's construction and will create 20 permanent jobs when the plant becomes operational. Positions will include engineers, plant operators, maintenance managers and technicians. Jobs will be filled from the community where possible. The permanent jobs will be year-round, career positions that pay family wages. The plant's anticipated annual payroll will be more than \$1 million.

- **Increase economic activity**

Many construction supplies and services will be purchased locally. When the plant opens in 2001, local businesses will continue to benefit because the Project will purchase products and services needed for plant operations. In addition, construction workers and permanent plant employees will spend money in the local community for food, housing, recreation and other needs.

- **Use financing provided by investors, not taxpayers**

The Project will be financed with the proceeds of revenue bonds purchased by a variety of large, typically institutional investors. These bonds will cover the plant's development and construction costs.

- **Stimulate economic development and improve local infrastructure**

PacifiCorp Power Marketing will broker that portion of the power from the Project that it does not buy. Using its expertise in the wholesale electricity market, PacifiCorp Power Marketing will facilitate selling the Project's output to qualified purchasers, and the City will use a portion of the Project's net revenues to attract new business and improve community infrastructure such as roads and sewer services.

- **Diversify and stabilize the economy**

The Klamath Falls community can look to other cities to see how cogeneration plants have helped stimulate and stabilize the local economy. PacifiCorp previously worked with a California sugar refinery to build a cogeneration plant in Crockett, Calif. The plant, which has broad community support, helped stabilize the sugar company, which was facing increasing competitive pressures to cut costs. PacifiCorp also is co-owner of a new cogeneration plant in Hermiston, Ore., which has brought jobs and diversity to the local economy. In a similar way, the Klamath Cogeneration Project will stimulate job growth and diversify the local economy, helping to reduce the region's dependence on the agricultural and timber industries.

- **Boost local industries' competitive position**

Each hour, the plant will produce up to 200,000 pounds of low-cost steam for use by Collins Products and other nearby mills. Cutting energy costs will strengthen the position of these industries in the highly competitive marketplace.

- **Serve as a responsible neighbor**

The City of Klamath Falls and PacifiCorp continue to actively seek public input about the Klamath Cogeneration Project. The City has appointed an ad hoc Technical Advisory Committee, made up of local community leaders, to provide input and share recommendations. In addition, citizens can voice concerns at city meetings or with the Project managers.

When the Project becomes operational, plant managers will offer educational tours to students and other members of the community, and will continue to seek ways to be a responsive neighbor.

If you have any questions about the Project, please call:

1. Jim Keller, City Manager, 541-883-5316
2. Peter van Alderwerelt, PacifiCorp Project Manager, 503-797-7596
3. Monte Mendenhall, Pacific Power General Business Manager, 541-883-7890.

Environmental Impacts

From using the most energy-efficient technology available today to improving regional water quality, the Klamath Cogeneration Project will serve as a model of an environmentally responsible facility. PacifiCorp and the City of Klamath Falls have incorporated many environmental components, setting a new standard for power generation in Oregon and the nation.

The Project will meet or exceed all state and federal regulations. State regulatory agencies have conducted extensive environmental reviews before issuing permits. Agencies involved in this process include the Energy Facility Siting Council, the Oregon Department of Energy, the Oregon Department of Water Resources and the Oregon Department of Environmental Quality. All permitting was completed in 1998.

Air quality

Advanced emissions control technologies will reduce the Project's air emissions to levels far lower than conventional power plants. The plant will be designed to control nitrogen oxide (NOx) emissions to extremely low levels using low-NOx combustor technology in the combustion turbines in combination with Selective Catalytic Reduction systems. The plant will use a continuous emissions monitoring system to verify and maintain the desired NOx emissions rate. Because the plant will use natural gas, only small amounts of sulfur dioxide and particulates will be emitted.

In addition, the Project will displace the existing boilers of nearby industries that purchase steam from the plant. These industries will curtail use of their existing, less efficient boilers, which burn a variety of fuels including oil, wood waste and gas.

Carbon dioxide offset program

The Klamath Cogeneration Project sets a new standard for environmental mitigation. With support from Oregon's governor, private industry and environmental groups, the state legislature passed a law in 1995 granting a one-time exemption to build a single 500-

megawatt electricity plant. Award of this exemption was to be based primarily on environmental performance.

Oregon's Energy Facility Siting Council developed a competition to grant the exemption to the project with the strongest environmental mitigation package. This process — the first of its kind in the nation — was recognized by Vice President Al Gore for its collaborative and innovative approach.

The Klamath Cogeneration Project won EFSC's competition after developing the most aggressive environmental mitigation program of any proposed project in the nation. Its environmental benefits include using advanced combustion technology in combination with cogeneration, a very efficient form of power generation. In addition, the Project will implement a \$4.2 million program to offset carbon dioxide emissions. As a result, the Project will offset its CO₂ emissions, about 30 percent — the lowest ever seen for a fossil-fueled electricity plant.

The Klamath Project's offset program won the support of statewide environmental groups such as Northwest Environmental Advocates and Renewables Northwest. The Northwest Environmental Advocates' testimony in support of the Project included these statements:

"The Klamath Cogeneration Project put forward a CO₂ offsets portfolio that is far more aggressive in achieving EFSC's "Best-of-Batch" goals than any other put forward in this proceeding... The evidence is clear that the Klamath Cogeneration Project put together the most comprehensive proposal that supports the policy goals on a state, national and global level. Based on this, NWEA believes the Klamath Cogeneration Project should be granted the 500 Megawatt Exemption."

The Klamath Cogeneration Project's CO₂ offset program includes:

- Reforesting about 6,250 acres in Oregon
- Capturing methane at sewage treatment plants and coal mines to convert the methane to electricity
- Funding solar energy projects that will bring electricity to about 100,000 residences in developing countries.
- Expanding the Klamath Falls geothermal district heating system to as many as 78 additional buildings.
- Providing about \$1.1 million to the Oregon Climate Trust, a non-profit formed to implement the state's offset programs.

Water quality

Treated wastewater effluent provided by the City will meet the plant's need for cooling water. This innovative approach will preserve freshwater supplies, make use of lower-cost treated water and reduce discharges into the Klamath River by about 2.3 million gallons per day. Reducing these discharges will have a net beneficial impact

on water quality, particularly reducing biological oxygen demand.

Energy efficiency

Equipping the plant with advanced combustion turbine technology will maximize fuel efficiency. This creates a more efficient use of our natural energy resources by producing power with less fuel than conventional power plants. The plant will have an overall fuel efficiency of about 62 percent, nearly twice the efficiency of a typical coal-fired plant.

What is CO₂?

- Carbon dioxide (CO₂) is a gas formed by the combustion of materials such as coal, natural gas and wood. CO₂ emissions from cars, power plants and other sources are increasing worldwide, and many scientists believe that greenhouse gases like CO₂ may contribute to a rise in the earth's temperature.

- CO₂ emissions can be offset in a variety of ways, including planting trees, which naturally absorb carbon. Other methods include funding conservation programs or using renewable resources such as solar energy, which produces no CO₂ emissions.

Community Issues

The City of Klamath Falls and PacifiCorp will build a project that is compatible with land use plans and addresses community concerns for noise control, environmental protection and visual impacts.

Land use

The Project is consistent with current land use practices. Located within an existing industrial area just outside the City of Klamath Falls, the plant will be built on the Collins Products mill site. Both the City and the County have granted land use approvals for the Project.

Less than a mile of new transmission line will connect the Project with PacifiCorp's existing transmission system, with no effect on residential or commercial land uses.

Other land impacts are minimal. PGT's Medford Lateral pipeline already crosses Collins property adjacent to the proposed plant. Pipelines carrying steam to and from Collins will be located entirely on Collins property. Other pipelines carrying water to and from the plant will be located underground and, as often as possible, on existing easements and rights of way.

Wildlife concerns

The site for the Klamath Cogeneration Project has been cleared of vegetation for years. The site does not provide high quality wildlife habitat. The Project developers have consulted with the Oregon Department of Fish and Wildlife to select a design for the transmission line which will avoid or minimize impacts on waterfowl and birds of prey. PacifiCorp, which will equip the line with devices to help protect birds of prey, has won national awards for its raptor protection programs.

Noise

The Klamath Cogeneration Project will be engineered for noise control and will comply with all noise control ordinances, which limit noise from new sources as well as increases in ambient noise levels. Under these regulations, noise levels in sensitive areas such as residential and wildlife zones must be held to very low levels.

After conducting a comprehensive noise study, a consultant determined that predicted noise levels will be below allowable limits and barely perceptible at the nearest sensitive sites. In granting the land use permit, county officials found that noise levels from the Klamath Cogeneration Project will not exceed those generated by nearby mills.

Cultural resources and Native American artifact protection

Although studies by a consultant have indicated that no archeological resources are likely to be in the Project area, the City of Klamath Falls and PacifiCorp will work with the Klamath Tribes to develop practices that ensure protection of any Native American archeological artifacts during construction.

A portion of the Collins Products mill is eligible to be listed on the National Register of Historic Places. The Project will not adversely affect the qualities of the site that make it eligible for listing.

Visual impacts

The Project's tallest structures will be the twin 150-foot tall stacks, which will be naturally screened on three sides. On the south side, the facility will be visible from Highway 97, but the visual impact will be mitigated by the plant's natural color scheme and landscaping.

Under certain weather conditions, the plant's cooling tower may produce a white, odorless plume of condensed water vapor. After conducting modeling studies of the potential plume, consultants determined that the largest plume would likely occur during night-time hours, when it would not be visible to off-site observers.

Competition and the Electric Utility Industry

According to one Wall Street analyst, “an earthquake is rocking the electric utility industry.” For nearly 100 years, the industry has been mostly immune to the competition that has swept through the airline, banking and telecommunications industries.

But the days of utilities operating as monopolies in franchised service areas are numbered. Legislators are gradually moving to bring deregulation to the electricity industry. Only those energy providers that can produce and sell cost-effective power will thrive in this new era.

The Klamath Cogeneration Project will be well positioned in the competitive electricity industry. It will be among the lowest-cost energy resources in the Pacific Northwest and Northern California.

Electricity from the Project will be sold to public utilities and other wholesale customers who will aggressively pursue the most cost-effective power for their residential, commercial and industrial customers.

Background

The first major ripples of industry change came with the passage of the Energy Policy Act in 1992. This federal legislation spurred competition at the wholesale level of the industry, where large quantities of power are traded and distributed before being sold to consumers. The law also required utilities and other organizations owning transmission lines to give other energy providers access to their wires.

Scores of new players entered the market, and these competitors differ from traditional utilities because they often don't own utility poles or power lines. They simply produce or trade power and use the existing transmission system to deliver the electricity. As competition increased, wholesale customers, which include public and private utilities and municipalities, began shopping for the best deals.

Competition's impact on customers

Industrial customers using a lot of electricity will likely be among the first to benefit from the industry's new competitive environment. Some have already found ways to shop for the best deal by locking in low contract rates and special services from their local utility. Others are developing their own power sources. Meanwhile, they eagerly await the day when they can shop for power on the open market.

Competition also will filter down to retail customers — industrial, commercial and residential. It's very likely that the federal and state governments will pass legislation within

the next several years that will give retail customers more choices in their electricity purchases. It has already happened in some states. People will be able to buy power from among different suppliers — similar to the choices customers have with their long-distance telephone provider. The power regardless of its source, will continue to be delivered to customers over existing utility poles and wires. This system will continue to be operated by the local utility, and regulated by the state.

PacifiCorp's pilot program in Oregon is already opening up the market for some large-use customers. They can shop for up to 50 percent of their load under an experimental program that runs through September 1999.

Competition pilots in Klamath County

Through the pilot, new choices are also available for Klamath County customers. Larger businesses can shop for all their power needs on the open market. Also, local residential and small commercial customers are the only ones in Oregon currently able to choose their power supply preference through a portfolio of options — green (environmentally friendly) power, power priced at the fluctuating market rate, and a community option (benefits low-income customers in the County).

During two different enrollment periods, 6 percent of eligible customers have elected to participate in one of the three new options. Satisfaction in the program has been relatively high. The portfolio pilot ends in July 1999. The portfolio approach is seen by many as the best way to transition the smaller-use customers into competitive markets. In addition, the portfolio approach also may represent an appropriate alternative to full competition. Unlike full competition, where the customer works directly with a new power supplier, portfolio customers remain within their existing utility but can choose from an array of energy supply and pricing options.

Because most marketers have been focusing on large-use customers during the early stages of competition — and most residential customers are skeptical about what benefits they will see — the portfolio approach is seen as a good way to get some of the benefits of choice to these customers more quickly than a fully competitive market possibly could.

What is learned in these and other pilots will be used by regulators and legislators as they begin shaping the future energy marketplace.

New alliances

The fast-changing industry is encouraging utilities like PacifiCorp to form new business relationships, particularly those that enhance their ability to serve customers. The alliance between the City of Klamath Falls and PacifiCorp is of benefit to the constituents of both entities. The City will provide revenue bond financing for the Klamath Cogeneration Project, and PacifiCorp will bring its experience in developing power plants and marketing energy. This will lead to the most efficient use of the plant's resources and production of low-cost power, generating funds for the City to invest in economic development.

Cost-effective power

The most successful energy providers will be those that can get the lowest-cost power to the marketplace. It's likely that electricity from older, less efficient power plants will be displaced, but that is the reality of competition. As Henry Ford II said, "Competition is the keen cutting edge of business, always cutting away at costs."

The emphasis on price does not mean environmental or social concerns will be sacrificed. In fact, the Klamath Cogeneration Project will have numerous environmental features that set a new and higher standard in Oregon and around the country.

Summary

Earthquakes permanently alter the landscape. The forces of change, choice and competition within the electric utility industry are having the same effect. Some companies will not make it through the transition. But for low-cost, strategically positioned companies like PacifiCorp, and for creative municipalities like the City of Klamath Falls, the changes are good news. They — and their customers — will find that they have more choices than ever before.

How Cogeneration Works

Cogeneration is a power generation process that produces two or more useful forms of energy from one fuel source, such as gas, coal or oil. It is an energy-efficient process, which in the case of the Klamath Cogeneration Project will be enhanced by the use of state-of-the-art technology.

History of cogeneration

One hundred years ago, it was common practice for industry to generate its own electricity through cogeneration. But as local utilities began to supply electricity at lower costs, the use of cogeneration declined. Today in the Northwest, it accounts for only a small portion of energy production, largely in the timber and paper products industries.

But thanks to advances in natural gas cogeneration technology, cogeneration is a highly feasible form of energy production. The cogeneration process produces fewer air emissions than other fossil-fueled plants, which makes it attractive from a community and public policy standpoint. PacifiCorp has been involved with the development of a number of cogeneration plants as well as three waste-to-energy facilities and two wind power plants.

The benefits of cogeneration

Cogeneration is one of the more promising resources in the country. Its benefits include:

- Cogeneration allows industrial customers to curtail their use of older, less efficient boilers, which limits pollution.
- Cogeneration enhances overall energy efficiency by supplying steam more effectively and at a lower cost than conventional steam boilers.
- Cogeneration is appropriate at a number of industrial sites and other facilities, such as hospitals, schools and shopping centers.

The Klamath Cogeneration Project

The Klamath Cogeneration Project will use one of the most technologically advanced combustion turbine designs commercially available. The combined-cycle cogeneration configuration will have an overall fuel efficiency of about 62 percent, nearly twice the efficiency of a typical power plant.

The plant will be fueled by natural gas from western Canada, which has abundant supplies. PG&E Gas Transmission Northwest's new Medford Lateral Pipeline will serve the Project.

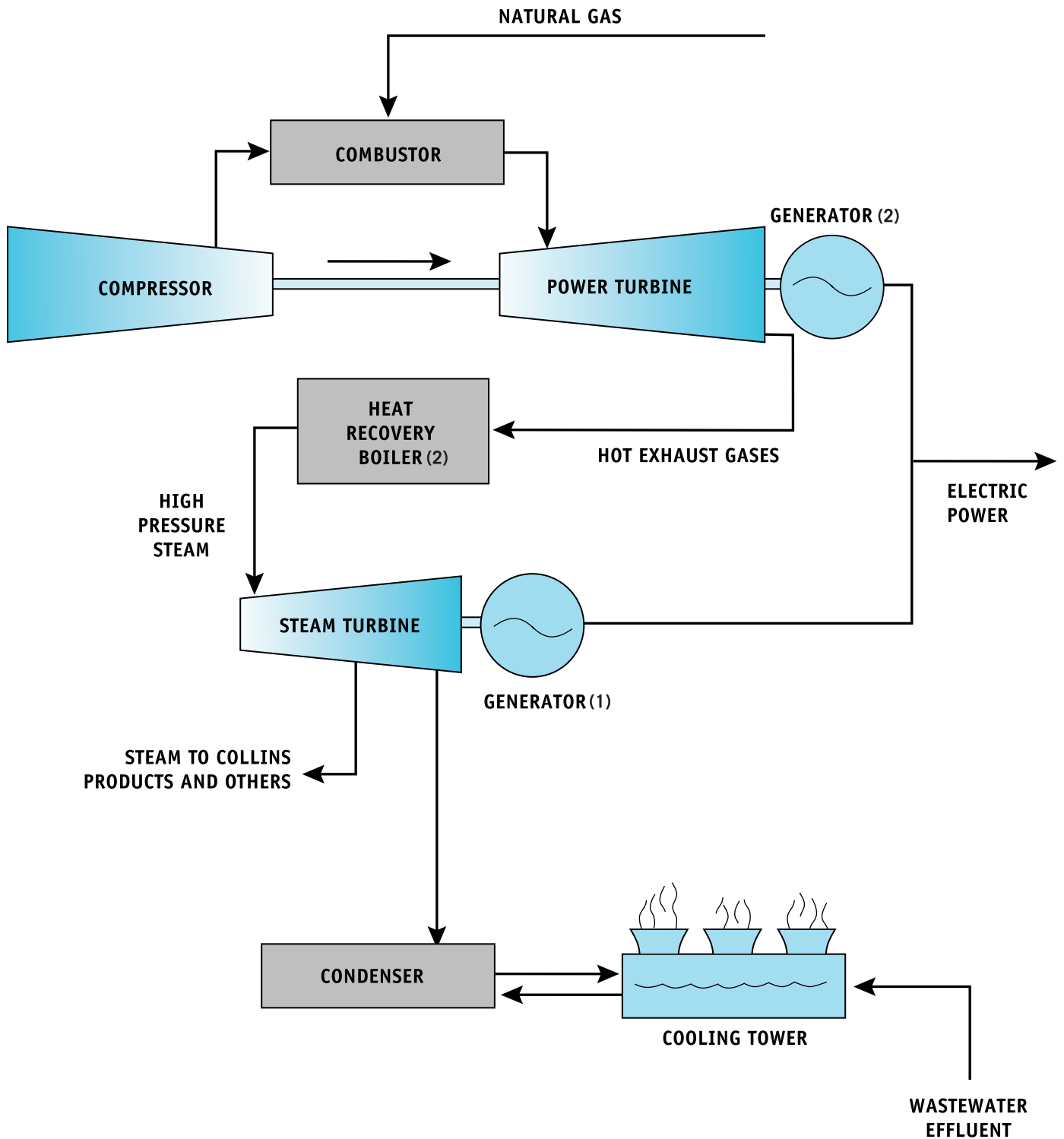
The Klamath plant will be fueled by natural gas to produce electrical energy and industrial steam efficiently. The electricity will be sold to utilities and other customers, and the heat from the power generation process will be used to produce process steam for nearby industries such as Collins Products.

The facility's major plant components include two combustion turbine generators; two heat recovery boilers; a steam turbine generator; a mechanical evaporative cooling tower; an electrical switchyard; an evaporation pond; and a variety of storage tanks.

By providing steam to Collins Products and other local industries while at the same time generating electricity for utilities and other customers, the Klamath Cogeneration Project can use natural gas more efficiently than a stand-alone electricity plant. This will provide competitively priced power to the region while setting a new standard for environmental mitigation.

Klamath Cogeneration Project

Energy Diagram



OVERALL SYSTEM EFFICIENCY = 62%
TYPICAL UTILITY POWER PLANT EFFICIENCY = 35%

Project Timeline

February 1996

Initial cogeneration agreement with Weyerhaeuser (now Collins Products)

February 1996

Site certificate application filed with State of Oregon to build Klamath Cogeneration Project

January 1998:

Oregon Department of Environmental Quality issues air permit

September 1997:

EFSC issues site certificate

February 1997:

Public hearing in Klamath Falls

Early 1999:

Project construction financing

July 2001:

Klamath Cogeneration Project is operational

1996

1997

1998

1999

2000

2001

October 1997–December 1998:

EFSC completes site certificate amendment process

August 1996:

Klamath Cogeneration Project awarded the 500-MW exemption

Spring 1999–Spring 2001:

Construction of Klamath Cogeneration Project

March–July 1996:

Oregon Energy Facility Siting Council (EFSC) holds competition to award one-time 500-MW exemption to project with lowest environmental impact.