

### **3.14 CUMULATIVE IMPACTS**

Development of the PGF presents the potential for site-specific, local, and regional impacts. While these impacts incrementally may be small, cumulative impacts of many projects in a regional area eventually change the character of the area and could have impacts that are not evident from any single project. The cumulative impacts analysis includes a discussion of regional development trends, local and regional cumulative impacts from other projects, and greenhouse gases and global warming.

#### **3.14.1 REGIONAL DEVELOPMENT TRENDS**

The PGF plant site is located in a predominately agricultural area of Benton County that also includes sparsely distributed industrial facilities, including grain, food processing, and wine-making. Because the site area is adjacent to river, rail, and highway transportation and has both electrical and gas pipeline infrastructure located nearby, it is a suitable location for further industrial development. The lack of urbanization in the region, except in small communities, reduces the potential for conflict between urban and industrial development.

The trend for continued industrial development in the area is supported by the location of several designated industrial parks in the Plymouth area, including the Port of Kennewick Industrial Park, which is located between Plymouth and the plant site on Christy Road.

The proximity of the natural gas pipelines and high voltage transmission lines along both sides of the Columbia River from McNary Dam down to The Dalles have supported the development of several natural gas-fired power plants, which provide energy for distribution through the Bonneville Power Administration (BPA) transmission system to regional load centers. While the transmission system is experiencing some capacity constraints, expansion is planned and additional power projects could be proposed in the future.

The trend toward additional industrial development is not likely to change the general land use pattern in the region, which is dominated by agriculture and undeveloped land. Furthermore, since industrial projects do not necessarily require significant land area, total conversion of agricultural or undeveloped land to industrial use is expected to be a small portion of the available land.

Further development of industrial activity, especially industry such as power production that produces air emissions, in the region could potentially affect air quality.

Future industrial development that requires water resources for process use will be limited to the extent that water rights can be acquired and transferred. Most water rights available in the region are related to agricultural use, and transfers are limited by type and season of use. Obtaining rights for additional withdrawals from surface water resources such as the Columbia River or its tributaries is constrained by impacts to threatened species of salmon and steelhead.

#### **3.14.2 LOCAL AND REGIONAL CUMULATIVE IMPACTS**

Construction and operation of the Plymouth Generating Facility (PGF) would occur during the same time frame and in proximity to other industrial projects in the mid-Columbia region,

including other power plants. The analysis of potential impacts from the PGF for each element of the environment (see Sections 3.1 – 3.13) assumes that other projects already in operation are part of the “existing conditions” described for each element. Projects that are currently being constructed, or are in the regulatory approval process, are not considered part of the existing conditions. The purpose of the cumulative impacts analysis is to identify potential impacts, including significant impacts, that could occur from the simultaneous construction or operation of projects that use, or would impact, the same resources.

A list of other power plants or industrial projects in a reasonable proximity to the PGF was compiled and is presented in Table 3.14-1. This table includes projects that are known to be:

- Filed as an application to a regulatory agency and in the review process
- Approved but not yet under construction
- Under construction but not yet in operation

Of the projects listed in Table 3.14-1, several can be excluded from further consideration, as follows.

- Two of the power plant projects (Mercer Ranch and Starbuck) have recently requested suspension of the regulatory review of their applications. With these suspensions in place, the schedule for their actual completion and start of operation is unknown.
- The Grizzley Power Project and the Morrow Generating Project have an indeterminate construction schedule.
- The Umatilla Generating Project has announced a delay.
- Construction of the three transmission line projects (the John Day-McNary line, the Wallula-McNary line, and the Schultz-Hanford line) has not yet been rescheduled.

The potential cumulative impacts of the projects listed in Table 3.14-1 were evaluated for each environmental element based on the following criteria:

- Would construction of other projects occur during the same time period?
- Would the offsite impacts of other projects occur in areas that would also be subject to offsite impacts from the PGF?
- Would the onsite impacts from other projects, when added to the onsite impacts of the PGF, cumulatively impact specific resources?

Of the thirteen environmental elements evaluated, cumulative impacts are most likely to occur in five elements: Air Quality, Transportation, Socioeconomics, Energy and Natural Resources, and Public Services and Utilities. For these five environmental elements, an evaluation with respect to each identified cumulative project is presented in Table 3.14-2. Where the potential for cumulative impacts within these elements of the environment have been identified, the potential

cumulative impacts were evaluated and are discussed in the corresponding element of the environment section (see Section 3.2 Air Quality, 3.5 Energy and Natural Resources, 3.11 Transportation, 3.12 Public Services and Utilities, and 3.13 Socioeconomics). For all other environmental elements, the potential impacts of the PGF were found to be nonexistent or low enough that cumulative impacts are unlikely to occur. These other environmental elements are discussed briefly below.

- **Earth** – Since any impacts related to earth resources would be on or adjacent to the plant site, and the closest other project considered (with the exception of the McNary-John Day Transmission Line) is more than 5 miles away, no cumulative earth impacts are expected. While the McNary-John Day Transmission Line and PGF projects would be constructed within 0.6 mile of each other, the transmission line would involve minimal earth disturbance that would occur only at the transmission tower locations.
- **Water** – Because the PGF would use water resources that have been in continuous use and not create a new water use, cumulative impacts with other projects are not expected. In addition, all of the other projects considered that are large-volume water users (primarily power plants) are at some distance from the PGF and would rely on different water resources for their supply.
- **Biological Resources** – Impacts to biological resources would be limited to the immediate vicinity of the proposed PGF. Since all other cumulative projects considered are at some distance from the PGF and do not have overlapping areas of impact, no cumulative impacts would be expected to occur.
- **Environmental Health** – Impacts to environmental health are not expected to occur from construction and operation of the PGF; therefore, no cumulative impacts are anticipated.
- **Noise** – Offsite noise impacts, which would be below significance levels, would decrease with distance from the proposed PGF plant site. The closest power generation project to the proposed PGF is the Wanapa Power Project located approximately 9 miles to the east. The city of Umatilla lies between these two locations but is closer to the Wanapa Power Project location. Given the distances separating the two projects, that they lie on opposite sides of Umatilla, and the distance from either project to Umatilla, it is unlikely that cumulative noise impacts would result.
- **Land Use** – The proposed PGF is located in a rural/industrial portion of Benton County. No other projects of any type were identified in the immediate vicinity of the PGF plant site that would conflict with the industrial use represented by the PGF. Thus, no cumulative impacts are anticipated. The plant site was also found not to include unique farmland resources; therefore, no cumulative impact to potential farm production is expected to occur.

- **Visual Resources** – As described in Section 3.9, facilities greater than 2 miles from a viewer are not expected to impact foreground or primary views. No other projects were identified within 2 miles of the proposed PGF site, except the McNary-John Day Transmission Line. However, the transmission line will be constructed within an existing transmission corridor that already contains two tower lines. Thus, no cumulative impact to foreground views would be expected. The nearest other project included in the cumulative impacts evaluation is located approximately 9 miles to the east across the Columbia River in Oregon. Given the separation between the PGF and all other facilities evaluated, no cumulative visual impacts would be expected.
- **Historic and Cultural Resources** – No historic or cultural resources were observed in the proposed site area, and no impacts to these resources would be expected. Thus, construction and operation of the PGF would not be expected to have cumulative impacts to historic and cultural resources.

In addition to the potential future projects identified in Table 3.14-1, the applicant has been contacted by more than one commercial greenhouse operator who have expressed interest in the possibility of locating a greenhouse operation in the vicinity of the PGF and using carbon dioxide and waste heat generated by the power plant for the greenhouse operation. Discussions at the time this Draft EIS was prepared were very preliminary, and no decision had been made to go forward with any project. Until there is a specific project proposed, it is not possible to determine whether impacts would occur, or the extent of potential impacts. Because the power plant may not always operate on the continuous basis needed for greenhouse operations, the greenhouse would likely be designed so that it could also operate on a stand-alone basis.

The permitting process for any future greenhouse project and the environmental analysis of its impacts would depend on the details of the specific project proposal, including the location, design, and size. If a commercial greenhouse operation were to be sited in proximity of the proposed power plant, the cumulative impacts might include an intensification of land use, a visual change in the landscape, and additional traffic from the workforce and from trucking.

**Table 3.14-1  
Projects Filed (in Review), Approved But Not Constructed, and in Construction – Mid Columbia Region**

No	Project	Location	Type	Status	Construction Period	Begin Operations	Comments
1	Goldendale Energy Project (Calpine)	Goldendale, WA	248-MW Gas P.P.	Construction	6/01 – 12/02	6/03	
2	Mercer Ranch (Cogentrix)	Alderdale (T5N, R24E, S20 & 20), WA	Gas P.P.	8/01 Preliminary Siting Study issued	Indefinite	Indefinite	Review suspended
3	Starbuck (Pacific Power and Light)	Starbuck, WA	1200-MW Gas P.P.	8/27/01 AFC filed/EIS preparation	Indefinite	Indefinite	Review suspended
4	Coyote Springs - Unit 2 (Portland General Electric)	Morrow Co., OR	260-MW Gas P.P.	Construction near completion	Current-6/02	6/02	Nearing completion
5	Grizzley Power Project (Cogentrix)	Jefferson Co., OR	980-MW Gas P.P.	11/01 ASC filed	2/04 – 2/06	mid-2006	Indeterminate construction period
6	Hermiston Power Project (Calpine)	Umatilla Co., OR	546-MW Gas P.P.	Construction	2003	4Q/03	
7	Umatilla Generating Project (Pacific Gas & Electric – National Energy Group)	Umatilla Co., OR	550-MW Gas P.P.	Approved	2Q/02 – 1Q/04	1Q/04	Announced delay
8	Morrow Generating Project (Pacific Gas & Electric – National Energy Group)	Morrow Co., OR	550-MW Gas P.P.	11/02 P.O. issued	1Q/05 – 1Q/07	1Q/07	Schedule for submitting ASC not announced, indeterminate construction period
9	Wallula (Newport Northwest LLC)	Walla Walla Co., WA	1300-MW Gas P.P.	8/01 AFC submitted	4Q/02-4Q/04	4Q/04	
10	McNary-John Day 500 kV (BPA)	Benton/Klickitat Co., WA	500-kV transmission line	Regulatory review/EIS preparation	3Q/02 – 4Q/03	4Q/03	Construction delayed, not committed

**Table 3.14-1 (Continued)**  
**Projects Filed (in Review), Approved But Not Constructed, and in Construction – Mid Columbia Region**

No	Project	Location	Type	Status	Construction Period	Begin Operations	Comments
11	Wallula-McNary (BPA)	Walla Walla Co., WA, Umatilla Co., OR	500-kV transmission line	Regulatory review/EIS preparation	Ends 3Q/04	3Q/04	Construction not committed
12	Schultz – Hanford (BPA)	Grant Co., WA	Transmission line	Regulatory review/EIS preparation	Ends 3Q/04	3Q/04	Construction not committed
13	Wanapa Energy Center (Confederated Tribes)	Umatilla, OR	1,300-MW Gas P.P.	Regulatory review - BIA	Approximately 2004-2005	Approximately 2006	Air Permit not filed
14	Motor Speedway	Boardman, OR	Racetrack, hotel, services	Regulatory review	3Q/02	4Q/02	1,500 Const. jobs 100 F-T jobs 1,250 P-T jobs
15	Stateline Wind Project	Near Helix, OR	60 wind turbines	Oregon EFSC review	3Q-4Q/02	4Q/02	
16	Combine Hills Turbine Ranch	Near Umapine, OR	174 wind turbines	Regulatory review – Umatilla Co.	3Q-4Q/02	4Q/02	
17	Hanford Vitrification Plant	Hanford Site, WA	Hazardous waste vitrification into glass	Pre-construction activities	2002-2006	2007	2,600 craft workers of 4,500 total workers at peak
18	Williams Pipeline/Compressor Upgrade	Plymouth, WA	Additional compressor at Pipeline Compressor Station	Regulatory review Skagit Co. (SEPA) BCAA	4Q/02	4Q/02	

Notes/Abbreviations:

ASC = Application for Site Certification (Oregon)  
 AFC = Application for Certification (Washington)  
 BIA = Bureau of Indian Affairs  
 BPA = Bonneville Power Administration  
 F-T = full-time

Gas P.P. = Gas-fired combined cycle power plant  
 P.O. = Project Order (Oregon)  
 P-T = part-time  
 Q = quarter

**Table 3.14-2  
Potential Cumulative Impacts**

No	Project	Air Quality	Transportation	Socioeconomics	Energy & Natural Resources	Public Services and Utilities
1	Goldendale Energy Project (Calpine)	70 miles separation/cumulative impacts unlikely	None – Construction period does not overlap with PGF	None – Construction period does not overlap with PGF	Natural Gas Fuel Use	None – Construction period does not overlap with PGF
4	Coyote Springs Unit 2 (Portland General Electric)	Potential cumulative air quality and visibility impacts	None – Construction period does not overlap with PGF	None – Construction period does not overlap with PGF	Natural Gas Fuel Use	None – Construction period does not overlap with PGF
6	Hermiston Power Project (Calpine)	Potential cumulative air quality and visibility impacts	Minimal potential/short construction overlap	Minimal potential/short construction overlap	Natural Gas Fuel Use	Minimal potential/short construction overlap
9	Wallula (Newport Northwest LLC)	27 miles east - separation/cumulative impacts unlikely	Potential impact – 1 year construction overlap	Potential impact – 1 year construction overlap	Natural Gas Fuel Use	Potential impact – 1 year construction overlap
13	Wanapa Energy Center (Confederated Tribes)	Potential cumulative air quality and visibility impacts	Potential cumulative impacts	Potential cumulative impact	Natural Gas Fuel Use	Potential cumulative impact
14	Motor Speedway	None	Potential impact – 2 year construction overlap	Potential impact – 2 year construction overlap	None	Potential impact – 2 year construction overlap
15	Stateline Wind Project	None	None – Construction period does not overlap with PGF	None	None	None – Construction period does not overlap with PGF
16	Combine Hills Turbine Ranch	None	None – Construction period does not overlap with PGF	None	None	None – Construction period does not overlap with PGF
17	Hanford Vitrification Plant	Potential cumulative air quality impacts	Potential impacts – 2 year construction overlap	Potential impacts – 2 year construction overlap	None	Potential impacts – 2 year construction overlap
18	Williams Pipeline/ Compressor Upgrade	Small source/none	None	None	Natural Gas Fuel Use	None – Construction period does not overlap with PGF

### **3.14.3 GREENHOUSE GASES AND GLOBAL WARMING**

The “greenhouse effect” refers to an increase in global temperatures resulting from a phenomenon where certain atmospheric gases prevent the solar energy absorbed by the earth’s surface from being radiated back into space as infrared energy. This effect is similar to how a greenhouse holds heat. The major gases present in the atmosphere that contribute to the greenhouse effect are carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), ozone (O<sub>3</sub>), and chlorofluorocarbons. Carbon dioxide is the primary greenhouse gas emitted from anthropogenic sources, and CO<sub>2</sub> accounts for 83.5 percent (5,840 teragrams [Tg]) of the total 6,994.2 Tg CO<sub>2</sub> equivalence (Eq) of greenhouse gases that were emitted by the United States in 2000.

Recent observations suggest that the earth’s climate is undergoing significant changes and, while there is some disagreement among scientists and political leaders over the cause of these global climate changes, most recognize that human activities are likely involved. Data collected over the last century suggest that the average land surface temperature has risen 0.45-0.6°C (0.8-1.0°F). Rainfall amounts have increased in higher-latitude regions of the planet, while many tropical areas have seen precipitation amounts decrease. Mean sea level has risen approximately 15-20 centimeters (6 to 8 inches) in the last century, mainly due to the melting of mountain glaciers and the expansion of the ocean water (as a result of increased ocean temperatures) (U.S. EPA 2001).

Although these changes in the earth’s climate have been accepted by scientists, there is a great deal of uncertainty regarding the actual magnitude of these changes that can be attributed to the anthropogenic emissions of greenhouse gases. The earth has experienced dramatic swings in global climate thousands and even hundreds of thousands of years prior to the emergence of the industrialized civilization.

CO<sub>2</sub> emissions are not currently regulated by local, state, or federal rules. Under the Clinton Administration, the United States signed the internationally sponsored Kyoto Protocol in 1999. The objective of the Protocol is the reduction of greenhouse gases by as much as 30 to 40 percent from participating developed nations by the year 2012. The United States has since withdrawn from the Protocol, citing that such drastic reductions would have too high an impact on the U.S. economy. President Bush has stated, “Addressing global climate change will require a sustained effort, over many generations. My approach recognizes that sustained economic growth is the solution, not the problem – because a nation that grows its economy is a nation that can afford investments in efficiency, new technologies, and a cleaner environment.”

One of the goals of the president’s plan is to reduce the greenhouse gas intensity of the U.S. economy by 18 percent in the next 10 years. Greenhouse gas intensity is the ratio of greenhouse gas emissions to economic output. This approach focuses on reducing the growth of greenhouse gas emissions, while sustaining the economic growth needed to finance investment in new, clean energy technologies (The Whitehouse 2002). The replacement of older power-generating facilities with more efficient ones, such as the PGF, is one step toward the accomplishment of this goal. Natural gas-fired combined cycle turbine power plants are considered to be the most efficient form of fossil fuel-powered electrical generation.

The PGF would have the potential to emit a maximum of approximately 983,000 tons (0.892 Tg) of CO<sub>2</sub> annually. This estimate assumes that the combined cycle plant would operate with duct firing (maximum power production) for 8,760 hours per year and at an overall net heat rate of 6,439 British thermal units per kilowatt hour (Btu/kWh). This estimate also assumes an average heating value of 1,020 Btu/standard cubic feet (scf) of natural gas and 99.5 percent conversion of fuel carbon to CO<sub>2</sub>. Actual emission of CO<sub>2</sub> would be less than 983,000 tons annually because the PGF is not expected to run all hours of the year nor would it operate duct firing for more than a portion of the year. The emissions of CH<sub>4</sub> and N<sub>2</sub>O from this facility are expected to be miniscule in comparison to CO<sub>2</sub> emissions and are therefore not considered significant. Even under the maximum conditions, PGF's contribution to national CO<sub>2</sub> emissions would amount to only 0.015 percent.

The PGF would make use of some of the most efficient technology available. While the facility would emit modest amounts of CO<sub>2</sub> in the short-term, it would not contribute greatly to the global budget (the total amount of greenhouse gases emitted to atmosphere). Energy conservation coupled with the replacement of some older electrical-generating capacity with newer, more efficient facilities could result in an overall reduction in U.S. CO<sub>2</sub> emissions.

#### **3.14.4 REFERENCES**

U.S. Environmental Protection Agency (U.S. EPA). 2001. Global Warming website available at <<http://www.epa.gov/globalwarming/climate/trends/index.html>>. August 29.

The Whitehouse. 2002. News release available at <<http://www.whitehouse.gov/news/releases/2002/02/climatechange.html>>. February.