3.18 ENERGY

This section describes the relationship between the proposed Project and state requirements encouraging the increased development and use of renewable energy sources. It describes the existing transmission system in Harney County and how the proposed Project would expand and affect those facilities. Figure 3.18-1 shows the existing and proposed transmission lines and development in the area.

3.18.1.1 Methodology

The area of analysis is comprised of a 150-foot wide study corridor along the route alternatives (i.e., 75 feet on each side of the centerline). The methodology for analyzing the impacts includes evaluating the conditions and potential effects to energy services (including power generation, transmission, and distribution) in and around Harney County. The information is compiled from various sources including the Bonneville Power Administration (BPA), Harney Electric Cooperative (HEC), Oregon Department of Energy, and the Energy Information Administration (EIA).

The analysis was informed by comments from the public scoping process that was conducted from July to September 2009 and the DEIS comment period from July through September 2010. Comments from agency representatives, local organizations, and private citizens requested that the following energy issues be addressed:

- Discussion about whether HEC's and BPA's transmission capabilities would need to be upgraded because of the proposed Project, particularly if other projects also were developed that would connect to the transmission system.
- Discussion about whether the HEC system would have to be upgraded to automatic switching because of the proposed Project.

3.18.2 Affected Environment

3.18.2.1 Renewable Portfolio Standards and the Transmission Grid

In 2005, Oregon passed a renewable portfolio standard (RPS) that requires the largest utilities in Oregon (i.e., those that provide three percent or more of Oregon's total retail electric sales) to provide 25 percent of their retail sales of electricity from renewable sources of energy by 2025. There are intermediate goals for these large utilities of five percent by 2011, 15 percent by 2015, and 20 percent by 2020. Smaller utilities (i.e., those providing 1.5 to 3 percent) are required to provide 10 percent of their retail sales from renewable power sources by 2025, and the smallest utilities (i.e., those providing less than 1.5 percent) must provide five percent of their retail sales from renewable power sources by 2025. Eligible resources include wind, solar photovoltaic and solar thermal, wave, tidal, ocean thermal, geothermal, some categories of hydropower, and some biomass and biomass byproducts (ODOE 2009). Of these, wind is by far the largest and fastest growing in Oregon.

California has a similar RPS mandate as Oregon. In 2002, Senate Bill 1078 established California's RPS, and it was amended and accelerated under Senate Bill 107 in 2006. California's RPS mandate requires utilities to provide 20 percent of retail sales of electricity from eligible renewable energy resources by 2010 through annual increases of at least one percent per year. Further, in 2008 under Executive Order S-14-08, the mandate was expanded to require all retail sellers of electricity to provide 33 percent of retail load through eligible renewable energy resources by 2020 (CPUC 2010).

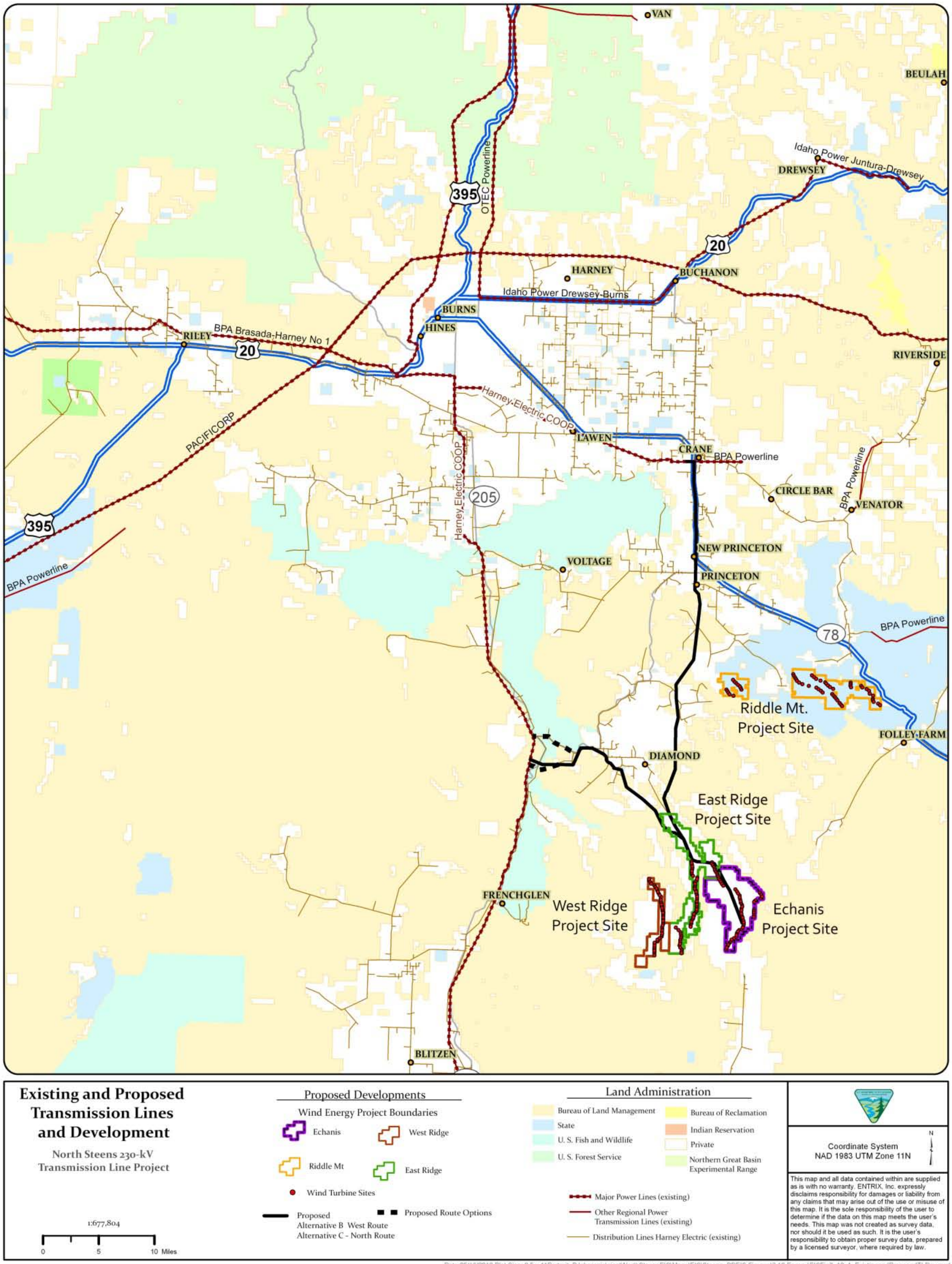

Figure 3.18-1 Existing and Proposed Transmission Lines and Development.

Oregon and California utilities need additional renewable energy generation to meet the 2025 RPS mandates of five to 25 percent, and 2020 mandate of 33 percent, respectively.

California and Washington State are connected to Oregon's transmission system and electricity grid through major transmission lines, including the Pacific Intertie, the largest single electricity transmission program in the United States. This system facilitates interstate energy exchanges (EIA 2009). High-voltage electricity transmission lines in Oregon are primarily operated and maintained by BPA. However there are some lines that are operated and maintained by other large utilities, such as Sierra Pacific, PacifiCorp, Idaho Power, and Portland General Electric (BPA 2009).

The Pacific Northwest, which includes Oregon, produces over 2,200 MW of wind power in BPA's load balancing area (BPA 2009). In fact, Oregon produces approximately four percent of the nation's total. Wind energy resources generally provide energy but not capacity, because wind energy generation is highly variable. As such, it requires that the rest of the system balances this variability so that the power supply can meet the energy demands. This in essence increases the demand for balancing reserves. With the ever-increasing requests for wind energy integration into the BPA transmission system, BPA is changing their system operations and pursuing new ways to reliably integrate wind into the power grid, while continuing to meet power loads and other non-power obligations, such as providing fish flows. Several short-term solutions, including improving wind generation forecast accuracy and modified scheduling practices, are being pursued while long-term solutions, which include new scheduling practices, transmission additions, and improving automatic generation control, are also being explored (BPA 2009).

3.18.2.2 Transmission System in Harney County

Electricity transmission in Harney County is provided by HEC, BPA, PacifiCorp, Idaho Power, and the Oregon Trail Electric Cooperative. Figure 3.18-1 shows the existing and proposed transmission lines in the Project Area, and includes the nearby proposed wind energy projects. HEC and BPA are the primary transmission providers in the Project Area.

HEC has a service area of approximately 20,000 square miles, covering southeastern Oregon and northwestern Nevada, and its headquarters are located in Burns, Oregon. It is a member owned non-profit cooperative, which means that it does not pay state or federal income taxes based upon profits from operations. Because of this, any profits that HEC might make during the year are allocated back to its members in the form of patronage capital. HEC purchases all of its power from BPA under a long-term contract, even though some that of that BPA power is transmitted and received through Sierra Pacific Power Company's (SPPC) system in Nevada. (HEC 2010) HEC currently operates the existing 115-kilovolt (kV) transmission line near Diamond Junction, Oregon, to which the proposed line is planned to connect. Further, HEC would take ownership, assuming all responsibility for operations and maintenance, of the proposed transmission line once it became operational.

BPA is a self-funding federal power marketing agency in the Pacific Northwest, with a territory that includes the entire states of Washington, Oregon, and Idaho, and parts of Montana, Wyoming, Utah, Nevada, and California. BPA markets wholesale power at-cost to public and private utilities, federal agencies, direct-service industries, tribes, and power marketers, from federal hydroelectric projects in the Columbia River Basin, one nonfederal nuclear power plant, and other nonfederal hydroelectric and wind energy generation facilities. BPA also operates an extensive high-voltage electricity transmission system throughout its territory, comprising approximately 75 percent of the high-voltage transmission in that area. At the time that the DEIS was prepared, BPA's transmission system had 21 wind energy generating facilities (with over 2,200-MW) interconnected, and those numbers were increasing quickly. BPA is currently developing programs to address the challenges of providing transmission services to the additional wind energy generating resources expected to increase to 6,000 MW by 2013 (BPA 2009).

3.18.3 Environmental Effects and Mitigation

Transmission is a significant issue for wind energy projects, in several ways. Generally, wind generation facilities are sited in unpopulated areas, and the highest demand for the energy produced is in the larger cities and populated areas (Davidson 2008). Further, because of their remoteness, access to the grid is limited and the biggest constraint for the facilities is finding a transmission system nearby with excess capacity into which they can connect.

3.18.3.1 Alternative A – No Action

Under the No Action Alternative, the Echanis Project would not be constructed and would not contribute to regional efforts to meet the 2025 RPS goal in Oregon, or the 2020 goal in California.

3.18.3.2 Echanis Project Effects Common to All Action Alternatives

The Echanis Project site was initially identified as a potential wind resource utilizing wind resource modeling data developed by the National Renewable Energy Laboratory (NREL), as part of a national wind resource assessment. That mapped data published graphically depicts the estimated annual and seasonal wind resource on a regional and state level. The classes of wind power are provided in Table 3.18-1.

Table 3.18-1 Wind Power Classes

	10 meters (33 feet)		50 meters (164 feet)	
Wind Power Class	Wind Power Density (W/m²)	Speed m/s (mph)	Wind Power Density (W/m²)	Speed m/s (mph)
1	0	0	0	0
	100	4.4 (9.8)	200	5.6 (12.5)
2				
	150	5.1 (11.5)	300	6.4 (14.3)
3				
	200	5.6 (12.5)	400	7.0 (15.7)
4				
	250	6.0 (13.4)	500	7.5 (16.8)
5				
	300	6.4 (14.3)	600	8.0 (17.9)
6				
	400	7.0 (15.7)	800	8.8 (19.7)
7				
	1000	9.4 (21.1)	2,000	11.9 (26.6)

As shown on the Wind Resource Map of Harney County (Figure 3.18-2), a significant portion of the Echanis Project site is estimated to be wind power class 7, and is complemented by the adjoining class 6 and 5 wind resources.

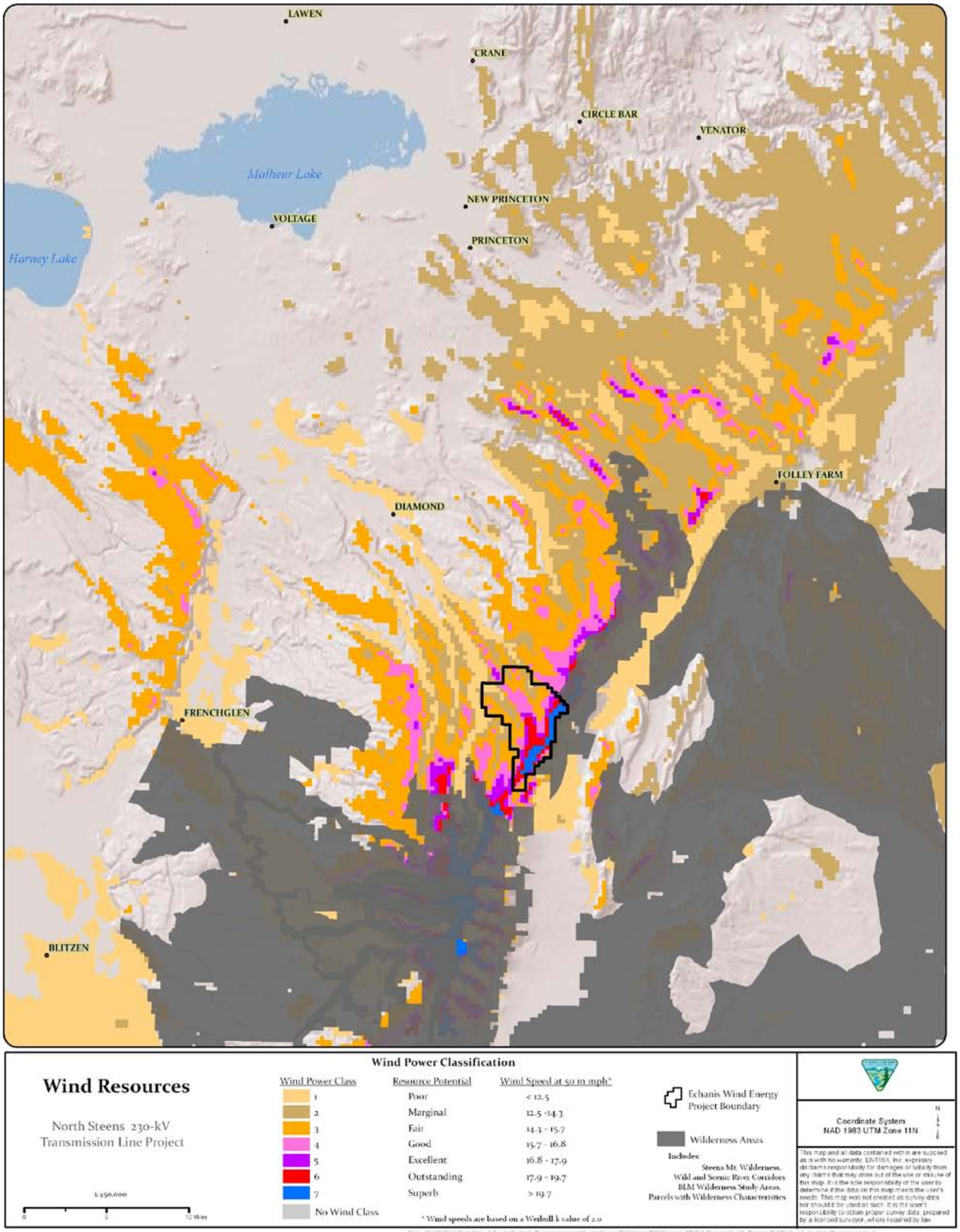

Figure 3.18-2 Wind Resources of Harney County.

The NREL data qualified the Echanis Project site for further investigation, to determine the potential economic viability of a wind energy project on the site. A number of additional qualifying characteristics were studied including, but not limited to:

- Orientation of the terrain (i.e., ridge lines perpendicular to the predominate wind direction).
- The economical feasibility of constructing access roads.
- The economical accessibility to the electrical transmission infrastructure.
- Not located within wilderness, wilderness study, or otherwise restricted development areas.
- Not located within airspace designated as a military operating area.
- Not located within an area of concern for airspace radar operations.
- Not located within an area of critical radio frequency (RF) communications.
- Preferable to be located on private land.
- On a high level review, not in environmentally or culturally sensitive areas.

Subsequent to determining that the Echanis Project site possessed the foregoing attributes, an extensive meteorological data program was initiated to characterize the wind resource on the site. This program included the installation of 60-meter meteorological towers at six locations to gather and record wind speed and direction data at multiple heights. In addition, sodar (sound detection and ranging) units were deployed to gather data up to 200 meters above ground level at various locations on the Project site. The extensive meteorological data developed for the Project site validated the NREL modeling and provided the basis for a wind resource assessment to be developed by a nationally recognized consulting meteorologist.

The wind resource assessment detailed on-site analysis and field engineering provided the basis for a preliminary site design. The preliminary site design, along with establishment of transmission line agreements, formed the basis for a response to multiple requests for proposal (RFPs) issued by electrical utilities. The Project site's wind resource, seasonality of the resource (which counterbalances wind energy produced by projects in the Columbia Gorge area, see additional discussion about this below), and other Project attributes resulted in the site being chosen for negotiation and execution of a power purchase agreement (PPA) to acquire the power to be produced on the Echanis Project site.

The Echanis Wind Energy Project would involve the construction and operation of 40 to 69 wind turbines on a 10,500-acre privately-owned site in rural Harney County. The proposed wind turbines would be arranged in multiple "strings" placed along several exposed ridgelines on the site. The Project would include several miles of 34.5-kV underground power collection cables to connect the turbine strings to a new 100-foot by 200-foot substation located near the center of the site. A 24-foot by 48-foot operations and maintenance (O&M) building would be located next to the substation. An existing access road that currently connects the site to Ham Brown Lane and South Diamond Lane would be widened, improved, and extended to the new substation on the site. The existing access road is located exclusively on private property and would be improved with the knowledge and consent of the underlying land owners. Additional service roads would be located on the site to provide access between the O&M building, wind turbines, and other wind energy related facilities on the site.

The Echanis Project would produce the most power during winter months, which would be beneficial to the integrated transmission and power system (Ramsayer 2008). While adding these resources to the power grid would increase the amount of energy without capacity into the system, the energy variability would occur at times that would complement the Columbia River Gorge wind energy projects, potentially benefitting the balancing required by BPA. As shown in Figure 3.18-3, the Echanis Project typically would generate the most energy in the December through March period, whereas the Columbia River Gorge wind energy projects would generate the most energy in the March through August period (Crowley 2011).

The process of electrically interconnecting the Echanis Project to the HEC and the BPA grids has progressed through the Feasibility and System Impact Study reports to the Facility Study report stage from January 2008 to date. BPA is currently finalizing the Facility Study report and an official cost and schedule for Phase I of the Echanis Project. It is estimated that the final Facility Study report, associated phased plan of service, and official cost and schedule will be completed in June 2010. Subsequent to that date, BPA will begin ordering long-lead items at Columbia Energy Partners LLC's (CEP) request, per BPA's Large Generator Interconnection Procedures (LGIP). A Large Generator Interconnection Agreement (LGIA) or a Balancing Area Authority Agreement (BAASA) will be signed upon final completion and issuance of the BLM EIS and permit for the Echanis generation-tie line right-of-way, based upon the selected transmission line route alternative. (Blood 2010)

The preliminary plan of service in the BPA Facility Study report calls for acceptable mitigation of problems on the 115-kV systems of HEC, BPA, and the Idaho Power Company to interconnect the full 104 MW. In the near-term, CEP, HEC, and BPA will be working together to, first, bring on-line the initial 40 MW of Phase I of the Echanis Project, requiring minimal upgrades. Then, the incremental 64 MW will be brought on-line in concert with certain long-lead items coordinated with BPA and Idaho Power. To allow interconnecting of the full 104 MW, the following system upgrades would be required to the HEC, BPA, and Idaho Power electrical and communications systems (Blood 2010):

HEC Upgrades

- Line Section
  - If the West Route is selected in the BLM EIS, no line upgrades are foreseen on the HEC system. However, the 30-MVA regulator at the HEC Hanley Substation will either have to be replaced or moved south of the Echanis Project's interconnection point on the HEC Hanley-Catlow 115-kV transmission line.
  - If the North Route is selected in the EIS, HEC will have to replace approximately 20 miles of the existing "3/0" 115-kV transmission line conductor with a higher rated 115-kV conductor. The 20-mile line section originates from CEP's gen-tie line interconnection point at HEC's Crane Substation to the east of the HEC Hanley Substation 30-MVA regulator and the BPA Harney Substation. In this case, the Hanley 30-MVA regulator will not be affected.
- Communications - Communications media, voice, metering and data, monitoring, and control equipment to coordinate the transmission of the Echanis-generate power between the HEC and BPA networks, to comply with Western Electric Coordinating Council (WECC) reliability standards.

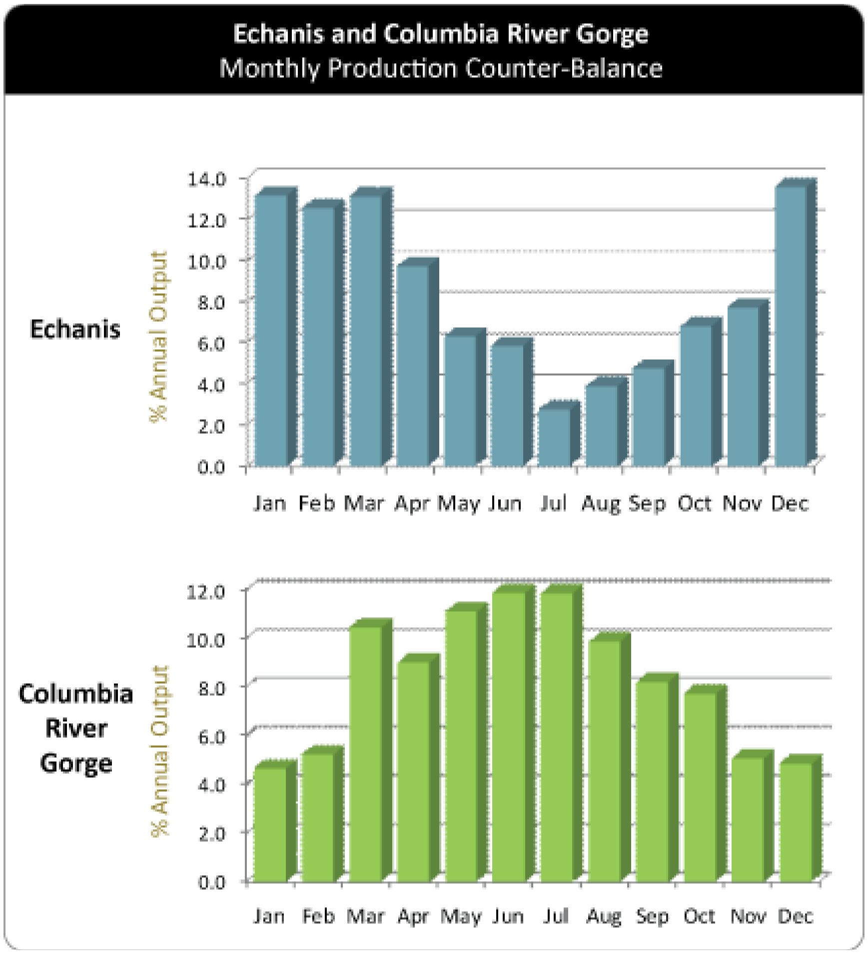

Figure 3.18-3 Echanis Project and Columbia River Gorge Projects Estimated Typical Monthly Energy Generation (in percent annual output).

BPA Upgrades

- Harney Substation - Static VAR Compensator (SVC, @ +20/-12 Mvar) and flow-based Remedial Action Schemes (RAS).
- Communications - Communications media, voice, metering and data, monitoring, and control equipment and RAS to coordinate the transmission of Echanis-generated power, and one other project on the Harney-Redmond line, with BPA's network to comply with WECC reliability standards.
- Harney-Redmond 115-kV Transmission Line - Upgrade of about a 20-mile section of transmission line between Brasada and Redmond from a Maximum Operating Temperature (MOT) of 80 degrees Celsius to 100 degrees Celsius by re-sagging /re-tensioning that line section, replacing individual structures, or adding intermediate structures as needed.

Idaho Power Company Upgrade

- Hines Substation - Replace the 50-MVA Hines Substation transformer with a 100-MVA unit to allow for single-line outage contingencies between BPA-Harney and Idaho Power Company systems.

In addition to the above equipment upgrades, HEC would have to make operational changes. HEC does not generate any of its own power or have any other power generators located in its service area. Thus, its electrical distribution system is only designed to deliver power to its members. Some of the related operational changes that would be required so that HEC could transmit the power from the Echanis Project to the regional electrical grid system include:

- Taking on the new role would require HEC to formally change its status from a "local service provider" to a "transmission owner and provider," and require it to coordinate the new power transmission with WECC.
- New operational procedures and training would have to be implemented to manage generation from several sources.
- Current service interruptions that occur about twice a year, to complete minor system maintenance, would have to change so that the Echanis Project could deliver the contracted power reliably. (Whitaker 2010)
- It is estimated that it would take at least 6 to 12 months to implement the above changes to the HEC electrical distribution and operational system.

Mitigation

There would be no impacts to energy, so no mitigation measures are recommended.

3.18.3.3 Alternative B – West Route (Proposed Action)

The addition of this Project would increase the flow of renewable wholesale electric power available to utilities for retail sale in the state of California, as well as, within Oregon. Further, the near-term availability of access to wind energy would increase the likelihood for the larger utilities in Oregon to meet their intermediate RPS goals. The West Route under Alternative B would provide a direct route to the HEC 115-kV transmission line, which would interconnect the proposed line to the BPA integration point. The power would then be transmitted through the BPA transmission system to Southern California Edison (SCE). As indicated above, if the West Route is selected in the this EIS, no line upgrades are foreseen on the HEC system. However, the 30-MVA regulator at the HEC Hanley Substation will either have to be replaced or moved south of the Echanis Project's interconnection point on the HEC Hanley-Catlow 115-kV transmission line.

The existing HEC 115-kV line would remain operational during the first phase of the proposed line, where it would carry one three phase circuit. The addition of the four proposed wind energy projects would require the North Steens transmission line to be developed to its full 230-kV capacity. This is discussed in the cumulative effects section (Section 3.19).

While construction of the Project might require the use of additional energy, the long-term energy generation transmitted as a result of operation of the Project would greatly exceed any potential increase in energy use during the construction phases.

Future Construction Phase – Upgrade to 230-kV

The upgrade of the initial single-circuit transmission line to a double-circuit 230-kV transmission line would require a second construction phase at a future date, when additional capacity was required on the transmission line. During the second construction phase, similar temporary construction related effects would be experienced, as described above. Increased energy generation with the development and operation of future Project phases would generate more power than would be needed to offset the construction of those additional phases.

Mitigation

There would be no impacts to energy, so no mitigation measures are recommended.

South Diamond Lane Route Option

The potential effects for the South Diamond Lane Route Option would be the same as those discussed for the Alternative B – West Route, including the future construction phase to upgrade to a 230-kV transmission line.

Hog Wallow Route Option

The potential effects for the Hog Wallow Route Option would be the same as those discussed for the Alternative B – West Route, including the future construction phase to upgrade to a 230-kV transmission line.

115-kV Transmission Line Option

~~There are several effects of this option regarding energy, as compared to the other alternatives.~~ Under this option, there would be no need to upgrade the HEC 115-kV line to a 230-kV line. However, the reduced voltage transmission line would not be able to transmit as much energy or interconnect as many potential wind energy projects as a 230-kV line, thus requiring additional transmission lines in the area if additional projects were developed. Furthermore, generally energy transmission line losses increase as voltage decreases, with all else constant. Therefore, this option would incur higher transmission line losses compared to other action alternatives. It should be noted that this alternative would result in long-term energy generation, which would more than offset any potential combined increase in energy needs from construction and total transmission line losses.

3.18.3.4 Alternative C – North Route (Preferred Alternative)

The potential effects for this option are the same as those discussed for Alternative B – West Route, with two exceptions. As indicated above, if the Alternative C - North Route is selected in this EIS, HEC would have to replace approximately 20 miles of the existing "3/0" 115-kV transmission line conductor with a higher rated 115-kV conductor. The 20-mile line section originates from CEP's gen-tie line interconnection point at HEC's Crane Substation to the east of the HEC Hanley Substation 30-MVA regulator and the BPA Harney Substation. In this case, the Hanley 30-MVA regulator would not be affected. Second, the route is longer under this alternative than for the Proposed Action and, therefore, is subject to an increase of energy loss along the transmission line, as compared to the shorter route. Energy is lost through transmission lines due to resistance (line loss). Line losses decrease with higher voltages and increase with longer distances and higher loads. This alternative would result in long-term energy generation realized from the operation of the Project, greater than any potential increase in energy needs during construction combined with total line losses.

Future Construction Phase – Upgrade to 230-kV

The upgrade of the initial single-circuit transmission line to a double-circuit 230-kV transmission line would require a second construction phase at a future date, when additional capacity was required on the transmission line. During the second construction phase, similar temporary construction related effects would be experienced, as described above. The increased amount of energy generation transmitted as a result of the upgraded operation of the Project would be greater than any potential increase in energy needs during the construction phases.

115-kV Transmission Line Option

Under this option, there would be no need to upgrade the HEC 115-kV line to a 230-kV line. However, the reduced voltage transmission line would not be able to transmit as much energy or interconnect as many potential wind energy projects as a 230-kV line, so additional transmission would be required if additional wind projects are permitted in the Project Area. In addition, this option would incur higher transmission line losses compared to Alternative C. As with Alternative B, this alternative would have negligible short-term energy effects and the long-term energy generation effects would far outweigh any potential minimal increase in energy needs during construction combined with total line losses.

Mitigation

There would be no impacts to energy, so no mitigation measures are recommended.

3.18.3.5 Residual Effects after Mitigation

There are no mitigation measures recommended for energy, so there are not residual effects.

3.18.3.6 Summary Comparison of Alternatives

Table 3.18-2 summarizes the effects that the Echanis Wind Energy Project, transmission line alternatives, and route options would have on development and use of renewable energy and the existing power transmission and distribution systems in Harney County.

Table 3.18-2 Summary of the Effects to Energy

		Alternative B			
	Alternative A - No Action	West Route (Proposed Action)	S. Diamond Lane Route Option	Hog Wallow Route Option	Alternative C - North Route (Preferred Alternative)
Renewable Electrical Power Supply	Under the No Action Alternative, the Echanis Project would not be constructed and would not contribute to regional efforts to meet the 2025 RPS goal in Oregon, or the 2020 goal in California.	Results in an increased supply of renewable wholesale electric power, available to utilities for retail sale.	Same as Alternative B - West Route	Same as Alternative B - West Route	Same as Alternative B - West Route
Power Transmission	No effect	Results in an increased transmission of renewable wholesale electric power, available to utilities for retail sale.	Same as Alternative B - West Route	Same as Alternative B - West Route	Same as Alternative B - West Route
Power Distribution	No effect	No effect	No effect	No effect	No effect

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