3.16 AIR QUALITY AND CLIMATE CHANGE/GREENHOUSE GASES

This section addresses the potential effects of Alternative B West Route and alternatives on local and regional air quality in the United States and on global climate change. For both criteria and greenhouse gas emissions, the analysis of the air quality effects of the action alternatives are based upon equipment specifications and planning estimates for construction activities. Emissions from operation and maintenance of the action alternatives would be very minor. Consistent with criteria emissions estimates, greenhouse gas emissions are evaluated on a quantitative basis.

3.16.1 Methodology

Effects to air quality would result from engine exhaust and fugitive dust (particulate) emissions caused by operation of off-road construction equipment and on-road vehicles. In addition to criteria pollutants, emissions of greenhouse gases are also estimated. Equipment lists and work schedules were provided by the Applicant.

Emission calculations were performed using the most recent (2008) emission factors published by the South Coast Air Quality Management District (SCAQMD)[1] and EPA (2006). For Alternative B West Route, actual construction would require about six months of planned work activities; construction could be distributed over a 10-month or longer period if work stoppages were required as a result of inclement weather or other factors. Extending the schedule to 12 months would not affect the air quality analysis because it was based upon maximum daily emissions (pounds per day) and total emissions (tons per year), which would remain unchanged.

Air quality effects were assessed using significance thresholds established by the Environmental Protection Agency (EPA) for Prevention of Significant Deterioration (PSD) to air quality in attainment areas, which are listed later in Table 3.16-7. The greatest potential for effects would occur during the construction activities that would result in ground disturbances (earthmoving), which would cause fugitive dust to be entrained in the wind. Effects from inspection and maintenance activities during operations were assessed qualitatively, through comparison to emissions from construction. As discussed in Section 3.16.2.3, General Conformity does not apply because the action alternatives would occur in a federal air quality attainment or unclassified area.

The analysis incorporated 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 issues be addressed with regards to air quality and climate change:

- Potential climate change effects:
  - Release of greenhouse gases to the atmosphere.
  - How the Project would be affected by the disruption of natural cycles (hydrology, sea level, weather patterns, precipitation rates, and chemical reaction rates) due to climate change.
- Potential effects to air quality:
  - Fugitive dust particulates from construction activities and ongoing use of the roadways.
  - Identification of types of fuels proposed for use during Project construction.

[1] Oregon ODEQ does not publish its own emission factors; the SCAQMD off-road factors are based on federal standards pursuant to 40 CFR 89.112; SCAQMD onroad factors are based on 40 CFR 86 et seq. vehicle category standards.

  - Effects to air quality from increased traffic during Project operation.
  - Release of VOC and NO_x emissions from equipment and vehicles.
- Mitigation or avoidance of effects to air quality and greenhouse gas emissions.
- Regulatory compliance:
  - Project effects to criteria pollutants under the National Ambient Air Quality Standards (NAAQS), including ozone; visibility impairment, and air quality related values (AQRV) in the protection of any affected Class I Areas.
  - Disclosure of any substantial concentrations of hazardous air pollutants.
  - Protection of public health.

3.16.2 Affected Environment

The alternative corridors of Alternative B West Route and alternatives would be located entirely within Harney County. Information about air quality in the affected environment was obtained from the Oregon Department of Environmental Quality (ODEQ). Air monitoring data collected by ODEQ in Burns is considered representative of Harney County in general. The locations of the transmission line corridors and the Echanis Wind Farm are depicted in Figure 2.0-1of the Project Description.

3.16.2.1 Climate

Harney County is located in southeastern Oregon and is the largest county by land area in the state. The County has a diverse landscape with forests, sagebrush, lakes, streams, deserts, and mountains. The county is located at the northwestern extremity of the Great Basin. The City of Burns (43.586°N, 119.054°W; or Township 23 South, Range 31 East) is the county seat at an elevation of approximately 4,200 feet above sea level (ASL).

Harney County has a cool, arid climate which can be generally characterized as high desert. Average annual rainfall is about 11.5 inches. Summer highs range from 75 to 85°F and winter lows are in the range of 15 to 25°F. Average annual temperature is about 46°F. Wind speeds average 8 to 9 miles per hour on an annual basis (WC 2009, NOAA 2008).

3.16.2.2 Air Quality Standards

Air quality in a given location is determined by the concentration of various pollutants in the atmosphere. NAAQS have been established by the U.S. Environmental Protection Agency (EPA)[2]. The NAAQS represent maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect public health (primary standards) and welfare (secondary standards). The EPA has defined six criteria pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable and fine particulate matter (PM_{10} and $PM_{2.5}$, respectively)[3], and airborne lead (Pb). The Clean Air Act (CAA) allows states to adopt ambient air quality standards and other regulations as long as they are at least as stringent as federal standards. The ODEQ has established NAAQS as state standards for all pollutants except SO_2, with more stringent (i.e., lower) 24-hour and annual exceedence levels for the state. State and federal ambient air quality standards are shown in Table 3.16-1.

[2] http://www.epa.gov/air/criteria.html

[3] PM_{10} refers to particulate matter 10 microns or smaller in diameter; $PM_{2.5}$ refers to particulate matter 2.5 microns or smaller.

Table 3.16-1 Ambient Air Quality Standards

		Oregon Standards		Federal Standards	
Pollutant	Averaging Time	ppmv	ug/m^3	ppmv	ug/m^3
Ozone (O_3)	8-hour	0.075	147	0.075	147
Nitrogen Dioxide (NO_2)	Annual	0.053	100	0.053	100
Sulfur Dioxide (SO_2)	3-hour (secondary)	0.50	1,309	0.50	1,309
	24-hour	0.10	262	0.14	367
	Annual	0.02	52	0.03	79
Carbon Monoxide (CO)	1-hour	35	40,071	35	40,071
	8-hour	9	10,304	9	10,304
Respirable Particulates (as PM_{10})	24-hour	--	150	--	150
Fine Particulates (as $PM_{2.5}$)	24-hour	--	35	--	35
	Annual	--	15	--	15
Lead (Pb)	3-month (rolling)	--	0.15	--	0.15

Source: ODEQ 2009a, EPA 2009b

Notes:

ppmv = parts per million by volume

ug/m3 = micrograms per cubic meter

For gases, ug/m3 calculated from ppmv based on molecular weight and standard conditions

Standard Temperature: 25 deg C

Standard Molar Volume: 24.465 liter/g-mole

3.16.2.3 Attainment Status

Areas that violate federal and/or state air quality standards are designated as nonattainment areas for the relevant pollutants, as opposed to areas that do comply with federal and/or state air quality standards, and hence are designated as attainment areas (i.e., areas that have attained compliance) for the relevant pollutants. Areas where insufficient data are available are designated as unclassified areas.

The ODEQ has established a State Implementation Plan (SIP) that describes how the state will comply with the CAA and achieve attainment with federal and/or state air quality standards. It consists of narrative, rules, technical documentation, and agreements that the state uses to maintain acceptable air quality and to improve air quality in areas with unacceptable levels of atmospheric contaminants. Where applicable, local attainment plans must also be approved by the state and incorporated into the SIP[4].

A General Conformity determination is required for federally sponsored or funded actions in nonattainment areas or in certain maintenance areas when the total direct and indirect net emissions of nonattainment pollutants (or their precursors) exceed specified thresholds (Section 176(c) of the CAA Amendments of 1990). This regulation ensures that federal actions conform to the SIP and agency (e.g., ODEQ) NAAQS attainment plans. Because Harney County is either in attainment or unclassified for all pollutants, General Conformity does not apply to the Proposed Action or action alternatives.

Most areas in the State of Oregon meet NAAQS, except Klamath Falls and Oakridge which currently violate the daily $PM_{2.5}$ standard. Lakeview and Burns are also exceeding the $PM_{2.5}$ standard and could violate it when three years of federal reference data were collected at the end of 2009, and have been validated and analyzed

[4] Harney County has no local attainment plans; authority is exercised by the state.

(which can take as much as a year to do). Table 3.16-2 lists the attainment status of Harney County for each of the criteria pollutants (ODEQ 2009b).

Table 3.16-2 Attainment Status Summary – Harney County

Criteria Pollutant	Federal Designation
Ozone (O_3) (8-hour)*	Attainment
Nitrogen Dioxide (NO_2)	Attainment
Sulfur Dioxide (SO_2)	Attainment
Carbon Monoxide (CO)	Attainment
Particulates (as PM_{10})	Attainment
Particulates (as $PM_{2.5}$)	Unclassified***
Lead (Pb)**	Attainment

Source: ODEQ 2009b

Notes:

* The 0.08 ppmv federal 8-hour ozone standard applied until 2008; 0.075 ppmv thereafter

** The 1.5 ug/m^3 federal quarterly lead standard applied until 2008; 0.015 ug/m^3 rolling 3-month average thereafter

*** "Burns [Harney County] is in danger of violating the standard when three years of federal reference method (FRM) data are collected. FRM monitoring data is the official data used for attainment designation" (ODEQ 2009a).

3.16.2.4 Sources of Air Pollutants

Although industry is a source of some air pollution in Oregon, it accounts for less than 15 percent of most types of criteria pollutants. Industry emissions are lower because the 1990 Clean Air Act Amendments forced the installation of pollution control devices, such as bag houses, and the development of pollution prevention measures, such as updating antiquated boilers or using alternative production processes. Motor vehicles and woodstoves, fireplaces, and open burning are now the primary sources of man made criteria air pollution in Oregon. Emissions from motor vehicles contribute to ground level ozone (smog), especially on hot summer days. Woodstoves and fireplaces are a primary source of wintertime smoke (PM_{10} and $PM_{2.5}$) levels. Other major sources of pollution are from domestic activities such as gas-powered lawn mowers, paints, solvents, aerosol products like hairspray and air fresheners, charcoal barbeques, and outdoor burning. Forest fires also are a major contributor of smoke and the U.S. Forest Service is actively using prescribed burning to reduce fuel in forests. The prescribed burning also contributes to smoke, but "ideally" at a far lower amount than wild fires (ODEQ 2009a).

Local emissions of PM_{10} and $PM_{2.5}$ are primarily the result of fugitive dust from travel on unpaved roads, as well as construction and agricultural activities. Coarser particles also could be emitted from activities that disturb the topsoil. Other sources include wind-blown dust, pollen, salts, brake dust, and tire-wear. Although $PM_{2.5}$ is a subset of PM_{10}, it differs from the rest of PM_{10}. While the majority of ambient PM_{10} results from direct emissions of the pollutant, a significant amount of the ambient $PM_{2.5}$ results from chemical transformation (i.e., chemical reactions) of precursors and condensing of gaseous pollutants in the atmosphere. Other than direct $PM_{2.5}$ emissions, the key pollutants contributing to $PM_{2.5}$ concentrations in the atmosphere are SO_2, NO_X, VOCs, and ammonia (CARB 2005).

3.16.2.5 Ambient Air Quality

The ODEQ ambient air monitoring station closest to the Alternative B West Route is located in Burns, approximately 40 miles (64 km) north-northwest of the Project Area. Presently, the Burns monitoring station measures only $PM_{2.5}$ by Federal Reference Method (FRM), although in the past it measured PM_{10}. Tables 3.16-3 and 3.16-4 summarize validated annual and 24-hour air quality data collected at Burns during the 11-

year period from 1998 through 2008 (inclusive). The tables also indicate the number of days in any given year in which 24-hour standards were exceeded for PM_{10} and $PM_{2.5}$, as applicable.

Table 3.16-3 Ambient Air Quality in Project Vicinity - Monitored PM_{10}

Year	Sample (days)	Exceedence (days)	Annual Mean (ug/m^3)	24-Hour Max (ug/m^3)
1998	170	0	24.7	81
1999	144	0	25.2	62
2000	145	0	21.9	54
2001	116	0	20.8	64
2002	107	0	24.1	136
2003	56	0	17.4	38
2004	55	0	18.4	52
2005	30	0	*	*
2006	32	0	*	*

Source: ODEQ 2009a

Notes:

ug/m^3 = micrograms per cubic meter

PM_{10} monitoring in Burns (Harney County) ceased in 2007

* insufficient number of samples collected for statistical analysis by ODEQ

Table 3.16-4 Ambient Air Quality in Project Vicinity - Monitored $PM_{2.5}$

Year	Sample (days)	Exceedence (days*)	Annual Mean (ug/m^3)	24-Hour Max (ug/m^3)
2000	44	38	9.3	38
2001	60	31	9.1	39
2002	54	30	9.7	36
2003	**	**	**	**
2004	**	**	**	**
2005	**	**	**	**
2006	**	**	**	**
2007	58	36	9.5	37
2008	54	36	11.2	41

Source: ODEQ 2009a

Notes:

ug/m^3 = micrograms per cubic meter

$PM_{2.5}$ monitoring in Burns (Harney County) commenced in 2000

per 2006 daily standard of 35 ug/m^3 (was 65 ug/m^3), 98th percentile

** no complete data available from ODEQ for 2003-06; Federal Reference Method (FRM) monitoring commenced in 2007

3.16.2.6 Odors

The Alternative B West Route and action alternatives are in a relatively remote high desert area, with a small population and no typical sources of odors other than dispersed livestock operations. There is no record of offensive (nuisance) odors reported in the vicinity of the action alternatives, pursuant to ODEQ Rule 340-208-0300, Nuisance Prohibited.

3.16.2.7 Sensitive Receptors

Sensitive receptors are those populations that are more susceptible to the effects of air pollution than the population at large, and those located in close proximity to localized sources of hazardous air pollutants (HAPS, also referred to as air toxics) and CO, which are of particular concern (see Figure 3.16-1). Sensitive receptors can include long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, childcare centers, parks and recreations centers, and athletic facilities. For air quality analyses when emissions are over applicable significance thresholds, sensitive receptors within 0.25 mile (400 meters) of a site are typically identified and assessed for ambient effects. Tables 3.16-5 and 3.16-6 list receptors proximate to the action alternatives, respectively, which are also shown in Figure 3.16-5. As shown in the Environmental Effects and Mitigation section, no significance thresholds are exceeded and, therefore, no ambient effect analyses are required.

Table 3.16-5 Proposed Action Transmission Line Sensitive Receptors

Type	Number	Distance (m)	Bearing	Degrees	Minutes	Seconds	Decimal
Alternative B – West Route (N-S)							
Residential	24	300	North	43	2	0.48	43.033467
			West	118	45	30.50	-118.758472
Residential	25	235	North	43	1	35.65	43.026569
			West	118	45	15.88	-118.754411
Residential	26	175	North	43	1	6.49	43.018469
			West	118	43	56.12	-118.732256
Residential	27	510	North	43	0	48.02	43.013339
			West	118	49	11.47	-118.819853
Residential	28	765	North	43	0	36.64	43.010178
			West	118	42	20.50	-118.705694
Residential	29	520	North	43	0	0.00	43.000000
			West	118	43	0.32	-118.716756
Residential	23	1,130	North	42	56	54.16	42.948378
			West	118	37	40.37	-118.627881
Alternative B – Hog Wallow Option							
Residential	27	510	North	43	0	48.02	43.013339
			West	118	49	11.47	-118.819853
Alternative B – South Diamond Lane Option							
Residential	27	2,180	North	43	0	48.02	43.013339
			West	118	49	11.47	-118.819853

Table 3.16-6 Proposed Action Wind Farm Sensitive Receptors

Type	Number	Distance (m)	Bearing	Degrees	Minutes	Seconds	Decimal
Echanis Wind Turbines (N-S)							
Residential	22	26,000	North	43	4	21.64	43.072678
			West	118	36	18.15	-118.605042
Residential	29	24,000	North	43	0	0.00	43.000000
			West	118	43	0.32	-118.716756
Residential	30	14,500	North	42	56	22.69	42.939636
			West	118	19	55.25	-118.332014
Residential	31	4,700	North	42	44	28.50	42.741250
			West	118	28	34.54	-118.476261
Residential	32	5,100	North	42	44	22.08	42.739467
			West	118	28	17.70	-118.471583
Residential	33	5,200	North	42	44	17.10	42.738083
			West	118	28	18.48	-118.471800
Residential	34	17,200	North	42	37	4.46	42.617906
			West	118	29	46.46	-118.496239

3.16.2.8 Greenhouse Gases and Climate Change

The American Meteorological Society (AMS) refers to climate change as any systematic change in the long-term statistics of climate elements (such as temperature, pressure, or winds) sustained over several decades or longer. The Society also indicates that climate change could be due to natural external forcings, such as changes in solar emission or slow changes in the Earth's orbital elements, natural internal processes of the climate system, or anthropogenic forcing. The climate system can be influenced by changes in the concentration of various greenhouse gases (GHG) in the atmosphere that affect the Earth's absorption of radiation (AMS 2009).

In its *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2006*, EPA (2009c) provides summary information about the work of the United Nations Framework Convention on Climate Change and the Intergovernmental Panel on Climate Change (IPCC 1990-2007). Key information from that report is summarized below.

The United Nations Framework Convention on Climate Change defined climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (UNFCCC 2009). In its *Second Assessment Report* (1995) of the science of climate change, the IPCC concluded that "human activities are changing the atmospheric concentrations and distributions of greenhouse gases and aerosols. These changes can produce a radiative forcing by changing either the reflection or absorption of solar radiation, or the emission and absorption of terrestrial radiation." Building on this conclusion, the *IPCC Third Assessment Report* (2001) asserted that "concentrations of atmospheric greenhouse gases and their radiative forcing have continued to increase as a result of human activities."

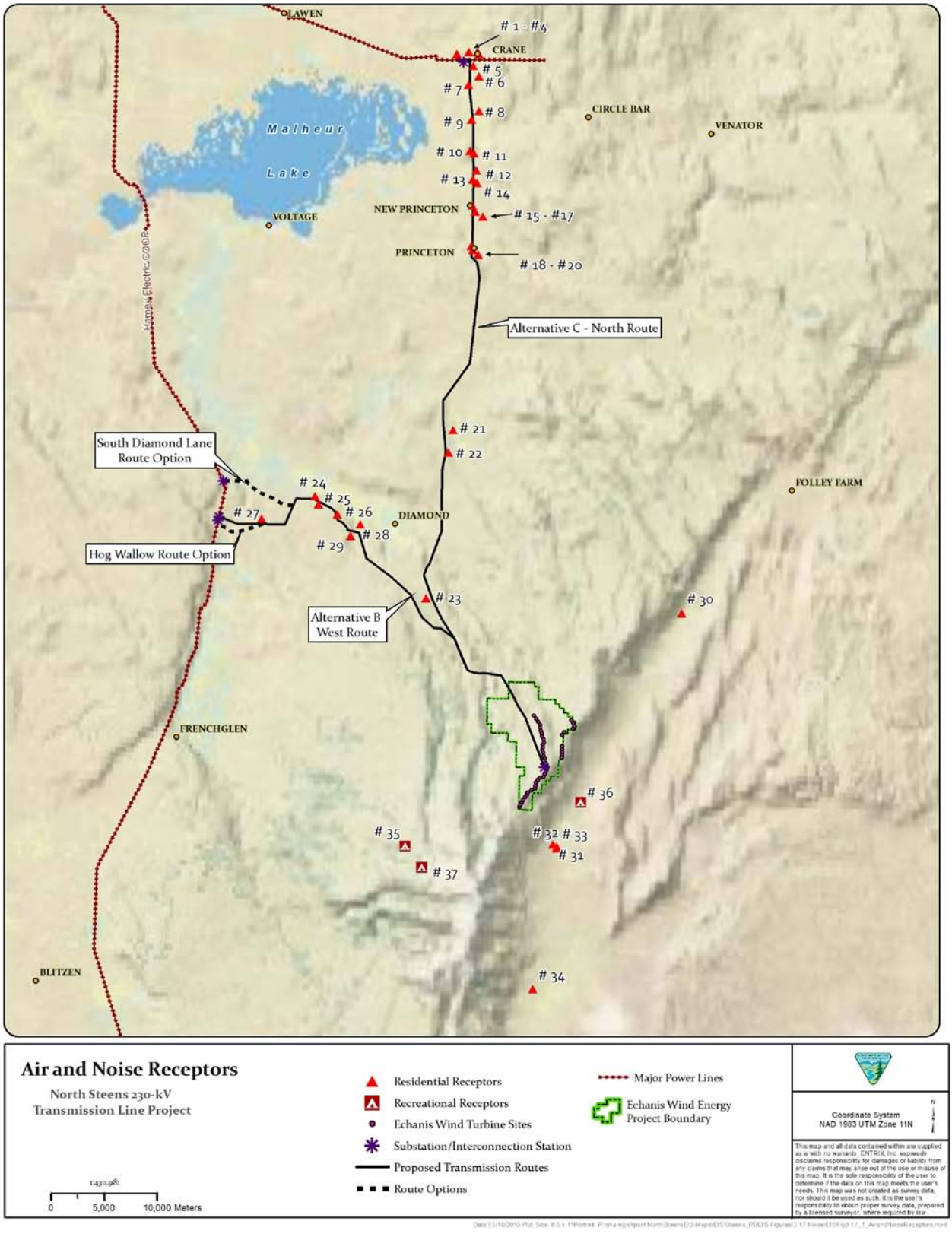

Figure 3.16-1 Sensitive Receptors.

The IPCC reports that the global average surface temperature of the Earth has increased by between 1.1 ± 0.4°F (0.6 ± 0.2°C) over the 20th century. This value is about 0.27°F (0.15°C) larger than that estimated by the *Second Assessment Report*, which reported for the period up to 1994, "owing to the relatively high temperatures of the additional years (1995 to 2000) and improved methods of processing the data."

While the *Second Assessment Report* concluded, "the balance of evidence suggests that there is a discernible human influence on global climate," the *Third Assessment Report* more directly connects the influence of human activities on climate. IPCC concluded that, "In light of new evidence and taking into account the remaining uncertainties, most of the observed warming over the last 50 years is likely to have been due to the increase in greenhouse gas concentrations."

In its most recent report (*Fourth Assessment Report*, 2007), the IPCC stated that warming of Earth's climate is unequivocal, and that warming is very likely attributable to increases in atmospheric greenhouse gases caused by human activities. IPCC further stated that changes in many physical and biological systems, such as increases in global temperatures, more frequent heat waves, rising sea levels, coastal flooding, loss of wildlife habitat, spread of infectious disease, and other potential environmental effects are linked to changes in the climate system, and that some changes might be irreversible.

There currently are no federal standards relating to GHG emissions, although on February 18, 2010 the Council on Environmental Quality issued draft Greenhouse Gas Emission guidance. This guidance does not apply to federal land managers such as the BLM and USFWS. The EPA and other federal agencies have established voluntary programs with state and local agencies and businesses, intended to increase energy efficiency and reduce GHG emissions.

State Actions

STATEWIDE EMISSIONS

In 2004, Oregon's GHG emissions were about 67.5 million metric tons[5] (MMT) of carbon dioxide equivalents (CO_2 eqv). That was about one percent of greenhouse gas emissions for the United States as a whole, which were about 7,100 MMT CO_2 eqv. Greenhouse gas emissions increased by about 12 MMT CO_2 eqv from 1990 levels by 2004, which is a 22 percent increase over Oregon's 1990 GHG emissions of 55.5 MMT CO_2 eqv. This compares with a 16 percent increase for the United States as a whole (ODEQ 2009a).

The vast majority of Oregon's GHG emissions (about 85 percent) comprise CO_2 from combustion sources. The primary source of CO_2 is burning of fossil fuels, such as coal at power plants serving the state, gasoline, diesel fuel, and natural gas. There were also emissions from industrial processes, such as the manufacture of cement and from combustion of fossil-fuel derived products (e.g., plastics) in burning municipal and industrial wastes. In 2004, emissions of methane (CH_4), primarily from cattle and landfills, contributed about 7 percent of greenhouse gas emissions in Oregon. Nitrous oxide (N_2O) emissions, primarily from agricultural practices, contributed about 4 percent to greenhouse gas emissions. High global warming potential (GWP) gases consist of two types, hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs), and one individual gas, sulfur hexafluoride (SF_6), and accounted for the remaining 4 percent of emissions. Emissions measured in CO_2 equivalents are calculated by multiplying the mass of each emitted gas by the coefficient of its GWP and summing the results for all the different gases (ODEQ 2009a).

[5] A metric tonne is 1,000 kilograms or 2,204.6 pounds (1.1023 English short tons)

QUANTITATIVE THRESHOLDS

Neither the federal government or the state have established quantitative thresholds for assessing the relative contribution of GHG emissions. No enforceable rules or regulations have been promulgated by ODEQ or any other state agency that define a substantial source of GHG emissions. In addition, there are no applicable facility-specific emission limitations or caps for GHG emissions statewide. Thus, there is no present state regulatory or guidance mechanism for determining whether a project advances or hinders Oregon's GHG reduction goals (ODOE 2004, 2008).

REPORTING RULES

In 2008, the Oregon Environmental Quality Commission (EQC) approved GHG mandatory reporting rules. The rules are needed to gain a better understanding of the sources of GHG emissions in Oregon, and to track progress toward meeting GHG emission reduction goals. The rules will also govern the collection of data regarding GHG emission sources in Oregon (ODEQ 2009c).

On September 22, 2009, the EPA finalized federal rules and emissions quantification methodologies for GHG reporting commencing in 2011 for the 2010 reporting year. The rules require reporting of GHG emissions from large source categories (25,000 MMT CO_2 eqv or greater) in the United States, and are intended to collect accurate and timely emissions data to inform future policy decisions (ODEQ 2009c).

Because the action alternatives would not be applicable stationary sources of GHG emissions, neither state nor federal mandatory reporting rules described above would apply to the Project.

STATE EMISSIONS STANDARDS

In December 2005, the EQC adopted rules to establish the Low Emission Vehicles (LEV) program. Oregon was the 11th state to adopt California's strict emission standards for new vehicles. Oregon's LEV requirements reduce pollution in several ways. The rules decrease emissions that cause ground-level ozone, promote zero-emission vehicles, and reduce greenhouse gases. The program applies only to new cars and trucks (vehicles with fewer than 7,500 miles) and began with the 2009 model year. When the rules take full effect in model year 2016 they will reduce greenhouse gas emissions by 30 percent and substantially improve fuel efficiency (ODEQ 2009d).

In 2010, under the authority of Oregon House Bill 2186, ODEQ will develop a proposed low carbon fuel standard rule to be considered by the EQC. To help develop that rule, ODEQ is working closely with an advisory committee of diverse interests and stakeholders to help design an effective low carbon fuel standard program. Once a proposed rule is developed, ODEQ will begin a formal and public rulemaking process to seek public and stakeholder review and comment on the proposed rules. ODEQ's low carbon fuel standard rule could be modified based upon public comment. ODEQ hoped to take its final proposed rule to the EQC for consideration in December 2010. House Bill 2186 did not place requirements on farmers or agricultural operations, and the bill specifically exempts farm trucks, tractors and logging trucks. However, the low carbon fuel standard could result in new markets for Oregon farm and forest products such as canola and mustard, which can be crushed to make biodiesel. With advances in technology, cellulosic ethanol could soon be produced from agricultural residues and wood (ODEQ 2009e).

The LEV standards would only indirectly affect the action alternatives, because post-construction inspection and maintenance activities could involve the use of LEVs. Similarly, the low carbon fuel standard could eventually affect fuel used by inspection and maintenance vehicles. Nether of these two initiatives would be expected to affect construction of the action alternatives.

3.16.3 Environmental Effects and Mitigation

In the absence of applicable ODEQ significance thresholds for construction activities in NAAQS attainment areas, air quality effects were assessed against PSD significance thresholds codified in 40 CFR 51.166, as shown in Table 3.16-7.

Table 3.16-7 Emissions Significance Thresholds – Prevention of Significant Deterioration

Criteria Emissions	tons/yr
Volatile Organic Compounds (VOC as CH_4)	40
Carbon Monoxide (CO)	100
Oxides of Nitrogen (NO_X as NO_2)	40
Sulfur Dioxide (SO_X as SO_2)	40
Particulates (PM_{10})	15*
Particulates ($PM_{2.5}$)	10**
Lead (Pb)	0.6

Source: 40 CFR 51.166

Notes:

25 tons/yr total PM, 15 tons/yr PM_{10}

** direct $PM_{2.5}$ emissions

As presented below, emissions from diesel engines used in off-road construction equipment were estimated using SCAQMD emission factors, which are based upon federal standards contained in 40 CFR 89.112, which makes them applicable in any location. Similarly, emissions from onroad vehicles were estimated using SCAQMD emission factors, based upon 40 CFR 86 et seq. vehicle category standards. The SCAQMD factors are pre-processed for conservatism and, thus, tend to overestimate the potential effects.

The transmission line, whether using the Proposed or alternative routes, would be constructed on newly installed double-circuit steel-pole towers. Initially, a single 115-kV circuit (three conductors) would be installed on one side of the towers (Phase I) to transmit the power generated by the Echanis project. This first circuit would be constructed so that it could transmit 230-kV, but it would only initially be operated at 115-kV for the Echanis project, and it would be installed concurrently with the actual erection of the new poles and construction of access roads. Future plans call for a second line operating at 230-kV to be placed on the other side of the poles (Phase II). This second circuit would be installed later, at an unknown date, when additional electrical system capacity was required to transmit the power generated by the West Ridge, East Ridge, or Riddle Mountain projects. Finally, the initial Phase I 115-kV line could be "re-energized" (no construction required) to 230-kV operation (Phase III) to transmit power if more than one or two of the West Ridge, East Ridge, or Riddle Mountain projects was constructed and the additional capacity was needed after Phase II was implemented. The second phase of construction would use the same laydown areas, tensioning sites, and overland routes used during the first phase. As such, the Phase I construction would be the "heavy lifting" portion of the Alternative B West Route, comprising installation of the new poles along with foundations and access roads. Phase II would only require stringing of three more conductors on the previously erected poles (no additional pole installation), and thus relatively "light" work. It should be noted that implementation of Phases II and III of the Applicant's transmission line system would also require upgrades of the Harney Electric Cooperative's existing transmission lines and ancillary facilities in the area, from 115-kV to 230-kV capacity and operation.

In general, construction of the wind farm would entail construction of access roads and turnarounds, grading of foundation pads, excavation and pouring of concrete tower foundations, trenching for underground power collector cables, installation of switchgear and step-up transformers, assembly and erection of wind turbine towers, attachment of generator nacelles, and hoisting of hub/blade assemblies onto transmission (gearbox)

input shafts. In addition to standard earthmoving and concrete work activities, much of wind farm construction would involve the use of tall heavy-lift cranes for tower erection, nacelle placement, and hub/blade attachment. For safety reasons, all crane work must be performed during relatively calm wind conditions, especially during hoisting of the lightweight aerodynamic hub/blade assemblies.

3.16.3.1 Alternative A – No Action

PERMANENT EFFECTS

Under the No Action Alternative, the proposed transmission line and the connected Echanis wind farm would not be installed; therefore, the generation of renewable energy at this location would not occur. This opportunity loss might be offset by mixed generating resources, including natural gas, coal, hydroelectric, nuclear, solar, wind, geothermal, and biomass. The Echanis wind farm would have had an average annual generating capacity of approximately 463,000 megawatt-hours[6], which might otherwise cause to be emitted elsewhere about 194,000 metric tons of CO_2 equivalents annually from mixed generating resources serving the Northwest region[7] (TCR 2008). In addition to GHG, criteria pollutants (VOC, CO, NO_X, SO_X, PM_{10}, and $PM_{2.5}$) from natural gas, coal, and biomass generating resources might be emitted elsewhere.

TEMPORARY EFFECTS

Under the No Action Alternative, the proposed transmission line and the connected Echanis wind farm would not be installed. Therefore, the effects to air quality and GHGs described for the construction of action alternatives would not occur.

MITIGATION

No mitigation would be required because no construction would occur. With operation of the action alternatives, energy conservation and development of zero net carbon energy projects would occur elsewhere.

3.16.3.2 Echanis Project Effects Common to All Action Alternatives

PERMANENT EFFECTS

AIR QUALITY

Once constructed, there would be no direct emissions of air pollutants from the Echanis wind farm, as connected to any of the transmission line alternatives. Because this electricity would be produced without burning carbon-based fuel, essentially no air pollutants would be generated per megawatt-hour of output (except for those related to inspections and maintenance as discussed below). Additionally, the wind turbines would aid in reducing the need to generate electricity within the United States using fossil-fuel generating resources, which could indirectly lead to reduced emissions from fossil fuel-fired power plants.

Inspection and maintenance activities would require occasional vehicle trips to patrol the wind farm, accomplish maintenance procedures, and to conduct repairs when necessary. Equipment and vehicle usage would be considerably less than required during construction, and the increase in emissions caused by such usage would be below the applicable thresholds listed in Table 3.16-7. Effects to air quality due to inspection and maintenance activities would be periodic and of short duration on each occasion, but would occur for the life of the Echanis Project.

[6] Assumes 46 mapped 2.3 MW turbines operating at 50 percent average annual capacity factor.

[7] GHG emissions are 926 lb/MW-hr or 0.42 tonnes/MW-hr as CO_2 eqv.

CLIMATE CHANGE/GHG

The wind turbines would generate electricity without burning fuel; therefore, no GHG would be generated per megawatt-hour of output (except for emissions related to inspections and maintenance). In addition, power generation from the Echanis Project would offset greenhouse gas emissions that would otherwise be produced from other types of energy generation sources, that might be required if it were not built.

TEMPORARY EFFECTS

AIR QUALITY

Wind farm construction would generate fugitive dust and exhaust emissions from the use of construction equipment, vehicles, and large cranes. Activities would be similar to transmission line construction (Proposed Action or alternatives) and would occur over an approximate 180-working day construction period, depending on site conditions. Table 3.16-8 presents a summary of the estimated maximum construction emissions with implementation of the fugitive dust reduction measures discussed under Alternative B Mitigation.

Table 3.16-8 Estimated Maximum Construction Emissions – Echanis Wind Farm (mitigated)

Criteria Emissions	Peak (lbs/day)	Total (tons)	Threshold (tons)	Substantial (Yes/No)
Volatile Organic Compounds (VOC as CH_4)	10.0	0.66	40	No
Carbon Monoxide (CO)	47.9	3.13	100	No
Oxides of Nitrogen (NO_X as NO_2)	84.9	5.05	40	No
Sulfur Dioxide (SO_X as SO_2)	0.1	0.01	40	No
Combustion Particulates (C-PM_{10})	3.8	0.25	15	No
Combustion Particulates (C-$PM_{2.5}$)	3.4	0.23	10	No
Fugitive Dust (F-PM_{10})	184	4.70	15	No
Fugitive Dust (F-$PM_{2.5}$)	22	0.68	10	No

Sources: SCAQMD 2008, EPA 2006

Note: Fugitive dust and combustion particulates are determined exclusively

As shown in Table 3.16-8, with implementation of the mitigation measures required by the ODEQ, the estimated maximum emissions of criteria pollutants are below PSD thresholds, thus, construction effects of the wind farm would be localized.

CLIMATE CHANGE/GHG

Table 3.16-9 presents a summary of the estimated maximum GHG emissions based on conservative assumptions.

Table 3.16-9 Estimated Maximum Construction GHG Emissions – Echanis Wind Farm

Greenhouse Gas Emissions	Peak (lbs/day)	Total (tons)	Threshold (tons)	Substantial (Yes/No)
Carbon Dioxide (GHG - CO_2)	10,627	645	n/a	n/a
Methane (GHG - CH_4)	0.9	0.06	n/a	n/a
Nitrous Oxide (GHG - N_2O)	0.4	0.03	n/a	n/a
Carbon Dioxide Equivalents (CO_2 eqv)	10,770	654	n/a	n/a

Sources: SCAQMD 2008, EPA 2009c

As shown in Table 3.16-9, maximum GHG construction emissions (CO_2 equivalents) from the Echanis wind farm would be about 0.0009 percent of Oregon's estimated 2004 emissions of 67.5 million metric tons of CO_2 equivalents (ODEQ 2009a). Further, the estimated emissions are conservative-case and actual emissions would be lower.

COMBINED TEMPORARY EFFECTS

AIR QUALITY

Table 3.16-10 presents a summary of the combined estimated maximum construction emissions for the combined Proposed Actions (i.e., transmission line and Echanis wind farm together) with implementation of the fugitive dust reduction measures previously discussed.

As shown in Table 3.16-10, with implementation of the mitigation measures required by the ODEQ,

Table 3.16-10 Estimated Maximum Construction Emissions - Combined Proposed Actions (mitigated)

Criteria Emissions	Peak (lbs/day)	Total (tons)	Threshold (tons)	Substantial (Yes/No)
Volatile Organic Compounds (VOC as CH_4)	17.1	0.85	40	No
Carbon Monoxide (CO)	81.7	4.14	100	No
Oxides of Nitrogen (NO_X as NO_2)	134.5	6.19	40	No
Sulfur Dioxide (SO_X as SO_2)	0.2	0.01	40	No
Combustion Particulates (C-PM_{10})	6.3	0.31	15	No
Combustion Particulates (C-$PM_{2.5}$)	5.7	0.28	10	No
Fugitive Dust (F-PM_{10})	287.0	6.33	15	No
Fugitive Dust (F-$PM_{2.5}$)	33.5	0.87	10	No

Sources: SCAQMD 2008, EPA 2006b

Note: Fugitive dust and combustion particulates are determined exclusively

the estimated maximum emissions of criteria pollutants would be well below PSD thresholds, thus, construction effects of the combined Proposed Actions would be localized.

CLIMATE CHANGE/GHG

Table 3.16-11 presents a summary of the combined estimated maximum GHG emissions for the combined Proposed Actions, based upon conservative assumptions.

Table 3.16-11 Estimated Maximum Construction GHG Emissions - Combined Proposed Actions

Greenhouse Gas Emissions	Peak (lbs/day)	Total (tons)	Threshold (tons)	Substantial (Yes/No)
Carbon Dioxide (GHG - CO_2)	16,818	832	n/a	n/a
Methane (GHG - CH_4)	1.5	0.07	n/a	n/a
Nitrous Oxide (GHG - N_2O)	0.7	0.03	n/a	n/a
Carbon Dioxide Equivalents (CO_2 eqv)	17,062	844	n/a	n/a

Sources: SCAQMD 2008, EPA 2009c

As shown in Table 3.16-11, maximum GHG construction emissions (CO_2 equivalents) from the combined Proposed Actions would be about 0.001 percent of Oregon's estimated 2004 emissions of 67.5 million metric tons of CO_2 equivalents (ODEQ 2009a).

MITIGATION

The mitigation measures would be the same as those for Alternative B West Route (Proposed Action).

3.16.3.3 Alternative B – West Route (Proposed Action)

PERMANENT EFFECTS

AIR QUALITY

Once constructed, there would be no direct emissions of air pollutants from the Alternative B West Route. The only function of the proposed transmission line would be to transmit electricity generated by the connected Echanis wind farm. Because this electricity would be produced without burning carbon-based fuel, essentially no air pollutants would be generated per megawatt-hour of output (except for emissions related to inspections and maintenance as discussed below). Additionally, by transmitting electricity from the wind turbines, the Alternative B West Route would aid in reducing the need to generate electricity within the United States using fossil-fuel generating resources, which could indirectly lead to reduced emissions from fossil fuel-fired power plants.

Inspection and maintenance activities would require occasional vehicle trips to patrol the right-of-way, perform maintenance procedures, and to conduct repairs when necessary. Equipment and vehicle usage would be less than required during construction, and the increase in emissions caused by such usage would be below the applicable thresholds listed in Table 3.16-7. Effects to air quality from inspection and maintenance activities would be periodic and of short duration on each occasion, but would occur for the life of the Project.

CLIMATE CHANGE

Sulfur hexafluoride (SF_6) is a highly potent GHG[8] (EPA 2009c) that is used as a dielectric medium (gaseous insulator) in high-voltage switchgear and circuit breakers at electric substations to prevent arcing. SF_6 is not associated with transmission lines per se, only with facilities that are connected to transmission lines. Therefore, operation of the Alternative B West Route would not directly result in emissions of SF_6. Potential effects that would be associated with operation of related switchgear would be limited to fugitive losses (and subsequent replacement) of SF_6 due to leakage over the long-

[8] GWP = 310 (EPA 2009c)

term as equipment ages. However, because the installed equipment would be new and initially leak-free, near-term losses of SF_6 would be small. Over the operational phase, SF_6 losses would be vastly offset by the zero-carbon benefits of wind power. Because of the high cost and high GWP of SF_6, Best Management Practices (BMP) would be implemented to mitigate for fugitive losses (i.e., periodic inspection, maintenance, and repair with appropriate documentation and recordkeeping).

As discussed above, the Alternative B West Route would transmit electricity generated by the Echanis wind farm without burning fuel; therefore, essentially no GHG would be generated per megawatt-hour of output (except for emissions related to inspections and maintenance).

OZONE GENERATION FROM HIGH VOLTAGE CORONA

The proposed overhead double-circuit 230-kV transmission line would have 3-phase single conductors strung from 30-meter tall monopole towers, on 3.5-meter centerlines placed from 180 to 300 meters apart along the 45-meter wide right-of-way. Thus, the lowermost conductors (17-meters) would be at least 24 meters (line-of-sight) from the nearest observer standing at the right-of-way boundary.

High voltage transmission line corona is visible only at night, with the aid of large-objective binoculars, and appears as a faint bluish glow or bluish plumes. Without a period of adaptation for the eyes to adjust to darkness and without intentionally looking for corona, it is unlikely corona would be noticed by the casual observer. The corona effect is most pronounced in humid or wet weather, less so in dry conditions (BPA 2002).

When corona is present, the air surrounding the conductors is ionized and chemical reactions take place, which generate small amounts of ozone (O_3) and other oxidants. Ozone is approximately 90 percent of the oxidants, while the remaining 10 percent is composed mainly of nitrogen oxides (NO_X). The NAAQS for ozone is 0.075 ppmv averaged over 8 hours. The maximum incremental ozone concentration at ground level produced by corona activity during inclement weather would be less than 0.001 ppmv, which would be less than 1.3 percent of the standard. This increment would be similar to background levels and fluctuations in background levels. Further, because the Project Area has an arid climate, which minimizes corona, ozone generation would likewise be minimized (BPA 2002).

Direct emissions of ozone from electrical apparatus such as transmission lines are not regulated by the EPA or state agencies, only emissions of photochemical ozone precursors NO_X and VOC from combustion sources. Because the Project Area is in NAAQS attainment for ozone and the increment would be less than 1.3 percent of the standard, there would be no effect on the environment or public health from corona-generated ozone.

TEMPORARY EFFECTS

AIR QUALITY

Construction of the Alternative B West Route would generate fugitive dust and exhaust emissions from the use of construction equipment, vehicles, and aircraft (helicopter). Surveying, grading and road work, hole digging, tower assembly and erection, sock line stringing and conductoring, cleanup and rehabilitation, and travel along the right-of-way could occur simultaneously in different places on any given day of the estimated 130-working day construction period. However, construction emissions would vary substantially from day to day, depending upon the level of activity, the specific type of activity, and, for dust, the prevailing weather conditions.

Table 3.16-12 presents a summary of the estimated maximum construction emissions (conservative case; i.e., the estimates are higher than would likely occur on a daily basis) with implementation of the fugitive dust reduction measures required by ODEQ pursuant to Rules 340-208-0210 and 304-208-0300.

Table 3.16-12 Estimated Maximum Construction Emissions – Alternative B West Route (mitigated)

Criteria Emissions	Peak (lbs/day)	Total (tons)	Threshold (tons)	Substantial (Yes/No)
Volatile Organic Compounds (VOC as CH_4)	7.1	0.19	40	No
Carbon Monoxide (CO)	33.8	1.01	100	No
Oxides of Nitrogen (NO_X as NO_2)	49.6	1.15	40	No
Sulfur Dioxide (SO_X as SO_2)	0.1	0.00	40	No
Combustion Particulates (C-PM_{10})	2.5	0.06	15	No
Combustion Particulates (C-$PM_{2.5}$)	2.3	0.05	10	No
Fugitive Dust (F-PM_{10})	103.0	1.63	15	No
Fugitive Dust (F-$PM_{2.5}$)	11.6	0.19	10	No

Sources: SCAQMD 2008, EPA 2006b

Note: Fugitive dust and combustion particulates are determined exclusively

As shown in Table 3.16-12, with implementation of the mitigation measures required by the ODEQ, the estimated maximum emissions of criteria pollutants would be well below PSD thresholds and, thus, construction effects would be localized during construction. Further, the actual emissions would likely be lower than the estimated emissions because the latter are conservative-case estimates (i.e., actual emissions would be less than estimated).

CLIMATE CHANGE/GHG

Construction would also result in the release of a minor amount of GHG emissions because of the short duration and relatively small number of emission sources (essentially vehicles). Table 3.16-13 presents a summary of the estimated maximum GHG emissions, also based upon conservative assumptions.

Table 3.16-13 Estimated Maximum Construction GHG Emissions – Alternative B West Route

Greenhouse Gas Emissions	Peak (lbs/day)	Total (tons)	Threshold (tons)	Substantial (Yes/No)
Carbon Dioxide (GHG - CO_2)	6,192	187	n/a	n/a
Methane (GHG - CH_4)	0.6	0.02	n/a	n/a
Nitrous Oxide (GHG – N_2O)	0.3	0.01	n/a	n/a
Carbon Dioxide Equivalents (CO_2 eqv)	6,292	190	n/a	n/a

Sources: SCAQMD 2008, EPA 2009c

As shown in Table 3.16-13, maximum GHG construction emissions (CO_2 equivalents) from the Alternative B West Route would be about 0.0003 percent of Oregon's estimated 2004 emissions of 67.5 million metric tons of CO_2 equivalents (ODEQ 2009a). Further, the estimated emissions are conservative-case and actual emissions would likely be lower.

MITIGATION

Because the Project Area is in NAAQS attainment (unclassified for $PM_{2.5}$) and engine exhaust emissions would be below significance thresholds, only mitigation of fugitive dust[9] emissions is required. Pursuant to ODEQ Rule 340-208-0210, Fugitive Emission Requirements, no person could cause or permit any materials to be handled, transported, or stored; or a building, its appurtenances, or a road to be used, constructed, altered, repaired or demolished; or any equipment to be operated, without taking reasonable precautions to prevent particulate matter from becoming airborne. PDFs and BMPs were taken into account in the effects analysis in this section and include such reasonable precautions, but would not be limited to, the following (as applicable to the Project):

- Use, where possible, of water or approved binding agents for control of dust from construction operations, the grading of roads or the clearing of land.
- Application of asphalt, water, or other suitable approved binding agents on unpaved roads, materials stockpiles, and other surfaces which can create airborne dusts.
- Full or partial enclosure of materials stockpiles in cases where application of water or approved binding agents are not sufficient to prevent particulate matter from becoming airborne.
- Covering, at all times when in motion, open bodied trucks transporting materials likely to become airborne.
- The prompt removal from paved streets of earth or other material that does or could become airborne.

Implementation of the above mitigation measures during construction activities would prevent violations of ODEQ Rule 340-208-0300, Nuisance Prohibited, which states that no person could cause or allow air contaminants from any source subject to regulation by the department to cause a nuisance.[10] Consistent with requirements of Rule 340-208-0210, the Applicant would prepare and submit for ODEQ approval a Dust Control Plan which would contain specific procedures and practices necessary to suppress the generation of fugitive dust during construction activities. Because of the arid nature of the region, the Dust Control Plan would emphasize water conservation by limiting water application strictly to necessary quantities.

South Diamond Lane Route Option

PERMANENT EFFECTS

The permanent effects would be the same as those described for the Alternative B West Route (Proposed Action).

TEMPORARY EFFECTS

AIR QUALITY

Construction of the South Diamond Lane Route Option would also generate fugitive dust and exhaust emissions from the use of construction equipment, vehicles, and aircraft. Activities would be the same as for the Alternative B West Route and would occur over a slightly longer 150-working day construction period, subject to site conditions. Table 3.16-14 presents a summary of the estimated

[9] "Fugitive Emissions" means emissions of any air contaminant that escape to the atmosphere from any point or area not identifiable as a stack, vent, duct, or equivalent opening.

[10] "Nuisance" means a substantial and unreasonable interference with another's use and enjoyment of real property, or the substantial and unreasonable invasion of a right common to members of the general public.

maximum construction emissions for all transmission line alternatives, with implementation of the fugitive dust reduction measures previously discussed.

Table 3.16-14 Estimated Maximum Construction Emissions - Comparison of Alternatives (mitigated)

	Alternative B					
Criteria Emissions	West Route (Proposed Action) (tons)	S. Diamond Lane Route Option (tons)	Hog Wallow Route Option (tons)	Alternative C - North Route (Preferred Alternative) (tons)	Threshold (tons)	Substantial (Yes/No)
Volatile Organic Compounds (VOC as CH_4)	0.19	0.22	0.21	0.30	40	No
Carbon Monoxide (CO)	1.01	1.17	1.11	1.61	100	No
Oxides of Nitrogen (NO_X as NO_2)	1.15	1.33	1.26	1.82	40	No
Sulfur Dioxide (SO_X as SO_2)	0.00	0.00	0.00	0.00	40	No
Combustion Particulates (C-PM_{10})	0.06	0.07	0.07	0.10	15	No
Combustion Particulates (C-$PM_{2.5}$)	0.05	0.06	0.06	0.08	10	No
Fugitive Dust (F-PM_{10})	1.63	1.89	1.79	2.59	15	No
Fugitive Dust (F-$PM_{2.5}$)	0.19	0.22	0.21	0.30	10	No

Sources: SCAQMD 2008, EPA 2006b

Note: Fugitive dust and combustion particulates are determined exclusively

As shown in Table 3.16-14, with implementation of the mitigation measures required by the ODEQ, the estimated maximum emissions of criteria pollutants are well below PSD thresholds and, thus, the construction effects of the South Diamond Lane Route Option would be localized.

CLIMATE CHANGE/GHG

Table 3.16-15 presents a summary of the estimated maximum GHG emissions for all transmission line alternatives, based upon conservative assumptions.

Table 3.16-15 Estimated Maximum Construction GHG Emissions - Comparison of Alternatives

	Alternative B					
Greenhouse Gas Emissions	West Route (Proposed Action) (tons)	S. Diamond Lane Route Option (tons)	Hog Wallow Route Option (tons)	Alternative C - North Route (Preferred Alternative) (tons)	Threshold (tons)	Substantial (Yes/No)
Carbon Dioxide (GHG - CO_2)	187	217	206	298	n/a	n/a
Methane (GHG - CH_4)	0.02	0.02	0.02	0.03	n/a	n/a
Nitrous Oxide (GHG – N_2O)	0.01	0.01	0.01	0.01	n/a	n/a
Carbon Dioxide Equivalents (CO_2 eqv)	190	220	209	302	n/a	n/a

Sources: SCAQMD 2008, EPA 2009c

As shown in Table 3.16-15, maximum GHG emissions (CO2 equivalents) were estimated to be about 0.0003 percent of Oregon's estimated 2004 emissions of 67.5 million metric tons of CO2 equivalents (ODEQ 2009a).

MITIGATION

The mitigation measures would be the same as those described for the Alternative B West Route (Proposed Action).

Hog Wallow Route Option

PERMANENT EFFECTS

The permanent effects would be the same as those described for Alternative B West Route (Proposed Action).

TEMPORARY EFFECTS

AIR QUALITY

The Hog Wallow Route Option construction would also generate fugitive dust and exhaust emissions from the use of construction equipment, vehicles, and aircraft. Activities would be the same as those described for the Alternative B West Route and would occur over a longer 140-working day construction period, subject to site conditions.

As shown in Table 3.16-14, with implementation of the mitigation measures required by the ODEQ, the estimated maximum emissions of criteria pollutants would be below PSD thresholds and, thus, the construction effects of the Hog Wallow Route Option would be localized.

CLIMATE CHANGE/GHG

As shown in Table 3.16-15, maximum GHG construction emissions (CO_2 equivalents) were estimated to be small 0.0003 percent of Oregon's estimated 2004 emissions of 67.5 million metric tons of CO_2 equivalents (ODEQ 2009a).

MITIGATION

The mitigation measures would be the same as those described for the Alternative B West Route (Proposed Action).

115-kV Transmission Line Option

Potential permanent and temporary air quality and climate change effects and mitigation measures related to construction, operation, and maintenance activities for a 115-kV transmission line would be to the same as those described above for the Alternative B West Route or the alternatives.

3.16.3.4 Alternative C – North Route (Preferred Alternative)

PERMANENT EFFECTS

The permanent effects would be the same as those described for Alternative B West Route (Proposed Action).

TEMPORARY EFFECTS

AIR QUALITY

Construction of the Alternative C North Route would also generate fugitive dust and exhaust emissions from the use of construction equipment, vehicles, and aircraft. Activities would be the same as those described for the Alternative B West Route and would occur over the 210-working day construction period, subject to site conditions.

As shown in Table 3.16-14, with implementation of the mitigation measures required by the ODEQ, the estimated maximum emissions of criteria pollutants would be below PSD thresholds and, thus, the construction effects of the Alternative C North Route would be localized.

CLIMATE CHANGE/GHG

As shown in Table 3.16-11, maximum GHG construction emissions (CO_2 equivalents) were estimated to be about 0.0004 percent of Oregon's estimated 2004 emissions of 67.5 million metric tons of CO_2 equivalents (ODEQ 2009a).

MITIGATION

The mitigation measures would be the same as those described for the Alternative B West Route (Proposed Action).

115-kV Transmission Line Option

Potential permanent and temporary air quality and climate change effects and mitigation measures related to construction, operation, and maintenance activities for a 115-kV transmission line would be the same as those described above for the Alternative C North Route.

3.16.1.1 Residual Effects after Mitigation

The residual effects of construction of the Alternative B West Route and other action alternatives would include air quality impacts from the generation of fugitive dust.

3.16.3.5 Summary Comparison of Alternatives

The effects to air quality and climate change from development of the Echanis wind farm, primary access road, and each transmission line alternative are compared in Table 3.16-16.

Table 3.16-16 Summary of Effects to Air Quality and Climate Change

Component	Alternative A – No Action	Echanis Wind Energy Project	Alternative B			Alternative C – North Route (Preferred Alternative)
			West Route (Proposed Action)	S. Diamond Lane Route Option	Hog Wallow Route Option	
Criteria Pollutants (combustion contaminants)	Unspecified amounts of VOC, CO, NO_X, SO_X, PM_{10}, and $PM_{2.5}$ might be emitted (effects) elsewhere by mixed generating resources, in lieu of the Echanis wind farm operation.	Short-term temporary construction effects below threshold levels.	Short-term temporary construction effects below thresholds.	The same as Alternative B – West Route	The same as Alternative B – West Route	The same as Alternative B – West Route
Fugitive Dust (earthmoving and road usage)	No construction or operational effects.	Short-term temporary construction effects below threshold levels.	Short-term temporary construction effects below thresholds.	The same as Alternative B – West Route	The same as Alternative B – West Route	The same as Alternative B – West Route
Greenhouse Gases (combustion byproducts and SF6)	About 194,000 metric tonnes GHG might be emitted (effects) elsewhere by mixed generating resources, in lieu of Echanis wind farm operation.	Short-term temporary construction effects.	Short-term temporary construction effects. *De minimis* operational effects, notwithstanding minor fugitive losses of SF_6.	The same as Alternative B – West Route	The same as Alternative B – West Route	The same as Alternative B – West Route