SECTION 3.5 ENERGY AND NATURAL RESOURCES
(WAC 463-42-342)

3.5.1 INTRODUCTION

The Cross Cascade Pipeline Project will consume energy and natural resources directly and indirectly during construction and operation. Direct consumption involves the use of electricity to drive pumps, storage tank mixers, and control systems during project operation and the electricity and fossil fuels used for construction and maintenance vehicles, machinery, and tools. Indirect consumption refers to energy (mostly from fossil fuels) expended in the construction and maintenance of the facility by such things as the use of energy to fabricate the steel pipe and fuels used by trucks to deliver materials to the site, as discussed in Section 3.5.2, paragraph one.

This section describes the direct and indirect energy and natural resource requirements of the Cross Cascade Pipeline Project. Also included are discussions of sources and availability of energy and natural resources, use of non-renewable resources, and energy conservation. A discussion of the effect of the Cross Cascade Pipeline Project on scenic and visual resources is contained in Section 5.1 Land and Shoreline Use, specifically sub-sections 5.1.3, Light and Glare and 5.1.4, Aesthetics.

3.5.2 ENERGY AND NATURAL RESOURCES REQUIRED

Construction

The Cross Cascade Pipeline Project will be constructed using materials, such as steel, that require energy and natural resources for fabrication. Energy will also be required to transport these materials from the fabrication point to the right-of-way. Data for energy and natural resource usage during this activity is not readily available, however, such consumption will predominately be in the form of electricity and fossil fuels, and various minerals and metallic ores.

Energy will also be consumed by construction vehicles, trucks, mobile equipment, and tools operated in the actual construction of the pipeline, pump stations, and the Kittitas Terminal. During the 15-month period encompassing pipeline construction and post-construction activities such as inspection, the estimated average daily usage of diesel fuel will be 7,600 gallons, with a peak daily usage of 15,200 gallons. The estimated average daily usage of gasoline during construction will be 4,100 gallons, with a peak daily usage of 8,200 gallons.

The main natural resource consumed during project construction is water. During construction, approximately 1.3 million gallons of water will be used for hydrostatic testing of the pipeline and 4.2 million gallons of water will be used for hydrostatic testing of the tanks at the Kittitas Terminal. Aggregate gravel, sand, and cement will also be needed for construction of the pump stations and the Kittitas

Terminal.

Operation

During operation of the Cross Cascade Pipeline Project, electricity will be a primary energy source. Table 3.5-1 lists projected energy utilization requirements for the 30-year operating period assumed for the project. Other energy and natural resource usage is expected to be minimal.

TABLE 3.5-1
ELECTRICAL ENERGY UTILIZATION DURING OPERATION

Year	Throughput Required	Thrasher			North Bend			Stampede		
		Hours of Operation	Peak Demand	Annual kWh Used	Hours of Operation	Peak Demand	Annual kWh Used	Hours of Operation	Peak Demand	Annual kWh Used
1	60,000	24.0	2,493	16,571,218	12.0	844	3,017,614	0.0	50	18,250
2	60,825	24.0	2,493	16,798,686	13.1	844	3,299,748	0.0	50	18,250
3	61,662	24.0	2,493	17,029,360	14.3	844	3,585,858	0.0	50	18,250
4	62,510	24.0	2,493	17,263,284	15.4	844	3,876,000	0.0	50	18,250
5	63,370	24.0	2,493	17,500,506	16.6	844	4,170,233	0.0	50	18,250
6	64,243	24.0	2,493	17,741,074	17.8	844	4,468,615	0.0	50	18,250
7	65,128	24.0	2,493	17,985,035	19.0	844	4,771,206	0.0	50	18,250
8	66,025	24.0	2,493	18,232,438	20.2	844	5,078,066	0.0	50	18,250
9	66,935	24.0	2,493	18,483,333	21.5	844	5,389,257	0.0	50	18,250
10	67,858	24.0	2,493	18,737,769	22.7	844	5,704,840	0.0	50	18,250
11	68,794	24.0	3,848	18,995,797	24.0	2,689	6,025,266	0.0	3,354	30,701
12	69,743	24.0	3,848	19,257,434	24.0	2,689	6,368,826	0.6	3,354	643,956
13	70,705	24.0	3,848	19,522,767	24.0	2,689	6,717,240	1.2	3,354	1,265,875
14	71,681	24.0	3,848	19,791,849	24.0	2,689	7,070,577	1.9	3,354	1,896,582
15	72,671	24.0	3,848	20,064,735	24.0	2,689	7,428,908	2.5	3,354	2,536,203
16	73,675	24.0	3,848	20,341,478	24.0	2,689	7,792,305	3.1	3,354	3,184,867
17	74,693	24.0	3,848	20,622,135	24.0	2,689	8,160,841	3.8	3,354	3,842,704
18	75,725	24.0	3,848	20,906,762	24.0	2,689	8,534,590	4.4	3,354	4,509,846
19	76,773	24.0	3,848	21,195,416	24.0	2,689	8,913,627	5.1	3,354	5,186,427
20	77,834	24.0	3,848	21,488,154	24.0	2,689	9,298,028	5.8	3,354	5,872,582
21	78,911	24.0	3,848	21,785,037	24.0	2,689	9,687,870	6.5	3,354	6,568,450
22	80,003	24.0	3,848	22,086,123	24.0	2,689	10,083,231	7.2	3,354	7,274,171
23	81,111	24.0	3,848	22,391,473	24.0	2,689	10,484,192	7.9	3,354	7,989,886
24	82,234	24.0	3,848	22,701,148	24.0	2,689	10,890,833	8.6	3,354	8,715,740
25	83,374	24.0	3,848	23,015,211	24.0	2,689	11,303,235	9.3	3,354	9,451,878
26	84,529	24.0	3,848	23,333,725	24.0	2,689	11,721,482	10.0	3,354	10,198,449
27	85,701	24.0	3,848	23,656,755	24.0	2,689	12,145,658	10.8	3,354	10,955,603
28	86,889	24.0	3,848	23,984,364	24.0	2,689	12,575,848	11.5	3,354	11,723,493
29	88,094	24.0	3,848	24,316,620	24.0	2,689	13,012,140	12.3	3,354	12,502,274
30	89,317	24.0	3,848	24,653,590	24.0	2,689	13,454,621	13.1	3,354	13,292,102

Year	Throughput Required	Kittitas Station			Kittitas Rack			Kittitas Total		
		Hours of Operation	Peak Demand	Annual kWh Used	Hours of Operation	Peak Demand	Annual kWh Used	Hours of Operation	Peak Demand	Annual kWh Used
2	45,675	14.3	2,387	11,095,183	15,150	17.7	149	238,741	2,537	11,333,924
3	46,360	14.5	2,387	11,261,337	15,302	17.9	149	241,128	2,537	11,502,465
4	47,056	14.7	2,387	11,429,983	15,455	18.0	149	243,539	2,537	11,673,523
5	47,761	14.9	2,387	11,601,159	15,609	18.2	149	245,975	2,537	11,847,134
6	48,478	15.2	2,387	11,774,903	15,765	18.4	149	248,434	2,537	12,023,338
7	49,205	15.4	2,387	11,951,253	15,923	18.6	149	250,919	2,537	12,202,172
8	49,943	15.6	2,387	12,130,248	16,082	18.8	149	253,428	2,537	12,383,676
9	50,692	15.9	2,387	12,311,928	16,243	19.0	149	255,962	2,537	12,567,890
10	51,453	16.1	2,387	12,496,333	16,405	19.1	149	258,522	2,537	12,754,855
11	52,224	16.3	2,387	12,683,504	16,569	19.3	149	261,107	2,537	12,944,611
12	53,008	16.6	2,387	12,873,483	16,735	19.5	149	263,718	2,537	13,137,201
13	53,803	16.8	2,387	13,066,312	16,902	19.7	149	266,355	2,537	13,332,667
14	54,610	17.1	2,387	13,262,032	17,071	19.9	149	269,019	2,537	13,531,051
15	55,429	17.3	2,387	13,460,689	17,242	20.1	149	271,709	2,537	13,732,398
16	56,260	17.6	2,387	13,662,326	17,415	20.3	149	274,426	2,537	13,936,752
17	57,104	17.9	2,387	13,866,987	17,589	20.5	149	277,171	2,537	14,144,157
18	57,961	18.1	2,387	14,074,718	17,765	20.7	149	279,942	2,537	14,354,660
19	58,830	18.4	2,387	14,285,565	17,942	20.9	149	282,742	2,537	14,568,307
20	59,713	18.7	2,387	14,499,575	18,122	21.1	149	285,569	2,537	14,785,144
21	60,608	19.0	2,387	14,716,795	18,303	21.4	149	288,425	2,537	15,005,219
22	61,518	19.2	2,387	14,937,273	18,486	21.6	149	291,309	2,537	15,228,582
23	62,440	19.5	2,387	15,161,058	18,671	21.8	149	294,222	2,537	15,455,280
24	63,377	19.8	2,387	15,388,200	18,857	22.0	149	297,164	2,537	15,685,365
25	64,328	20.1	2,387	15,618,749	19,046	22.2	149	300,136	2,537	15,918,885
26	65,293	20.4	2,387	15,852,757	19,236	22.4	149	303,137	2,537	16,155,894
27	66,272	20.7	2,387	16,090,275	19,429	22.7	149	306,169	2,537	16,396,443
28	67,266	21.0	2,387	16,331,355	19,623	22.9	149	309,230	2,537	16,640,585
29	68,275	21.4	2,387	16,576,052	19,819	23.1	149	312,323	2,537	16,888,374
30	69,299	21.7	2,387	16,824,419	20,018	23.4	149	315,446	2,537	17,139,864

Year	Throughput Required	Beverly			Othello			Total
		Hours of Operation	Peak Demand	Annual kWh Used	Hours of Operation	Peak Demand	Annual kWh Used	Annual kWh Used
2	45,675	0.0	50	18,250	0.0	50	18,250	31,487,108
3	46,360	0.0	50	18,250	0.0	50	18,250	32,172,432
4	47,056	0.0	50	18,250	0.0	50	18,250	32,867,557
5	47,761	0.0	50	18,250	0.0	50	18,250	33,572,623
6	48,478	0.0	50	18,250	0.0	50	18,250	34,287,776
7	49,205	0.0	50	18,250	0.0	50	18,250	35,013,162
8	49,943	0.0	50	18,250	0.0	50	18,250	35,748,930
9	50,692	0.0	50	18,250	0.0	50	18,250	36,495,229
10	51,453	0.0	50	18,250	0.0	50	18,250	37,252,214
11	52,224	0.0	50	18,250	0.0	50	18,250	38,032,875
12	53,008	0.0	50	18,250	0.0	50	18,250	39,443,918
13	53,803	0.0	50	18,250	0.0	50	18,250	40,875,049
14	54,610	0.0	50	18,250	0.0	50	18,250	42,326,559
15	55,429	0.0	50	18,250	0.0	50	18,250	43,798,744
16	56,260	0.0	50	18,250	0.0	50	18,250	45,291,903
17	57,104	0.0	50	18,250	0.0	50	18,250	46,806,338
18	57,961	0.0	50	18,250	0.0	50	18,250	48,342,358
19	58,830	0.0	50	18,250	0.0	50	18,250	49,900,276
20	59,713	0.0	50	18,250	0.0	50	18,250	51,480,408
21	60,608	0.0	50	18,250	0.0	50	18,250	53,083,076
22	61,518	0.0	50	18,250	0.0	50	18,250	54,708,607
23	62,440	0.0	50	18,250	0.0	50	18,250	56,357,331
24	63,377	0.0	50	18,250	0.0	50	18,250	58,029,585
25	64,328	0.0	50	18,250	0.0	50	18,250	59,725,709
26	65,293	0.0	50	18,250	0.0	50	18,250	61,446,050
27	66,272	0.0	50	18,250	0.0	50	18,250	63,190,959
28	67,266	0.0	50	18,250	0.0	50	18,250	64,960,791
29	68,275	0.0	50	18,250	0.0	50	18,250	66,755,908
30	69,299	0.0	50	18,250	0.0	50	18,250	68,576,677

3.5.3 SOURCE AND AVAILABILITY OF ENERGY AND NATURAL RESOURCES

Electricity

Thrasher Station

The Snohomish County Public Utility District (PUD) is the energy supplier for this area. Puget Sound Energy (PSE) has a power line near the proposed site and no new transmission line poles would have to be constructed to serve the site. PSE and Snohomish PUD have a reciprocity agreement that allows service to customers outside of normal service areas, and services OPL's existing Woodinville Station in a similar manner. Snohomish PUD's nearest substation is at Turners Corner, approximately 1.5 miles east of the Thrasher Station. The Snohomish PUD will build a substation on the pump station property and either: (1) enter into an agreement with PSE to tap its transmission line which crosses the station property; or (2) build a new transmission line to connect with its existing 115 kV line approximately 1/2 mile away. See Figure 3.5-1 for the proposed transmission line route.

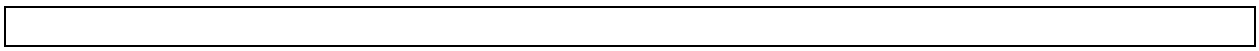

Figure 3.5-1 Thrasher Station - Proposed Transmission Line Route

North Bend Station

PSE and Tanner Electric are the suppliers in this area. The proposed pump station could be served either by PSE or Tanner Electric Cooperative, both of which have substations in the vicinity of the site. PSE has a substation approximately 200 feet from the site. PSE would provide service via dedicated 4 kV feeders from PSE's existing North Bend Substation. (See Figure 3.5-2)

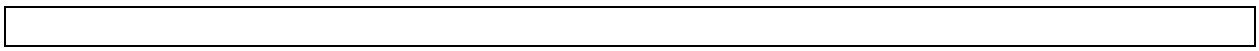

Figure 3.5-2 North Bend Station - Proposed PSE Transmission Line Route

Tanner Electric proposes to serve the North Bend Pump Station from Tanner's new South Fork Substation located approximately 1.0 miles northwest of the pump station. A short underground distribution line will be constructed from the substation to the pump station to step down the transformer. (See Figure 3.5-3)

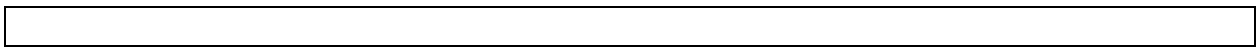

Figure 3.5-3 North Bend Pump Station - Proposed Tanner Electric Transmission Line Route

Stampede Station

PSE and Kittitas PUD both supply power in this area. PSE has an existing transmission line immediately adjacent to the site. PSE proposes to provide service to the site via dedicated 4 kV feeders from a new substation fed via PSE's existing Cle Elum-Hyak 115 kV Line. (See Figure 3.5-4)

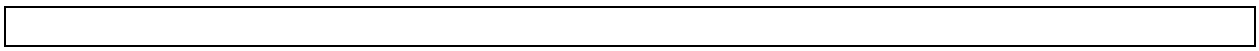

Figure 3.5-4 Stampede Pump Station - Proposed PSE Transmission Line Route

Kittitas County PUD would serve the pump station by constructing a 115 kV to 12.5 kV substation and tapping PSE's 115 kV transmission line in the vicinity of the intersection of the Stampede Pass Road and the railroad right-of-way (Iron Horse Trail). This location is just north of the Stampede Pump Station. A short underground distribution line would be constructed from the substation to the pump station step-down transformers. (See Figure 3.5-5)

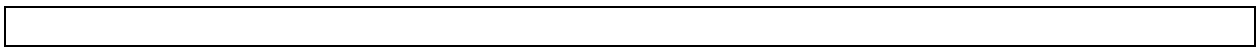

Figure 3.5-5 Stampede Pump Station - Proposed Kittitas County PUD Transmission Line Route

Kittitas Terminal

PSE and Kittitas County PUD #1 are the suppliers in this area and both provide an option for providing power to the Kittitas Terminal site. There are no defined territorial boundaries in this area and either PSE or Kittitas PUD could provide service to the terminal. PSE has a substation on the south side of the city's main commercial area about 0.75 miles to the north and west of the terminal property. The substation is located between Pierce and King Streets, and between Railroad Avenue and 1st Avenue in the city of Kittitas. PSE's Cle Elum-Kittitas 115 kV Line and Taunton-Kittitas 115 kV Line meet at the Kittitas Substation.

PSE has provided two alternative methods of providing service:

(1) The Primary Voltage Alternative would provide to the Kittitas Terminal via two dedicated 4 kV underground feeders. These feeders would be routed east along Railroad Avenue and then south along Badger Pocket Road to the site. PSE's Kittitas Substation. The Substation site would be expanded to the west to allow the installation of a 115 - 4 kV transformer. Temporary construction power would be provided via PSE's existing 12.5 kV Distribution Line which is routed from the Kittitas Substation south along Badger Pocket Road. (See Figure 3.5-6)

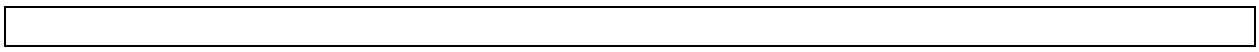

Figure 3.5-6 Kittitas Terminal - Proposed PSE Primary Voltage Alternative Transmission Line Route

(2) The High Voltage Alternative would provide service via a new tap of the Taunton-Kittitas 115 kV Line and a dedicated 115 - 4 kV substation constructed on OPL's Kittitas Terminal Site. The transmission line would by routed along the east side of Badger Pocket Road to the terminal site. (See Figure 3.5-7)

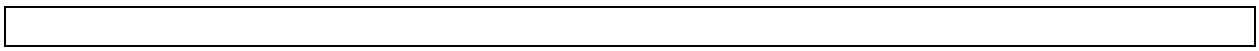

Figure 3.5-7 Kittitas Terminal - Proposed PSE High Voltage Alternative Transmission Line Route

Kittitas County PUD #1 has a 34.5 kV transmission line running east-west through the City of Kittitas approximately 1.0 mile north of the Kittitas Terminal. Kittitas County PUD would construct a 34.5 - 12 kV substation near the 34.5 transmission line and tap into their 34.5 kV transmission line. A 1.0 mile underground distribution line would be constructed adjacent to the east side of Badger Pocket Road (County Road #81). A distribution substation would be constructed on site. See Figure 3.5-8.

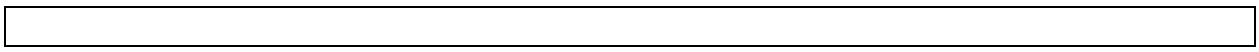

Figure 3.5-8 Kittitas Terminal - Kittitas County PUD Proposed Transmission Line Route

Beverly-Burke Station

This station will be served by Grant County PUD, the supplier in this area. The PUD has a overhead 13.8 kV distribution feeder paralleling the Beverly Burke Road in front of the site. Grant County PUD would construct a short distribution tap line (either overhead or underground) from the existing 13.8 kV distribution feeder to a utility substation (step down transformer) on the pump station site. Grant County PUD has found that their existing Jericho substation has sufficient capacity to serve the pump station load and no modifications are required. See Figure 3.5-9.

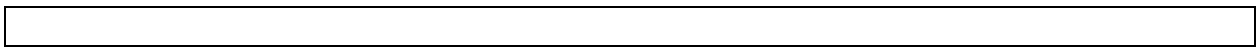

Figure 3.5-9 Beverly Burke Pump Station - Grant County PUD Proposed Transmission Line Route

Othello Station

This area is served by the Big Bend Electrical Cooperative. Big Bend has a transmission line along SR 24 approximately 0.50 miles south of the station property. Big Bend would tap into their transmission line, build a new (0.50-mile) distribution line from Highway 24 to the site. A distribution substation (step-down transformers) would be constructed on the station property. The Cooperative currently has adequate capacity in the existing transmission line to serve the site from the Eagle Lake Substation, located approximately 5.0 miles south of the pump station. See Figure 3.5-10.

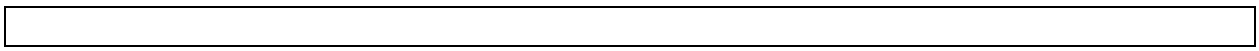

Figure 3.5-10 Othello Pump station - Proposed Big Bend Electric Cooperative Transmission Route

Pasco, Northwest Terminalling

The site currently has power and no new upgraded transmission lines will be required for OPL facilities. Power will be served by installing a second distribution transformer and service at the existing facility.

Block Valves

All block valves will require power, however the expected power usage is anticipated to be very small and the block valves do not have special power requirements. Sites for block valves have tentatively been identified with proximity to existing power service as one criteria. As the block valves are located at various points along the pipeline, the power needs would be served by a variety of suppliers with existing electrical facilities. No difficulty in securing electrical service is anticipated.

Fossil Fuels

Fossil fuels needed for construction, mainly diesel and gasoline, will be obtained from local bulk petroleum distributors. These distributors have adequate capacity to accommodate the fuel needs of this project.

Water

Water for hydrostatic testing of the pipeline, pump stations, and Kittitas Terminal will be obtained from either the Snoqualmie River or the Alderwood Water District, City of North Bend, the Cascade Irrigation Canal, and the Wahluke Branch Canal. Hydrostatic test water will be routed through the pipeline and reused as much as practicable to reduce the total water demand for this process. The water sources identified have adequate capacity to accommodate the water needs of this project. (See Section 2.5 Water Supply for a description of sources for hydrostatic test water.)

Materials and Commodities

Soil excavated during trenching operations will be the primary source for backfill material for the pipeline. Aggregate gravel, sand, and cement will be supplied by local vendors. Other building materials, equipment, and operational commodities, will be purchased from equipment and material suppliers. Table 3.5-2 lists the anticipated quantities of building materials, sand, gravel, and cement that would be used by the project. This represents the project needs with respect to resources. As shown on the table, the construction of the pipeline would require approximately 861 total tons of cement, 1,813 tons of sand, 3,180 tons of gravel, and 4,536 tons of crushed stone. There would also be a need for approximately 13,747 linear feet of fencing, and approximately 25,180 square feet of buildings. Again, these number are the approximate total for the entire project, with the Kittitas Terminal making up the larger amount of each

material. From Dames & Moore's experience in local construction projects, these amounts represent less than the total that would be used on a small commercial or industrial development consisting of site clearing and preloading, grading and filling, and construction of a small commercial building, paved parking and loading areas, and a fenced enclosure. These materials would be purchased locally.

TABLE 3.5-2
ESTIMATED CONSTRUCTION MATERIAL QUANTITY

County	Mile Post	Pump Station	MLV Site	Length (LF)	Concrete			Graded Soil (cy)	Crushed Stone (cy)	Asphaltic Concrete (tons)	Clay Liner (cy)	Building (sf)	Fence (lf)	Structural Steel (tons)	Padding (cy)	Precast Concrete Building (8'x8'x9')
					Cement (ton)	Sand (ton)	Gravel (ton)									
Snohomish	0 - 14															
Thrasher Pump Station		1			42	89	156		932			3120	2104	3		
Remote Valve			2		2	3	6					128	200			2
Pipeline				71,280												
Subtotal		**1**	**3**	**71,280**	**44**	**92**	**162**		**932**			**3248**	**2304**	**3**		**2**
King	14 - 57.5															
North Bend Pump Station		1			40	80	150		100			3120	1430	2		
Remote Valve			8		2	3	6					512	800			8
Pipeline				224,400											25,000	
Subtotal		**1**	**8**	**224,400**	**42**	**83**	**156**		**100**			**3632**	**2230**		**25,000**	**8**
Kittitas	57.5 - 150															
Stampede Pump Station		1			30	63	110		722			3120	820	3		
Kittitas Terminal		1			683	1450	2538	7000	296	1417	3117	5588	4403	67		
Remote Valve			7		3	6	10					448	700			7
Pipeline				469,920											17,000	
Subtotal		**2**	**7**	**469,920**	**716**	**1,519**	**2,658**	**7,000**	**1,018**	**1,417**	**3,117**	**9,156**	**5,923**	**70**	**17,000**	**7**
Grant	150 - 180.5															
Beverly-Burke Pump Station		1			15	31	54		833			3120	900	3		
Remote Valve			4		4	8	14					256	400			4
Pipeline				171,600												
Subtotal		**1**	**4**	**171,600**	**19**	**38**	**68**		**833**			**3,376**	**1,300**	**3**		**4**
Adams	180.5 - 189.9															
Othello Pump Station		1			15	31	54		819			3120	890	3		
Remote Valve			1		1	2	4					64	100			1
Pipeline				44,800												
Subtotal		**1**	**1**	**44,800**	**16**	**33**	**58**		**819**			**3,184**	**990**	**3**		**1**
Franklin	189.9 - 231 230															
Pasco Facility		1			25	45	75		834			2520	900	3		
Remote Valve			1		1	2	4					64	100			1
Pipeline				216,480												
Subtotal		**1**	**1**	**216,480**	**26**	**47**	**79**		**834**			**2,584**	**1000**	**3**		**1**
Total		**6**	**23**	**1,196,560**	**861**	**1,813**	**3,180**	**7,000**	**4,536**	**1,417**	**3,117**	**25,180**	**13,747**	**83**	**42,000**	**23**

3.5.4 NON-RENEWABLE RESOURCES

During construction, the largest non-renewable energy resource consumed would be fossil fuels in the form of diesel and gasoline. To a much lesser extent, electricity will also be consumed. The largest non-renewable natural resource consumed will be steel (coming from iron ore), and concrete (coming from aggregate gravel, sand, and cement quarries and pits).

The main resource consumed during operation will be electricity, which will be the primary energy source. There will also be minor consumption of various metals, petroleum-based lubricants, paints, and selected chemicals as the pipeline, pump stations, and Kittitas Terminal are operated and maintained.

3.5.5 CONSERVATION AND RENEWABLE RESOURCES

Gasoline products are currently transported between eastern and western Washington by tanker trucks on interstate highways, and by barges on the Columbia River. Barges require energy, both in the form of diesel fuel for operation and in the form of electricity to operate locks on the river. Electricity consumed during operation of the Cross Cascade Pipeline will be partially offset by a decrease in current levels of fuel usage if the trucks and barges are used less frequently. In addition, by transporting product directly to Pasco via pipeline, OPL will eliminate the consumption of electricity necessary to pump the product to Portland and the fossil fuel used in barging product from Portland to Pasco.

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