

APPENDIX A

Detailed Analytical Tables Power Supply Evaluation

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
UPPER LYNN CANAL											
Skagway/Haines											
Energy Requirements											
Skagway	1.0%	10,950	11,060	11,170	11,280	11,390	11,500	11,620	11,740	11,860	11,980
Haines	1.0%	12,900	13,030	13,160	13,290	13,420	13,550	13,690	13,830	13,970	14,110
Subtotal		23,850	24,090	24,330	24,570	24,810	25,050	25,310	25,570	25,830	26,090
Hydroelectric Energy											
Existing Facilities		23,200	23,200	23,200	23,200	23,200	23,200	23,200	23,200	23,200	23,200
New Facilities	2006	-	-	-	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Subtotal		23,200	23,200	23,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200
Net Diesel Energy		650	890	1,130	-	-	-	-	-	-	-
Surplus Hydro Energy		-	-	-	10,630	10,390	10,150	9,890	9,630	9,370	9,110
Chilkat Valley/Klukwan											
Energy Requirements	2.0%	1,700	1,730	1,760	1,800	1,840	1,880	1,920	1,960	2,000	2,040
Hydroelectric Energy		1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
Net Diesel Energy		-	-	-	-	40	80	120	160	200	240
Surplus Hydro Energy		100	70	40	-	-	-	-	-	-	-
Regional Totals											
Energy Requirements		25,550	25,820	26,090	26,370	26,650	26,930	27,230	27,530	27,830	28,130
Hydroelectric Energy		25,000	25,000	25,000	37,000	37,000	37,000	37,000	37,000	37,000	37,000
Net Diesel		650	890	1,130	-	40	80	120	160	200	240
Surplus Hydro		100	70	40	10,630	10,390	10,150	9,890	9,630	9,370	9,110
Power Transfers (MWh)											
Within Region											
Skagway to Chilkat Valley	2007	-	-	-	-	40	80	120	160	200	240
Available for Export		100	70	40	10,630	10,350	10,070	9,770	9,470	9,170	8,870
Export Energy	2050										
Import from Juneau	2050	-	-	-	-	-	-	-	-	-	-

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
NORTH REGION											
Juneau - AEL&P											
Energy Requirements	0.7%	339,930	343,500	346,840	349,900	353,140	355,530	357,950	363,710	370,180	372,700
Hydroelectric Energy											
Existing Facilities		353,000	353,000	353,000	353,000	353,000	353,000	353,000	353,000	353,000	353,000
Dorothy Lake - Phase 1	2007	-	-	-	-	75,000	75,000	75,000	75,000	75,000	75,000
Dorothy Lake - Phase 2	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		353,000	353,000	353,000	353,000	428,000	428,000	428,000	428,000	428,000	428,000
Net Diesel Energy		-	-	-	-	-	-	-	-	-	-
Surplus Hydro Energy		13,070	9,500	6,160	3,100	74,860	72,470	70,050	64,290	57,820	55,300
Green's Creek											
Energy Requirements		55,190	55,190	57,290	57,290	58,690	58,690	58,690	58,690	58,690	58,690
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		55,190	55,190	57,290	57,290	58,690	58,690	58,690	58,690	58,690	58,690
Hoonah											
Energy Requirements	2.6%	4,620	6,160	6,980	7,810	7,920	8,020	8,110	8,200	8,290	8,380
Hydroelectric Energy											
Existing Facilities		-	-	-	-	-	-	-	-	-	-
New Facilities	2011	-	-	-	-	-	-	-	-	3,700	3,700
Subtotal		-	-	-	-	-	-	-	-	3,700	3,700
Net Diesel Energy		4,620	6,160	6,980	7,810	7,920	8,020	8,110	8,200	4,590	4,680
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Excursion Inlet Cannery											
Energy Requirements	1.5%	5,600	5,680	5,770	5,860	5,950	6,040	6,130	6,220	6,310	6,400
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		5,600	5,680	5,770	5,860	5,950	6,040	6,130	6,220	6,310	6,400

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Gustavus incl. NPS											
Energy Requirements	1.0%	2,640	2,670	2,700	2,730	2,760	2,790	2,820	2,850	2,880	2,910
Hydroelectric Energy											
Existing Facilities		-	-	-	-	-	-	-	-	-	-
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		2,640	2,670	2,700	2,730	2,760	2,790	2,820	2,850	2,880	2,910
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Regional Totals											
Energy Requirements		407,980	413,200	419,580	423,590	428,460	431,070	433,700	439,670	446,350	449,080
Hydroelectric Energy		353,000	353,000	353,000	353,000	428,000	428,000	428,000	428,000	431,700	431,700
Net Diesel		68,050	69,700	72,740	73,690	75,320	75,540	75,750	75,960	72,470	72,680
Surplus Hydro		13,070	9,500	6,160	3,100	74,860	72,470	70,050	64,290	57,820	55,300
Power Transfers (MWh)											
Within Region											
Juneau to Greens Creek	2007	-	-	-	-	58,690	58,690	58,690	58,690	57,820	55,300
Juneau to Hoonah	2007	-	-	-	-	7,920	8,020	8,110	5,600	-	-
Juneau to Gustavus	2017	-	-	-	-	-	-	-	-	-	-
Available for Export		13,070	9,500	6,160	3,100	8,250	5,760	3,250	-	-	-
Export Energy	2050										
Import from Sitka	2050	-									
WEST CENTRAL REGION											
Sitka											
Energy Requirements	1.0%	100,200	101,200	102,210	103,230	104,260	105,300	106,350	107,410	108,480	109,560
Hydroelectric Energy											
Existing Facilities		115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700
Net Diesel Energy		-	-	-	-	-	-	-	-	-	-
Surplus Hydro Energy		15,500	14,500	13,490	12,470	11,440	10,400	9,350	8,290	7,220	6,140

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Angoon											
Energy Requirements	1.5%	2,030	2,060	2,090	2,120	2,150	2,180	2,210	2,240	2,270	2,300
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		2,030	2,060	2,090	2,120	2,150	2,180	2,210	2,240	2,270	2,300
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Tenakee Springs											
Energy Requirements	1.0%	441	445	449	453	458	463	468	473	478	483
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		441	445	449	453	458	463	468	473	478	483
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Regional Totals											
Energy Requirements		102,671	103,705	104,749	105,803	106,868	107,943	109,028	110,123	111,228	112,343
Hydroelectric Energy		115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700
Net Diesel		2,471	2,505	2,539	2,573	2,608	2,643	2,678	2,713	2,748	2,783
Surplus Hydro		15,500	14,500	13,490	12,470	11,440	10,400	9,350	8,290	7,220	6,140
Power Transfers (MWh)											
Within Region											
Sitka to Angoon	2050	-	-	-	-	-	-	-	-	-	-
Sitka to Tenakee Springs	2050	-	-	-	-	-	-	-	-	-	-
Available for Export		15,500	14,500	13,490	12,470	11,440	10,400	9,350	8,290	7,220	6,140
Export Energy											
Import from Juneau											
Import from Petersburg											

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
TYEE-SWAN REGION											
Petersburg / Wrangell											
Energy Requirements	0.7%	67,460	67,970	68,500	69,030	69,560	70,100	70,640	71,190	71,740	72,300
Hydroelectric Energy											
Existing Facilities		131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000
Net Diesel Energy		-	-	-	-	-	-	-	-	-	-
Surplus Hydro Energy		63,540	63,030	62,500	61,970	61,440	60,900	60,360	59,810	59,260	58,700
Kake											
Energy Requirements	1.2%	4,390	4,460	4,540	4,620	4,690	4,750	4,810	4,870	4,940	4,990
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		4,390	4,460	4,540	4,620	4,690	4,750	4,810	4,870	4,940	4,990
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Ketchikan											
Energy Requirements	1.1%	153,970	155,670	157,380	159,110	160,860	162,630	164,420	166,230	168,050	169,900
Hydroelectric Energy											
Existing Facilities		139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300
Net Diesel Energy		14,670	16,370	18,080	19,810	21,560	23,330	25,120	26,930	28,750	30,600
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Metlakatla											
Energy Requirements	1.0%	14,500	14,650	14,800	14,950	15,100	15,250	15,400	15,550	15,710	15,870
Hydroelectric Energy											
Existing Facilities		25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045
Net Diesel Energy		-	-	-	-	-	-	-	-	-	-
Surplus Hydro Energy		10,545	10,395	10,245	10,095	9,945	9,795	9,645	9,495	9,335	9,175

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Regional Totals											
Energy Requirements		240,320	242,750	245,220	247,710	250,210	252,730	255,270	257,840	260,440	263,060
Hydroelectric Energy		295,345	295,345	295,345	295,345	295,345	295,345	295,345	295,345	295,345	295,345
Net Diesel		19,060	20,830	22,620	24,430	26,250	28,080	29,930	31,800	33,690	35,590
Surplus Hydro		74,085	73,425	72,745	72,065	71,385	70,695	70,005	69,305	68,595	67,875
Power Transfers (MWh)											
Within Region											
Tyee to Ketchikan	2006	-	-	-	19,810	21,560	23,330	25,120	26,930	28,750	30,600
Tyee to Kake	2007	-	-	-	-	4,690	4,750	4,810	4,870	4,940	4,990
Metlakatla to Ketchikan	2020	-	-	-	-	-	-	-	-	-	-
Metlakatla to Kake	2020	-	-	-	-	-	-	-	-	-	-
Available for Export		74,085	73,425	72,745	52,255	45,135	42,615	40,075	37,505	34,905	32,285
Imports											
PRINCE OF WALES REGION											
Craig/Klawock/Thorne Bay/Kasaan											
Energy Requirements	1.0%	23,510	23,750	23,990	24,230	24,470	24,710	24,960	25,210	25,460	25,710
Hydroelectric Energy											
Existing Facilities		22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000
New Facilities	2006	-	-	-	7,000	7,000	7,000	7,000	7,000	7,000	7,000
Subtotal		22,000	22,000	22,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000
Net Diesel Energy		1,510	1,750	1,990	-	-	-	-	-	-	-
Surplus Hydro Energy		-	-	-	4,770	4,530	4,290	4,040	3,790	3,540	3,290
Hollis											
Energy Requirements	1.5%	573	582	591	600	609	618	627	636	646	656
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		573	582	591	600	609	618	627	636	646	656
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-

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		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Hydaburg											
Energy Requirements	1.0%	1,556	1,572	1,588	1,604	1,620	1,636	1,652	1,669	1,686	1,703
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		1,556	1,572	1,588	1,604	1,620	1,636	1,652	1,669	1,686	1,703
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Coffman Cove											
Energy Requirements	1.5%	744	755	766	777	789	801	813	825	837	850
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		744	755	766	777	789	801	813	825	837	850
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Naukati Bay											
Energy Requirements	1.5%	463	470	477	484	491	498	505	513	521	529
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		463	470	477	484	491	498	505	513	521	529
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Regional Totals											
Energy Requirements		26,846	27,129	27,412	27,695	27,979	28,263	28,557	28,853	29,150	29,448
Hydroelectric Energy		22,000	22,000	22,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000
Net Diesel		4,846	5,129	5,412	3,465	3,509	3,553	3,597	3,643	3,690	3,738
Surplus Hydro		-	-	-	4,770	4,530	4,290	4,040	3,790	3,540	3,290
Power Transfers (MWh)											
Within Region											
Craig to Hydaburg	2004	-	-	-	1,604	1,620	1,636	1,652	1,669	1,686	1,703
Craig to Hollis	2003	-	-	-	600	609	618	627	636	646	656
Craig to Coffman/Naukati	2007	-	-	-	-	1,280	1,299	1,318	1,338	1,208	931
Available for Export		-	-	-	2,566	1,021	737	443	147	-	-
Imports	2011	-	-	-	-	-	-	-	-	150	448
Remaining Diesel Req.		4,846	5,129	5,412	1,261	-	-	-	-	-	-

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Projected Loads, Resources and Energy Transfers by Sub-Region

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
TOTALS										
Energy Requirements (MWh)	803,367	812,604	823,051	831,168	840,167	846,936	853,785	864,016	874,998	882,061
Hydroelectric Energy (MWh)	811,045	811,045	811,045	830,045	905,045	905,045	905,045	905,045	908,745	908,745
Net Diesel (MWh)	95,077	99,054	104,441	82,144	11,318	11,473	11,628	14,383	17,548	20,611
Surplus Hydro (MWh)	102,755	97,495	92,435	103,035	172,605	168,005	163,335	155,305	146,545	141,715
Total Intra-Regional Transfers	-	-	-	22,014	96,409	98,423	100,447	99,893	95,250	94,420
Energy Requirements (Ave MW)	91.7	92.8	94.0	94.9	95.9	96.7	97.5	98.6	99.9	100.7
Hydroelectric Energy (Ave MW)	92.6	92.6	92.6	94.8	103.3	103.3	103.3	103.3	103.7	103.7
Net Diesel (Ave MW)	10.9	11.3	11.9	9.4	1.3	1.3	1.3	1.6	2.0	2.4
Surplus Hydro (Ave MW)	11.7	11.1	10.6	11.8	19.7	19.2	18.6	17.7	16.7	16.2

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Projected Loads, Resources and Energy Transfers by Sub-Region

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
UPPER LYNN CANAL											
Skagway/Haines											
Energy Requirements											
Skagway	1.0%	12,100	12,220	12,340	12,460	12,580	12,710	12,840	12,970	13,100	13,230
Haines	1.0%	14,250	14,390	14,530	14,680	14,830	14,980	15,130	15,280	15,430	15,580
Subtotal		26,350	26,610	26,870	27,140	27,410	27,690	27,970	28,250	28,530	28,810
Hydroelectric Energy											
Existing Facilities		23,200	23,200	23,200	23,200	23,200	23,200	23,200	23,200	23,200	23,200
New Facilities	2006	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Subtotal		35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200
Net Diesel Energy		-	-	-	-	-	-	-	-	-	-
Surplus Hydro Energy		8,850	8,590	8,330	8,060	7,790	7,510	7,230	6,950	6,670	6,390
Chilkat Valley/Klukwan											
Energy Requirements	2.0%	2,080	2,120	2,160	2,200	2,240	2,280	2,330	2,380	2,430	2,480
Hydroelectric Energy		1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
Net Diesel Energy		280	320	360	400	440	480	530	580	630	680
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Regional Totals											
Energy Requirements		28,430	28,730	29,030	29,340	29,650	29,970	30,300	30,630	30,960	31,290
Hydroelectric Energy		37,000	37,000	37,000	37,000	37,000	37,000	37,000	37,000	37,000	37,000
Net Diesel		280	320	360	400	440	480	530	580	630	680
Surplus Hydro		8,850	8,590	8,330	8,060	7,790	7,510	7,230	6,950	6,670	6,390
Power Transfers (MWh)											
Within Region											
Skagway to Chilkat Valley	2007	280	320	360	400	440	480	530	580	630	680
Available for Export		8,570	8,270	7,970	7,660	7,350	7,030	6,700	6,370	6,040	5,710
Export Energy	2050										
Import from Juneau	2050	-	-	-	-	-	-	-	-	-	-

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Projected Loads, Resources and Energy Transfers by Sub-Region

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
NORTH REGION											
Juneau - AEL&P											
Energy Requirements	0.7%	375,230	377,660	380,100	382,550	385,030	387,520	390,030	392,550	395,100	397,660
Hydroelectric Energy											
Existing Facilities		353,000	353,000	353,000	353,000	353,000	353,000	353,000	353,000	353,000	353,000
Dorothy Lake - Phase 1	2007	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000
Dorothy Lake - Phase 2	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		428,000	428,000	428,000	428,000	428,000	428,000	428,000	428,000	428,000	428,000
Net Diesel Energy		-	-	-	-	-	-	-	-	-	-
Surplus Hydro Energy		52,770	50,340	47,900	45,450	42,970	40,480	37,970	35,450	32,900	30,340
Green's Creek											
Energy Requirements		58,690	58,690	58,690	58,690	-	-	-	-	-	-
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		58,690	58,690	58,690	58,690	-	-	-	-	-	-
Hoonah											
Energy Requirements	2.6%	8,460	8,550	8,620	8,700	8,780	8,860	8,940	9,030	9,110	9,190
Hydroelectric Energy											
Existing Facilities		-	-	-	-	-	-	-	-	-	-
New Facilities	2011	3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700
Subtotal		3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700
Net Diesel Energy		4,760	4,850	4,920	5,000	5,080	5,160	5,240	5,330	5,410	5,490
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Excursion Inlet Cannery											
Energy Requirements	1.5%	6,500	6,600	6,700	6,800	6,900	7,000	7,110	7,220	7,330	7,440
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		6,500	6,600	6,700	6,800	6,900	7,000	7,110	7,220	7,330	7,440

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Gustavus incl. NPS											
Energy Requirements	1.0%	2,940	2,970	3,000	3,030	3,060	3,090	3,120	3,150	3,180	3,210
Hydroelectric Energy											
Existing Facilities		-	-	-	-	-	-	-	-	-	-
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		2,940	2,970	3,000	3,030	3,060	3,090	3,120	3,150	3,180	3,210
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Regional Totals											
Energy Requirements		451,820	454,470	457,110	459,770	403,770	406,470	409,200	411,950	414,720	417,500
Hydroelectric Energy		431,700	431,700	431,700	431,700	431,700	431,700	431,700	431,700	431,700	431,700
Net Diesel		72,890	73,110	73,310	73,520	15,040	15,250	15,470	15,700	15,920	16,140
Surplus Hydro		52,770	50,340	47,900	45,450	42,970	40,480	37,970	35,450	32,900	30,340
Power Transfers (MWh)											
Within Region											
Juneau to Greens Creek	2007	52,770	50,340	47,900	45,450	-	-	-	-	-	-
Juneau to Hoonah	2007	-	-	-	-	5,080	5,160	5,240	5,330	5,410	5,490
Juneau to Gustavus	2017	-	-	-	-	3,060	3,090	3,120	3,150	3,180	3,210
Available for Export		-	-	-	-	34,830	32,230	29,610	26,970	24,310	21,640
Export Energy	2050										
Import from Sitka	2050										
WEST CENTRAL REGION											
Sitka											
Energy Requirements	1.0%	110,660	111,770	112,890	114,020	115,160	116,310	117,470	118,640	119,830	121,030
Hydroelectric Energy											
Existing Facilities		115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700
Net Diesel Energy		-	-	-	-	-	610	1,770	2,940	4,130	5,330
Surplus Hydro Energy		5,040	3,930	2,810	1,680	540	-	-	-	-	-

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Angoon											
Energy Requirements	1.5%	2,330	2,360	2,400	2,440	2,480	2,520	2,560	2,600	2,640	2,680
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		2,330	2,360	2,400	2,440	2,480	2,520	2,560	2,600	2,640	2,680
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Tenakee Springs											
Energy Requirements	1.0%	488	493	498	503	508	513	518	523	528	533
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		488	493	498	503	508	513	518	523	528	533
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Regional Totals											
Energy Requirements		113,478	114,623	115,788	116,963	118,148	119,343	120,548	121,763	122,998	124,243
Hydroelectric Energy		115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700
Net Diesel		2,818	2,853	2,898	2,943	2,988	3,643	4,848	6,063	7,298	8,543
Surplus Hydro		5,040	3,930	2,810	1,680	540	-	-	-	-	-
Power Transfers (MWh)											
Within Region											
Sitka to Angoon	2050	-	-	-	-	-	-	-	-	-	-
Sitka to Tenakee Springs	2050	-	-	-	-	-	-	-	-	-	-
Available for Export		5,040	3,930	2,810	1,680	540	-	-	-	-	-
Export Energy											
Import from Juneau											
Import from Petersburg											

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
TYEE-SWAN REGION											
Petersburg / Wrangell											
Energy Requirements	0.7%	72,860	73,430	74,000	74,570	75,140	75,710	76,280	76,850	77,420	77,990
Hydroelectric Energy											
Existing Facilities		131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000
Net Diesel Energy		-	-	-	-	-	-	-	-	-	-
Surplus Hydro Energy		58,140	57,570	57,000	56,430	55,860	55,290	54,720	54,150	53,580	53,010
Kake											
Energy Requirements	1.2%	5,050	5,100	5,160	5,220	5,280	5,340	5,400	5,460	5,520	5,580
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		5,050	5,100	5,160	5,220	5,280	5,340	5,400	5,460	5,520	5,580
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Ketchikan											
Energy Requirements	1.1%	171,770	173,660	175,570	177,500	179,450	181,420	183,410	185,420	187,450	189,500
Hydroelectric Energy											
Existing Facilities		139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300
Net Diesel Energy		32,470	34,360	36,270	38,200	40,150	42,120	44,110	46,120	48,150	50,200
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Metlakatla											
Energy Requirements	1.0%	16,030	16,190	16,350	16,510	16,680	16,850	17,020	17,190	17,360	17,530
Hydroelectric Energy											
Existing Facilities		25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045
Net Diesel Energy		-	-	-	-	-	-	-	-	-	-
Surplus Hydro Energy		9,015	8,855	8,695	8,535	8,365	8,195	8,025	7,855	7,685	7,515

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Regional Totals											
Energy Requirements		265,710	268,380	271,080	273,800	276,550	279,320	282,110	284,920	287,750	290,600
Hydroelectric Energy		295,345	295,345	295,345	295,345	295,345	295,345	295,345	295,345	295,345	295,345
Net Diesel		37,520	39,460	41,430	43,420	45,430	47,460	49,510	51,580	53,670	55,780
Surplus Hydro		67,155	66,425	65,695	64,965	64,225	63,485	62,745	62,005	61,265	60,525
Power Transfers (MWh)											
Within Region											
Tyee to Ketchikan	2006	32,470	34,360	36,270	38,200	40,150	42,120	44,110	46,120	48,150	50,200
Tyee to Kake	2007	5,050	5,100	5,160	5,220	5,280	5,340	5,400	5,460	5,430	2,810
Metlakatla to Ketchikan	2020	-	-	-	-	-	-	-	-	-	-
Metlakatla to Kake	2020	-	-	-	-	-	-	-	-	90	2,770
Available for Export		29,635	26,965	24,265	21,545	18,795	16,025	13,235	10,425	7,595	4,745
Imports											
PRINCE OF WALES REGION											
Craig/Klawock/Thorne Bay/Kasaan											
Energy Requirements	1.0%	25,970	26,230	26,490	26,750	27,020	27,290	27,560	27,840	28,120	28,400
Hydroelectric Energy											
Existing Facilities		22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000
New Facilities	2006	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000
Subtotal		29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000
Net Diesel Energy		-	-	-	-	-	-	-	-	-	-
Surplus Hydro Energy		3,030	2,770	2,510	2,250	1,980	1,710	1,440	1,160	880	600
Hollis											
Energy Requirements	1.5%	666	676	686	696	706	717	728	739	750	761
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		666	676	686	696	706	717	728	739	750	761
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Hydaburg											
Energy Requirements	1.0%	1,720	1,737	1,754	1,772	1,790	1,808	1,826	1,844	1,862	1,881
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		1,720	1,737	1,754	1,772	1,790	1,808	1,826	1,844	1,862	1,881
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Coffman Cove											
Energy Requirements	1.5%	863	876	889	902	916	930	944	958	972	987
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		863	876	889	902	916	930	944	958	972	987
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Naukati Bay											
Energy Requirements	1.5%	537	545	553	561	569	578	587	596	605	614
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		537	545	553	561	569	578	587	596	605	614
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Regional Totals											
Energy Requirements		29,756	30,064	30,372	30,681	31,001	31,323	31,645	31,977	32,309	32,643
Hydroelectric Energy		29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000
Net Diesel		3,786	3,834	3,882	3,931	3,981	4,033	4,085	4,137	4,189	4,243
Surplus Hydro		3,030	2,770	2,510	2,250	1,980	1,710	1,440	1,160	880	600
Power Transfers (MWh)											
Within Region											
Craig to Hydaburg	2004	1,720	1,737	1,754	1,772	1,790	1,710	1,440	1,160	880	600
Craig to Hollis	2003	666	676	686	478	190	-	-	-	-	-
Craig to Coffman/Naukati	2007	644	357	70	-	-	-	-	-	-	-
Available for Export		-	-	-	-	-	-	-	-	-	-
Imports	2011	756	1,064	1,372	1,681	2,001	2,323	2,645	2,977	3,309	3,643
Remaining Diesel Req.		-	-	-	-	-	-	-	-	-	-

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
TOTALS										
Energy Requirements (MWh)	889,194	896,267	903,380	910,554	859,119	866,426	873,803	881,240	888,737	896,276
Hydroelectric Energy (MWh)	908,745	908,745	908,745	908,745	908,745	908,745	908,745	908,745	908,745	908,745
Net Diesel (MWh)	23,694	26,687	29,680	32,694	11,889	12,966	14,603	16,260	17,937	19,626
Surplus Hydro (MWh)	136,845	132,055	127,245	122,405	117,505	113,185	109,385	105,565	101,715	97,855
Total Intra-Regional Transfers	93,600	92,890	92,200	91,520	55,990	57,900	59,840	61,800	63,770	65,760
Energy Requirements (Ave MW)	101.5	102.3	103.1	103.9	98.1	98.9	99.7	100.6	101.5	102.3
Hydroelectric Energy (Ave MW)	103.7	103.7	103.7	103.7	103.7	103.7	103.7	103.7	103.7	103.7
Net Diesel (Ave MW)	2.7	3.0	3.4	3.7	1.4	1.5	1.7	1.9	2.0	2.2
Surplus Hydro (Ave MW)	15.6	15.1	14.5	14.0	13.4	12.9	12.5	12.1	11.6	11.2

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
UPPER LYNN CANAL											
Skagway/Haines											
Energy Requirements											
Skagway	1.0%	13,360	13,490	13,620	13,760	13,900	14,040	14,180	14,320	14,460	14,600
Haines	1.0%	15,740	15,900	16,060	16,220	16,380	16,540	16,710	16,880	17,050	17,220
Subtotal		29,100	29,390	29,680	29,980	30,280	30,580	30,890	31,200	31,510	31,820
Hydroelectric Energy											
Existing Facilities		23,200	23,200	23,200	23,200	23,200	23,200	23,200	23,200	23,200	23,200
New Facilities	2006	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Subtotal		35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200
Net Diesel Energy		-	-	-	-	-	-	-	-	-	-
Surplus Hydro Energy		6,100	5,810	5,520	5,220	4,920	4,620	4,310	4,000	3,690	3,380
Chilkat Valley/Klukwan											
Energy Requirements	2.0%	2,530	2,580	2,630	2,680	2,730	2,780	2,840	2,900	2,960	3,020
Hydroelectric Energy		1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
Net Diesel Energy		730	780	830	880	930	980	1,040	1,100	1,160	1,220
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Regional Totals											
Energy Requirements		31,630	31,970	32,310	32,660	33,010	33,360	33,730	34,100	34,470	34,840
Hydroelectric Energy		37,000	37,000	37,000	37,000	37,000	37,000	37,000	37,000	37,000	37,000
Net Diesel		730	780	830	880	930	980	1,040	1,100	1,160	1,220
Surplus Hydro		6,100	5,810	5,520	5,220	4,920	4,620	4,310	4,000	3,690	3,380
Power Transfers (MWh)											
Within Region											
Skagway to Chilkat Valley	2007	730	780	830	880	930	980	1,040	1,100	1,160	1,220
Available for Export		5,370	5,030	4,690	4,340	3,990	3,640	3,270	2,900	2,530	2,160
Export Energy	2050										
Import from Juneau	2050	-	-	-	-	-	-	-	-	-	-

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
NORTH REGION											
Juneau - AEL&P											
Energy Requirements	0.7%	400,240	402,840	405,460	408,100	410,760	413,440	416,140	418,860	421,600	424,360
Hydroelectric Energy											
Existing Facilities		353,000	353,000	353,000	353,000	353,000	353,000	353,000	353,000	353,000	353,000
Dorothy Lake - Phase 1	2007	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000
Dorothy Lake - Phase 2	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		428,000	428,000	428,000	428,000	428,000	428,000	428,000	428,000	428,000	428,000
Net Diesel Energy		-	-	-	-	-	-	-	-	-	-
Surplus Hydro Energy		27,760	25,160	22,540	19,900	17,240	14,560	11,860	9,140	6,400	3,640
Green's Creek											
Energy Requirements		-	-	-	-	-	-	-	-	-	-
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		-	-	-	-	-	-	-	-	-	-
Hoonah											
Energy Requirements	2.6%	9,280	9,360	9,450	9,530	9,610	9,690	9,770	9,850	9,930	10,010
Hydroelectric Energy											
Existing Facilities		-	-	-	-	-	-	-	-	-	-
New Facilities	2011	3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700
Subtotal		3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700	3,700
Net Diesel Energy		5,580	5,660	5,750	5,830	5,910	5,990	6,070	6,150	6,230	6,310
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Excursion Inlet Cannery											
Energy Requirements	1.5%	7,550	7,660	7,770	7,890	8,010	8,130	8,250	8,370	8,500	8,630
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		7,550	7,660	7,770	7,890	8,010	8,130	8,250	8,370	8,500	8,630

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Gustavus incl. NPS											
Energy Requirements	1.0%	3,240	3,270	3,300	3,330	3,360	3,390	3,420	3,450	3,480	3,510
Hydroelectric Energy											
Existing Facilities		-	-	-	-	-	-	-	-	-	-
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		3,240	3,270	3,300	3,330	3,360	3,390	3,420	3,450	3,480	3,510
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Regional Totals											
Energy Requirements		420,310	423,130	425,980	428,850	431,740	434,650	437,580	440,530	443,510	446,510
Hydroelectric Energy		431,700	431,700	431,700	431,700	431,700	431,700	431,700	431,700	431,700	431,700
Net Diesel		16,370	16,590	16,820	17,050	17,280	17,510	17,740	17,970	18,210	18,450
Surplus Hydro		27,760	25,160	22,540	19,900	17,240	14,560	11,860	9,140	6,400	3,640
Power Transfers (MWh)											
Within Region											
Juneau to Greens Creek	2007	-	-	-	-	-	-	-	-	-	-
Juneau to Hoonah	2007	5,580	5,660	5,750	5,830	5,910	5,990	6,070	6,150	6,230	3,640
Juneau to Gustavus	2017	3,240	3,270	3,300	3,330	3,360	3,390	3,420	2,990	170	-
Available for Export		18,940	16,230	13,490	10,740	7,970	5,180	2,370	-	-	-
Export Energy	2050										
Import from Sitka	2050										
WEST CENTRAL REGION											
Sitka											
Energy Requirements	1.0%	122,240	123,460	124,690	125,940	127,200	128,470	129,750	131,050	132,360	133,680
Hydroelectric Energy											
Existing Facilities		115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700
Net Diesel Energy		6,540	7,760	8,990	10,240	11,500	12,770	14,050	15,350	16,660	17,980
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Angoon											
Energy Requirements	1.5%	2,720	2,760	2,800	2,840	2,880	2,920	2,960	3,000	3,050	3,100
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		2,720	2,760	2,800	2,840	2,880	2,920	2,960	3,000	3,050	3,100
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Tenakee Springs											
Energy Requirements	1.0%	538	543	548	553	559	565	571	577	583	589
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		538	543	548	553	559	565	571	577	583	589
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Regional Totals											
Energy Requirements		125,498	126,763	128,038	129,333	130,639	131,955	133,281	134,627	135,993	137,369
Hydroelectric Energy		115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700	115,700
Net Diesel		9,798	11,063	12,338	13,633	14,939	16,255	17,581	18,927	20,293	21,669
Surplus Hydro		-	-	-	-	-	-	-	-	-	-
Power Transfers (MWh)											
Within Region											
Sitka to Angoon	2050	-	-	-	-	-	-	-	-	-	-
Sitka to Tenakee Springs	2050	-	-	-	-	-	-	-	-	-	-
Available for Export		-	-	-	-	-	-	-	-	-	-
Export Energy											
Import from Juneau											
Import from Petersburg											

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
TYEE-SWAN REGION											
Petersburg / Wrangell											
Energy Requirements	0.7%	78,560	79,130	79,700	80,270	80,840	81,410	81,980	82,550	83,120	83,690
Hydroelectric Energy											
Existing Facilities		131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000	131,000
Net Diesel Energy		-	-	-	-	-	-	-	-	-	-
Surplus Hydro Energy		52,440	51,870	51,300	50,730	50,160	49,590	49,020	48,450	47,880	47,310
Kake											
Energy Requirements	1.2%	5,640	5,700	5,770	5,830	5,890	5,950	6,010	6,070	6,130	6,190
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		5,640	5,700	5,770	5,830	5,890	5,950	6,010	6,070	6,130	6,190
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Ketchikan											
Energy Requirements	1.1%	191,570	193,660	195,770	197,900	200,050	202,220	204,410	206,620	208,850	211,100
Hydroelectric Energy											
Existing Facilities		139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300	139,300
Net Diesel Energy		52,270	54,360	56,470	58,600	60,750	62,920	65,110	67,320	69,550	71,800
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Metlakatla											
Energy Requirements	1.0%	17,710	17,890	18,070	18,250	18,430	18,610	18,800	18,990	19,180	19,370
Hydroelectric Energy											
Existing Facilities		25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045
New Facilities	2050	-	-	-	-	-	-	-	-	-	-
Subtotal		25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045	25,045
Net Diesel Energy		-	-	-	-	-	-	-	-	-	-
Surplus Hydro Energy		7,335	7,155	6,975	6,795	6,615	6,435	6,245	6,055	5,865	5,675

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Regional Totals											
Energy Requirements		293,480	296,380	299,310	302,250	305,210	308,190	311,200	314,230	317,280	320,350
Hydroelectric Energy		295,345	295,345	295,345	295,345	295,345	295,345	295,345	295,345	295,345	295,345
Net Diesel		57,910	60,060	62,240	64,430	66,640	68,870	71,120	73,390	75,680	77,990
Surplus Hydro		59,775	59,025	58,275	57,525	56,775	56,025	55,265	54,505	53,745	52,985
Power Transfers (MWh)											
Within Region											
Tyee to Ketchikan	2006	52,270	51,870	51,300	50,730	50,160	49,590	49,020	48,450	47,880	47,310
Tyee to Kake	2007	170	-	-	-	-	-	-	-	-	-
Metlakatla to Ketchikan	2020	-	2,490	5,170	6,795	6,615	6,435	6,245	6,055	5,865	5,675
Metlakatla to Kake	2020	5,470	4,665	1,805	-	-	-	-	-	-	-
Available for Export		1,865	-	-	-	-	-	-	-	-	-
Imports											
PRINCE OF WALES REGION											
Craig/Klawock/Thorne Bay/Kasaan											
Energy Requirements	1.0%	28,680	28,970	29,260	29,550	29,850	30,150	30,450	30,750	31,060	31,370
Hydroelectric Energy											
Existing Facilities		22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000
New Facilities	2006	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000
Subtotal		29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000
Net Diesel Energy		-	-	260	550	850	1,150	1,450	1,750	2,060	2,370
Surplus Hydro Energy		320	30	-	-	-	-	-	-	-	-
Hollis											
Energy Requirements	1.5%	772	784	796	808	820	832	844	857	870	883
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		772	784	796	808	820	832	844	857	870	883
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Hydaburg											
Energy Requirements	1.0%	1,900	1,919	1,938	1,957	1,977	1,997	2,017	2,037	2,057	2,078
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		1,900	1,919	1,938	1,957	1,977	1,997	2,017	2,037	2,057	2,078
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Coffman Cove											
Energy Requirements	1.5%	1,002	1,017	1,032	1,047	1,063	1,079	1,095	1,111	1,128	1,145
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		1,002	1,017	1,032	1,047	1,063	1,079	1,095	1,111	1,128	1,145
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Naukati Bay											
Energy Requirements	1.5%	623	632	641	651	661	671	681	691	701	712
Hydroelectric Energy		-	-	-	-	-	-	-	-	-	-
Net Diesel Energy		623	632	641	651	661	671	681	691	701	712
Surplus Hydro Energy		-	-	-	-	-	-	-	-	-	-
Regional Totals											
Energy Requirements		32,977	33,322	33,667	34,013	34,371	34,729	35,087	35,446	35,816	36,188
Hydroelectric Energy		29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000
Net Diesel		4,297	4,352	4,667	5,013	5,371	5,729	6,087	6,446	6,816	7,188
Surplus Hydro		320	30	-	-	-	-	-	-	-	-
Power Transfers (MWh)											
Within Region											
Craig to Hydaburg	2004	320	30	-	-	-	-	-	-	-	-
Craig to Hollis	2003	-	-	-	-	-	-	-	-	-	-
Craig to Coffman/Naukati	2007	-	-	-	-	-	-	-	-	-	-
Available for Export		-	-	-	-	-	-	-	-	-	-
Imports	2011	1,865	-	-	-	-	-	-	-	-	-
Remaining Diesel Req.		2,112	4,322	4,667	5,013	5,371	5,729	6,087	6,446	6,816	7,188

TABLE A-1
Projected Loads, Resources and Energy Transfers by Sub-Region

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
TOTALS										
Energy Requirements (MWh)	903,895	911,565	919,305	927,106	934,970	942,884	950,878	958,933	967,069	975,257
Hydroelectric Energy (MWh)	908,745	908,745	908,745	908,745	908,745	908,745	908,745	908,745	908,745	908,745
Net Diesel (MWh)	21,325	24,080	28,740	33,441	38,185	42,959	47,773	53,088	60,854	68,672
Surplus Hydro (MWh)	93,955	90,025	86,335	82,645	78,935	75,205	71,435	67,645	63,835	60,005
Total Intra-Regional Transfers	67,780	68,765	68,155	67,565	66,975	66,385	65,795	64,745	61,305	57,845
 Energy Requirements (Ave MW)	 103.2	 104.1	 104.9	 105.8	 106.7	 107.6	 108.5	 109.5	 110.4	 111.3
Hydroelectric Energy (Ave MW)	103.7	103.7	103.7	103.7	103.7	103.7	103.7	103.7	103.7	103.7
Net Diesel (Ave MW)	2.4	2.7	3.3	3.8	4.4	4.9	5.5	6.1	6.9	7.8
Surplus Hydro (Ave MW)	10.7	10.3	9.9	9.4	9.0	8.6	8.2	7.7	7.3	6.8

APPENDIX B

Detailed Analytical Tables Economic Analysis

TABLE B-1
Southeast Alaska Intertie Study
Economic Analysis

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Juneau - Haines										
Energy Requirements (MWh) ¹	25,550	25,820	26,090	26,370	26,650	26,930	27,230	27,530	27,830	28,130
Energy Purchased (MWh) ²	-	-	-	-	-	-	-	-	-	-
Purchased Power Price (¢/kWh) ³	7.0	7.0	7.0	7.0	8.5	8.5	8.5	8.5	8.5	8.5
Annual Costs with Intertie (\$000)										
Purchased Power ⁴	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Intertie O&M ⁵	-	-	-	-	-	-	-	-	-	-
Intertie A&G ⁶	-	-	-	-	-	-	-	-	-	-
Intertie R&R ⁷	-	-	-	-	-	-	-	-	-	-
Total Annual Costs with Intertie	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Unit Cost (¢/kWh) ⁸	-	-	-	-	-	-	-	-	-	-
Savings with Intertie (\$000) ⁹	-	-	-	-	-	\$ -	\$ -	\$ -	\$ -	\$ -
Savings (¢/kWh) ¹⁰	-	-	-	-	-	-	-	-	-	-
Hoonah - Gustavus										
Energy Requirements (MWh) ¹	2,640	2,670	2,700	2,730	2,760	2,790	2,820	2,850	2,880	2,910
Energy Purchased (MWh) ²	-	-	-	-	-	-	-	-	-	-
Purchased Power Price (¢/kWh) ³	7.0	7.0	7.0	7.0	8.5	8.5	8.5	8.5	8.5	8.5
Annual Costs with Intertie (\$000)										
Purchased Power ⁴	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Intertie O&M ⁵	-	-	-	-	-	-	-	-	-	-
Intertie A&G ⁶	-	-	-	-	-	-	-	-	-	-
Intertie R&R ⁷	-	-	-	-	-	-	-	-	-	-
Total Annual Costs with Intertie	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Unit Cost (¢/kWh) ⁸	-	-	-	-	-	-	-	-	-	-
Savings with Intertie (\$000) ⁹	-	-	-	-	-	\$ -	\$ -	\$ -	\$ -	\$ -
Savings (¢/kWh) ¹⁰	-	-	-	-	-	-	-	-	-	-

TABLE B-1
Southeast Alaska Intertie Study
Economic Analysis

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Ketchikan - Prince of Wales										
Energy Requirements (MWh) ¹	26,846	27,129	27,412	27,695	27,979	28,263	28,557	28,853	29,150	29,448
Energy Purchased (MWh) ²	-	-	-	-	-	-	-	-	150	448
Purchased Power Price (¢/kWh) ³	7.0	7.0	7.0	7.0	7.0	7.5	7.5	7.5	7.5	7.5
Annual Costs with Intertie (\$000)										
Purchased Power ⁴	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 12	\$ 35
Intertie O&M ⁵	-	-	-	-	-	-	-	-	146	150
Intertie A&G ⁶	-	-	-	-	-	-	-	-	79	81
Intertie R&R ⁷	-	-	-	-	-	-	-	-	116	116
Total Annual Costs with Intertie	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 354	\$ 382
Unit Cost (¢/kWh) ⁸	-	-	-	-	-	-	-	-	235.7	85.3
Savings with Intertie (\$000) ⁹	-	-	-	-	-	-	-	-	(337)	(332)
Savings (¢/kWh) ¹⁰	-	-	-	-	-	-	-	-	(224.6)	(74.0)
Metlakatla - Ketchikan										
Energy Requirements (MWh) ¹	-	-	-	-	-	-	-	-	-	-
Energy Purchased (MWh) ²	-	-	-	-	-	-	-	-	-	-
Purchased Power Price (¢/kWh) ³	7.0	7.0	7.0	7.0	7.0	7.5	7.5	7.5	7.5	7.5
Annual Costs with Intertie (\$000)										
Purchased Power ⁴	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Intertie O&M ⁵	-	-	-	-	-	-	-	-	-	-
Intertie A&G ⁶	-	-	-	-	-	-	-	-	-	-
Intertie R&R ⁷	-	-	-	-	-	-	-	-	-	-
Total Annual Costs with Intertie	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Unit Cost (¢/kWh) ⁸	-	-	-	-	-	-	-	-	-	-
Savings with Intertie (\$000) ⁹	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Savings (¢/kWh) ¹⁰	-	-	-	-	-	-	-	-	-	-

TABLE B-1
Southeast Alaska Intertie Study
Economic Analysis

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Kake - Sitka										
Energy Requirements (MWh) ¹	100,200	101,200	102,210	103,230	104,260	105,300	106,350	107,410	108,480	109,560
Energy Purchased (MWh) ²	-	-	-	-	-	-	-	-	-	-
Purchased Power Price (¢/kWh) ³	7.0	7.0	7.0	7.0	7.0	7.5	7.5	7.5	7.5	7.5
Annual Costs with Intertie (\$000)										
Purchased Power ⁴	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Intertie O&M ⁵	-	-	-	-	-	-	-	-	-	-
Intertie A&G ⁶	-	-	-	-	-	-	-	-	-	-
Intertie R&R ⁷	-	-	-	-	-	-	-	-	-	-
Total Annual Costs with Intertie	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Unit Cost (¢/kWh) ⁸	-	-	-	-	-	-	-	-	-	-
Savings with Intertie (\$000) ⁹	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Savings (¢/kWh) ¹⁰	-	-	-	-	-	-	-	-	-	-
Hawk Inlet - Angoon - Sitka										
Energy Requirements (MWh) ¹	102,230	103,260	104,300	105,350	106,410	107,480	108,560	109,650	110,750	111,860
Energy Purchased (MWh) ²	-	-	-	-	-	-	-	-	-	-
Purchased Power Price (¢/kWh) ³	7.0	7.0	7.0	7.0	8.5	8.5	8.5	8.5	8.5	8.5
Annual Costs with Intertie (\$000)										
Purchased Power ⁴	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Intertie O&M ⁵	-	-	-	-	-	-	-	-	-	-
Intertie A&G ⁶	-	-	-	-	-	-	-	-	-	-
Intertie R&R ⁷	-	-	-	-	-	-	-	-	-	-
Total Annual Costs with Intertie	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Unit Cost (¢/kWh) ⁸	-	-	-	-	-	-	-	-	-	-
Savings with Intertie (\$000) ⁹	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Savings (¢/kWh) ¹⁰	-	-	-	-	-	-	-	-	-	-

TABLE B-1
Southeast Alaska Intertie Study
Economic Analysis

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Hawk Inlet - Angoon										
Energy Requirements (MWh) ¹	2,030	2,060	2,090	2,120	2,150	2,180	2,210	2,240	2,270	2,300
Energy Purchased (MWh) ²	-	-	-	-	-	-	-	-	-	2,300
Purchased Power Price (¢/kWh) ³	7.0	7.0	7.0	7.0	8.5	8.5	8.5	8.5	8.5	8.5
Annual Costs with Intertie (\$000)										
Purchased Power ⁴	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 203
Intertie O&M ⁵	-	-	-	-	-	-	-	-	-	150
Intertie A&G ⁶	-	-	-	-	-	-	-	-	-	81
Intertie R&R ⁷	-	-	-	-	-	-	-	-	-	116
Total Annual Costs with Intertie	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 550
Unit Cost (¢/kWh) ⁸	-	-	-	-	-	-	-	-	-	23.9
Savings with Intertie (\$000) ⁹	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (201)
Savings (¢/kWh) ¹⁰	-	-	-	-	-	-	-	-	-	(8.7)
Assumed Annual Inflation										
		2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
Energy Losses										
Juneau - Haines (SEI-8)	6.0%									
Ketchikan - POW (SEI-4)	4.0%									
Ketchikan - Metlakatla (SEI-3)	4.0%									
Hoonah - Gustavus (SEI-7)	4.0%									
Kake - Sitka (SEI-5)	4.0%									
Hawk Inlet - Sitka (SEI-6)	6.0%									
Hawk Inlet - Angoon (SEI-6)	4.0%									

TABLE B-1
Southeast Alaska Intertie Study
Economic Analysis

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Juneau - Haines											
Energy Requirements (MWh)	28,430	28,730	29,030	29,340	29,650	29,970	30,300	30,630	30,960	31,290	31,630
Energy Purchased (MWh) ²	-	-	-	-	-	-	-	-	-	-	-
Purchased Power Price (¢/kWh)	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
Annual Costs with Intertie (\$000)											
Purchased Power ⁴	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Intertie O&M ⁵	-	-	-	-	-	-	-	-	-	-	-
Intertie A&G ⁶	-	-	-	-	-	-	-	-	-	-	-
Intertie R&R ⁷	-	-	-	-	-	-	-	-	-	-	-
Total Annual Costs with Intertie	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Unit Cost (¢/kWh) ⁸	-	-	-	-	-	-	-	-	-	-	-
Savings with Intertie (\$000) ⁹	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Savings (¢/kWh) ¹⁰	-	-	-	-	-	-	-	-	-	-	-
Hoonah - Gustavus											
Energy Requirements (MWh)	2,940	2,970	3,000	3,030	3,060	3,090	3,120	3,150	3,180	3,210	3,240
Energy Purchased (MWh) ²	-	-	-	-	3,060	3,090	3,120	3,150	3,180	3,210	3,240
Purchased Power Price (¢/kWh)	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
Annual Costs with Intertie (\$000)											
Purchased Power ⁴	\$ -	\$ -	\$ -	\$ -	\$ 271	\$ 273	\$ 276	\$ 278	\$ 281	\$ 284	\$ 286
Intertie O&M ⁵	-	-	-	-	233	239	245	251	257	264	270
Intertie A&G ⁶	-	-	-	-	92	94	97	99	101	104	107
Intertie R&R ⁷	-	-	-	-	116	116	116	116	116	116	116
Total Annual Costs with Intertie	\$ -	\$ -	\$ -	\$ -	\$ 712	\$ 722	\$ 733	\$ 744	\$ 756	\$ 768	\$ 779
Unit Cost (¢/kWh) ⁸	-	-	-	-	23.3	23.4	23.5	23.6	23.8	23.9	24.0
Savings with Intertie (\$000) ⁹	\$ -	\$ -	\$ -	\$ -	\$ (132)	\$ (123)	\$ (112)	\$ (102)	\$ (91)	\$ (80)	\$ (68)
Savings (¢/kWh) ¹⁰	-	-	-	-	(4.3)	(4.0)	(3.6)	(3.2)	(2.9)	(2.5)	(2.1)

TABLE B-1
Southeast Alaska Intertie Study
Economic Analysis

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Ketchikan - Prince of Wales											
Energy Requirements (MWh)	29,756	30,064	30,372	30,681	31,001	31,323	31,645	31,977	32,309	32,643	32,977
Energy Purchased (MWh) ²	756	1,064	1,372	1,681	2,001	2,323	2,645	2,977	3,309	3,643	3,977
Purchased Power Price (¢/kWh)	7.5	7.5	7.5	7.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Annual Costs with Intertie (\$000)											
Purchased Power ⁴	\$ 59	\$ 83	\$ 107	\$ 131	\$ 166	\$ 193	\$ 220	\$ 248	\$ 275	\$ 303	\$ 331
Intertie O&M ⁵	154	158	162	166	170	174	178	183	187	192	197
Intertie A&G ⁶	83	85	87	90	92	94	97	99	101	104	107
Intertie R&R ⁷	116	116	116	116	116	116	116	116	116	116	116
Total Annual Costs with Intertie	\$ 412	\$ 442	\$ 472	\$ 502	\$ 543	\$ 577	\$ 611	\$ 646	\$ 680	\$ 715	\$ 750
Unit Cost (¢/kWh) ⁸	54.5	41.5	34.4	29.9	27.2	24.8	23.1	21.7	20.5	19.6	18.9
Savings with Intertie (\$000) ⁹	(324)	(315)	(305)	(292)	(287)	(272)	(255)	(235)	(212)	(187)	(160)
Savings (¢/kWh) ¹⁰	(42.9)	(29.6)	(22.2)	(17.4)	(14.3)	(11.7)	(9.6)	(7.9)	(6.4)	(5.1)	(4.0)
Metlakatla - Ketchikan											
Energy Requirements (MWh)	-	-	-	-	-	-	-	-	-	-	-
Energy Purchased (MWh) ²	-	-	-	-	-	-	-	7,855	7,685	7,515	7,335
Purchased Power Price (¢/kWh)	7.5	7.5	7.5	7.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Annual Costs with Intertie (\$000)											
Purchased Power ⁴	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 654	\$ 639	\$ 625	\$ 610
Intertie O&M ⁵	-	-	-	-	-	-	-	168	172	176	180
Intertie A&G ⁶	-	-	-	-	-	-	-	99	101	104	107
Intertie R&R ⁷	-	-	-	-	-	-	-	46	46	46	46
Total Annual Costs with Intertie	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 966	\$ 958	\$ 951	\$ 943
Unit Cost (¢/kWh) ⁸	-	-	-	-	-	-	-	12.3	12.5	12.7	12.9
Savings with Intertie (\$000) ⁹	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 72	\$ 83	\$ 93	\$ 102
Savings (¢/kWh) ¹⁰	-	-	-	-	-	-	-	0.9	1.1	1.2	1.4

TABLE B-1
Southeast Alaska Intertie Study
Economic Analysis

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Kake - Sitka											
Energy Requirements (MWh)	110,660	111,770	112,890	114,020	115,160	116,310	117,470	118,640	119,830	121,030	122,240
Energy Purchased (MWh) ²	-	-	-	-	-	610	1,770	2,940	4,130	5,330	6,540
Purchased Power Price (¢/kWh)	7.5	7.5	7.5	7.5	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Annual Costs with Intertie (\$0)											
Purchased Power ⁴	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 51	\$ 147	\$ 245	\$ 344	\$ 443	\$ 544
Intertie O&M ⁵	-	-	-	-	-	333	341	350	359	368	377
Intertie A&G ⁶	-	-	-	-	-	94	97	99	101	104	107
Intertie R&R ⁷	-	-	-	-	-	116	116	116	116	116	116
Total Annual Costs with Intertie	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 594	\$ 701	\$ 810	\$ 920	\$ 1,030	\$ 1,143
Unit Cost (¢/kWh) ⁸	-	-	-	-	-	97.4	39.6	27.5	22.3	19.3	17.5
Savings with Intertie (\$000) ⁹	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (498)	\$ (416)	\$ (324)	\$ (220)	\$ (105)	\$ 21
Savings (¢/kWh) ¹⁰	-	-	-	-	-	(81.7)	(23.5)	(11.0)	(5.3)	(2.0)	0.3
Hawk Inlet - Angoon - Sitka											
Energy Requirements (MWh)	112,990	114,130	115,290	116,460	117,640	118,830	120,030	121,240	122,470	123,710	124,960
Energy Purchased (MWh) ²	-	-	-	-	-	3,130	4,330	5,540	6,770	8,010	9,260
Purchased Power Price (¢/kWh)	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
Annual Costs with Intertie (\$0)											
Purchased Power ⁴	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 282	\$ 390	\$ 499	\$ 610	\$ 722	\$ 834
Intertie O&M ⁵	-	-	-	-	-	377	386	396	405	416	426
Intertie A&G ⁶	-	-	-	-	-	94	97	99	101	104	107
Intertie R&R ⁷	-	-	-	-	-	116	116	116	116	116	116
Total Annual Costs with Intertie	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 869	\$ 988	\$ 1,109	\$ 1,233	\$ 1,357	\$ 1,482
Unit Cost (¢/kWh) ⁸	-	-	-	-	-	27.8	22.8	20.0	18.2	16.9	16.0
Savings with Intertie (\$000) ⁹	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (330)	\$ (241)	\$ (143)	\$ (32)	\$ 89	\$ 224
Savings (¢/kWh) ¹⁰	-	-	-	-	-	(10.5)	(5.6)	(2.6)	(0.5)	1.1	2.4

TABLE B-1
Southeast Alaska Intertie Study
Economic Analysis

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Hawk Inlet - Angoon											
Energy Requirements (MWh)	2,330	2,360	2,400	2,440	2,480	2,520	2,560	2,600	2,640	2,680	2,720
Energy Purchased (MWh) ²	2,330	2,360	2,400	2,440	2,480	2,520	2,560	2,600	2,640	2,680	2,720
Purchased Power Price (¢/kWh)	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
Annual Costs with Intertie (\$0											
Purchased Power ⁴	\$ 206	\$ 209	\$ 212	\$ 216	\$ 219	\$ 223	\$ 226	\$ 230	\$ 233	\$ 237	\$ 240
Intertie O&M ⁵	154	158	162	166	170	174	178	183	187	192	197
Intertie A&G ⁶	83	85	87	90	92	94	97	99	101	104	107
Intertie R&R ⁷	116	116	116	116	116	116	116	116	116	116	116
Total Annual Costs with Intertie	\$ 559	\$ 568	\$ 577	\$ 587	\$ 596	\$ 607	\$ 617	\$ 628	\$ 638	\$ 649	\$ 659
Unit Cost (¢/kWh) ⁸	24.0	24.1	24.0	24.1	24.0	24.1	24.1	24.1	24.2	24.2	24.2
Savings with Intertie (\$000) ⁹	\$ (197)	\$ (191)	\$ (184)	\$ (178)	\$ (170)	\$ (164)	\$ (155)	\$ (147)	\$ (137)	\$ (128)	\$ (117)
Savings (¢/kWh) ¹⁰	(8.5)	(8.1)	(7.7)	(7.3)	(6.9)	(6.5)	(6.0)	(5.6)	(5.2)	(4.8)	(4.3)
Assumed Annual Inflation	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
Energy Losses											
Juneau - Haines (SEI-8)											
Ketchikan - POW (SEI-4)											
Ketchikan - Metlakatla (SEI-4)											
Hoonah - Gustavus (SEI-7)											
Kake - Sitka (SEI-5)											
Hawk Inlet - Sitka (SEI-6)											
Hawk Inlet - Angoon (SEI-6)											

TABLE B-1
Southeast Alaska Intertie Study
Economic Analysis

	2024	2025	2026	2027	2028	2029	2030	2031	2032
Juneau - Haines									
Energy Requirements (MWh)	31,970	32,310	32,660	33,010	33,360	33,730	34,100	34,470	34,840
Energy Purchased (MWh) ²	-	-	-	-	-	-	-	-	-
Purchased Power Price (¢/kWh)	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
Annual Costs with Intertie (\$000)									
Purchased Power ⁴	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Intertie O&M ⁵	-	-	-	-	-	-	-	-	-
Intertie A&G ⁶	-	-	-	-	-	-	-	-	-
Intertie R&R ⁷	-	-	-	-	-	-	-	-	-
Total Annual Costs with Intertie	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Unit Cost (¢/kWh) ⁸	-	-	-	-	-	-	-	-	-
Savings with Intertie (\$000) ⁹	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Savings (¢/kWh) ¹⁰	-	-	-	-	-	-	-	-	-
Hoonah - Gustavus									
Energy Requirements (MWh)	3,270	3,300	3,330	3,360	3,390	3,420	3,450	3,480	3,510
Energy Purchased (MWh) ²	3,270	3,300	3,330	3,360	3,390	3,420	3,450	3,480	3,510
Purchased Power Price (¢/kWh)	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
Annual Costs with Intertie (\$000)									
Purchased Power ⁴	\$ 289	\$ 292	\$ 294	\$ 297	\$ 300	\$ 302	\$ 305	\$ 308	\$ 310
Intertie O&M ⁵	277	284	291	298	306	314	321	329	338
Intertie A&G ⁶	109	112	115	118	121	124	127	130	133
Intertie R&R ⁷	116	116	116	116	116	116	116	116	116
Total Annual Costs with Intertie	\$ 791	\$ 804	\$ 816	\$ 829	\$ 842	\$ 855	\$ 869	\$ 883	\$ 897
Unit Cost (¢/kWh) ⁸	24.2	24.4	24.5	24.7	24.8	25.0	25.2	25.4	25.5
Savings with Intertie (\$000) ⁹	\$ (55)	\$ (43)	\$ (29)	\$ (19)	\$ (9)	\$ 2	\$ 13	\$ 24	\$ 37
Savings (¢/kWh) ¹⁰	(1.7)	(1.3)	(0.9)	(0.6)	(0.3)	0.1	0.4	0.7	1.0

TABLE B-1
Southeast Alaska Intertie Study
Economic Analysis

	2024	2025	2026	2027	2028	2029	2030	2031	2032
Ketchikan - Prince of Wales									
Energy Requirements (MWh)	33,322	33,667	34,013	34,371	34,729	35,087	35,446	35,816	36,188
Energy Purchased (MWh) ²	4,322	4,667	5,013	5,371	5,729	6,087	6,446	6,816	7,188
Purchased Power Price (¢/kWh)	8.0	8.0	8.0	8.5	8.5	8.5	8.5	8.5	8.5
Annual Costs with Intertie (\$000)									
Purchased Power ⁴	\$ 360	\$ 388	\$ 417	\$ 475	\$ 506	\$ 538	\$ 570	\$ 603	\$ 635
Intertie O&M ⁵	202	207	212	217	223	228	234	240	246
Intertie A&G ⁶	109	112	115	118	121	124	127	130	133
Intertie R&R ⁷	116	116	116	116	116	116	116	116	116
Total Annual Costs with Intertie	\$ 787	\$ 823	\$ 860	\$ 926	\$ 965	\$ 1,006	\$ 1,046	\$ 1,088	\$ 1,130
Unit Cost (¢/kWh) ⁸	18.2	17.6	17.1	17.2	16.8	16.5	16.2	16.0	15.7
Savings with Intertie (\$000) ⁹	(129)	(95)	(58)	(47)	(5)	37	84	135	191
Savings (¢/kWh) ¹⁰	(3.0)	(2.0)	(1.1)	(0.9)	(0.1)	0.6	1.3	2.0	2.7
Metlakatla - Ketchikan									
Energy Requirements (MWh)	-	-	-	-	-	-	-	-	-
Energy Purchased (MWh) ²	7,155	6,975	6,795	6,615	6,435	6,245	6,055	5,865	5,675
Purchased Power Price (¢/kWh)	8.0	8.0	8.0	8.5	8.5	8.5	8.5	8.5	8.5
Annual Costs with Intertie (\$000)									
Purchased Power ⁴	\$ 595	\$ 580	\$ 565	\$ 585	\$ 569	\$ 552	\$ 535	\$ 518	\$ 502
Intertie O&M ⁵	185	190	194	199	204	209	214	220	225
Intertie A&G ⁶	109	112	115	118	121	124	127	130	133
Intertie R&R ⁷	46	46	46	46	46	46	46	46	46
Total Annual Costs with Intertie	\$ 935	\$ 927	\$ 920	\$ 948	\$ 940	\$ 931	\$ 922	\$ 914	\$ 906
Unit Cost (¢/kWh) ⁸	13.1	13.3	13.5	14.3	14.6	14.9	15.2	15.6	16.0
Savings with Intertie (\$000) ⁹	\$ 109	\$ 116	\$ 122	\$ 88	\$ 88	\$ 88	\$ 86	\$ 83	\$ 79
Savings (¢/kWh) ¹⁰	1.5	1.7	1.8	1.3	1.4	1.4	1.4	1.4	1.4

TABLE B-1
Southeast Alaska Intertie Study
Economic Analysis

	2024	2025	2026	2027	2028	2029	2030	2031	2032
Kake - Sitka									
Energy Requirements (MWh)	123,460	124,690	125,940	127,200	128,470	129,750	131,050	132,360	133,680
Energy Purchased (MWh) ²	7,760	8,990	10,240	11,500	12,770	14,050	15,350	16,660	17,980
Purchased Power Price (¢/kWh)	8.0	8.0	8.0	8.5	8.5	8.5	8.5	8.5	8.5
Annual Costs with Intertie (\$000)									
Purchased Power ⁴	\$ 646	\$ 748	\$ 852	\$ 1,017	\$ 1,129	\$ 1,242	\$ 1,357	\$ 1,473	\$ 1,589
Intertie O&M ⁵	386	396	406	416	426	437	448	459	471
Intertie A&G ⁶	109	112	115	118	121	124	127	130	133
Intertie R&R ⁷	116	116	116	116	116	116	116	116	116
Total Annual Costs with Intertie	\$ 1,257	\$ 1,372	\$ 1,488	\$ 1,666	\$ 1,792	\$ 1,918	\$ 2,047	\$ 2,178	\$ 2,309
Unit Cost (¢/kWh) ⁸	16.2	15.3	14.5	14.5	14.0	13.7	13.3	13.1	12.8
Savings with Intertie (\$000) ⁹	\$ 157	\$ 308	\$ 473	\$ 577	\$ 745	\$ 923	\$ 1,115	\$ 1,317	\$ 1,535
Savings (¢/kWh) ¹⁰	2.0	3.4	4.6	5.0	5.8	6.6	7.3	7.9	8.5
Hawk Inlet - Angoon - Sitka									
Energy Requirements (MWh)	126,220	127,490	128,780	130,080	131,390	132,710	134,050	135,410	136,780
Energy Purchased (MWh) ²	10,520	11,790	13,080	14,380	15,690	17,010	18,350	19,710	21,080
Purchased Power Price (¢/kWh)	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
Annual Costs with Intertie (\$000)									
Purchased Power ⁴	\$ 948	\$ 1,062	\$ 1,179	\$ 1,296	\$ 1,414	\$ 1,533	\$ 1,653	\$ 1,776	\$ 1,899
Intertie O&M ⁵	437	447	459	470	482	494	506	519	532
Intertie A&G ⁶	109	112	115	118	121	124	127	130	133
Intertie R&R ⁷	116	116	116	116	116	116	116	116	116
Total Annual Costs with Intertie	\$ 1,610	\$ 1,737	\$ 1,868	\$ 2,000	\$ 2,132	\$ 2,266	\$ 2,402	\$ 2,541	\$ 2,680
Unit Cost (¢/kWh) ⁸	15.3	14.7	14.3	13.9	13.6	13.3	13.1	12.9	12.7
Savings with Intertie (\$000) ⁹	\$ 369	\$ 530	\$ 702	\$ 872	\$ 1,055	\$ 1,247	\$ 1,454	\$ 1,674	\$ 1,908
Savings (¢/kWh) ¹⁰	3.5	4.5	5.4	6.1	6.7	7.3	7.9	8.5	9.1

TABLE B-1
Southeast Alaska Intertie Study
Economic Analysis

	2024	2025	2026	2027	2028	2029	2030	2031	2032
Hawk Inlet - Angoon									
Energy Requirements (MWh)	2,760	2,800	2,840	2,880	2,920	2,960	3,000	3,050	3,100
Energy Purchased (MWh) ²	2,760	2,800	2,840	2,880	2,920	2,960	3,000	3,050	3,100
Purchased Power Price (¢/kWh)	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
Annual Costs with Intertie (\$000)									
Purchased Power ⁴	\$ 244	\$ 248	\$ 251	\$ 255	\$ 258	\$ 262	\$ 265	\$ 270	\$ 274
Intertie O&M ⁵	202	207	212	217	223	228	234	240	246
Intertie A&G ⁶	109	112	115	118	121	124	127	130	133
Intertie R&R ⁷	116	116	116	116	116	116	116	116	116
Total Annual Costs with Intertie	\$ 671	\$ 683	\$ 694	\$ 706	\$ 717	\$ 730	\$ 741	\$ 755	\$ 769
Unit Cost (¢/kWh) ⁸	24.3	24.4	24.4	24.5	24.6	24.6	24.7	24.8	24.8
Savings with Intertie (\$000) ⁹	\$ (107)	\$ (96)	\$ (85)	\$ (77)	\$ (66)	\$ (58)	\$ (47)	\$ (36)	\$ (24)
Savings (¢/kWh) ¹⁰	(3.9)	(3.4)	(3.0)	(2.7)	(2.3)	(1.9)	(1.6)	(1.2)	(0.8)
Assumed Annual Inflation									
	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
Energy Losses									
Juneau - Haines (SEI-8)									
Ketchikan - POW (SEI-4)									
Ketchikan - Metlakatla (SEI-3)									
Hoonah - Gustavus (SEI-7)									
Kake - Sitka (SEI-5)									
Hawk Inlet - Sitka (SEI-6)									
Hawk Inlet - Angoon (SEI-6)									

APPENDIX C

Report of DC Technologies
Prepared by
Northstar Power Engineering and Dr. George Karady

SOUTHEAST ALASKA INTERTIE STUDY 2

George G. Karady and F. Mike Carson

Introduction

The purpose of this study is to design a high voltage DC system to interconnect Point White (Kake), Warm Springs (Sitka), Angoon and Hoonah(Juneau) with DC submarine cables.

The system can be divided into three submarine cable segments. The segments are:

- a) Point White-Warm Springs Bay 35 mi
- b) Warm Springs Bay-Angoon 30.1mi
- c) Angoon – Hawk Inlet 49.2 mi

Presently the local loads are less than 3 MW, but because of the expected growth of the area the system will be designed to carry 20 MW load.

Concept of the interconnection

The concept is to interconnect Point White to Hawk Inlet with HVDC cables and place converters connected in parallel at Angoon and Warm Springs. The system conceptual connection diagram is shown in Figure 1.

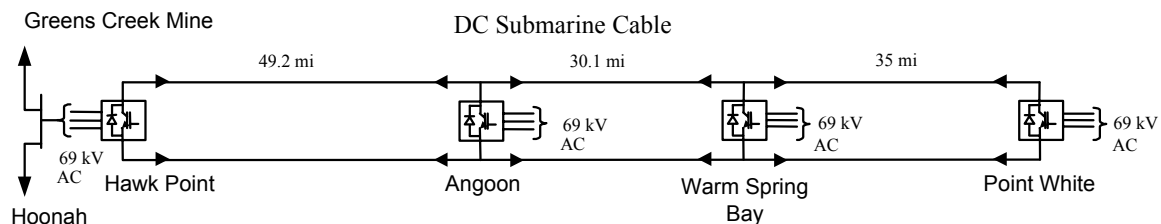


Figure 1. Multi terminal HVDC interconnection between Point White and Hoonah

Each converter can operate as an inverter or a rectifier, which permits energy transfer between any of the stations. The voltage source converters are connected to the local 69kV network through transformers and standard AC switchgear (circuit breakers, disconnect switches, current transformers, etc.).

The system produces positive and negative DC voltages. Consequently, there are positive and negative high voltage cables and the middle point is grounded. The current through the ground is zero in the normal operating condition. However, in case of cable fault, the system can operate with half power for a short duration.

The DC system will use voltage source converters with PWM modulation. This is a new HVDC system. Presently two manufacturers offer this system: ABB and Siemens.

The voltage source converters use semiconductor switches, (IGBT or MOSFET) and pulse width modulation (PWM). The capacity of a HVDC system with VSCs is around 30-150 MW. Operating experience is limited. The relatively low power rating makes this system ideal for Alaska, where the loads are less than 20 MW.

Description of the HVDC system operation

The PWM inverters and rectifiers with IGBT or MOSFET switches are frequently used for motor drives. These drives operate close to unity power factor and do not generate significant current harmonics in the AC supply. Also, the PWM drive can be controlled very accurately. These technical parameters indicate that the voltage converter based PWM system is a nearly ideal transmission component. The proposed system is an enlarged version of these well accepted techniques.

The light HVDC system concept is shown on Figure 2. The major components are:

- AC reactance
- Two converters connected in series, with six IGBT or MOSFET switches with shunting diodes
- DC capacitor

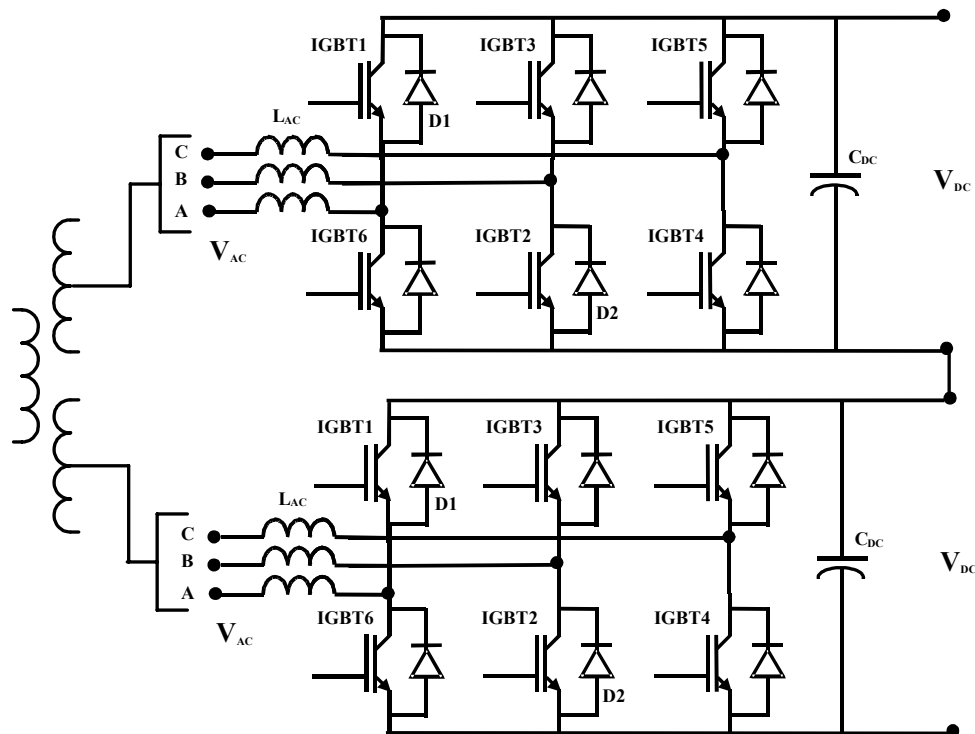


Figure 2. Voltage source converter.

In each converter the six switches form a six-pulse bridge. The switches are turned on in sequence, e.g. 12, 34, 56, etc. The turn on of switch 1 connects the positive DC terminals to phase A. Turn on of switch 2 connects the negative DC terminals to phase B. The switches are turned on for a short period of time, which generates a pulse train at the AC terminals.

Figure 3 shows the generated pulse train. It can be seen that the width of the pulses is modulated and hence the name PWM. The filtering of the output voltage produces a sinusoidal waveform.

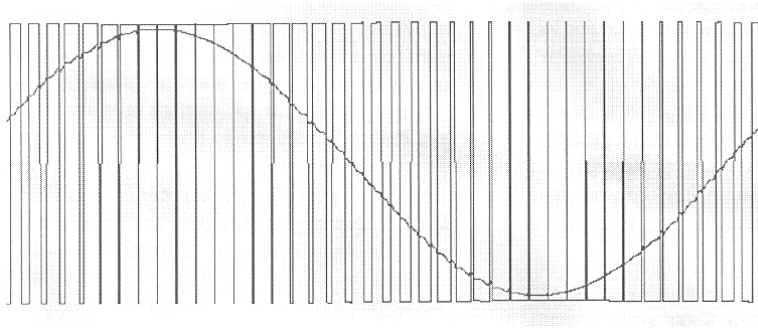


Figure 3. PWM voltage waveform

The DC capacitor reduces the harmonics at the DC side. The DC capacitor also controls the turn-off overvoltages, by providing a low impedance path. The turn off of the switches generate overvoltages. The output voltage can be controlled by the pulse pattern (on and off time ratio) and by the DC voltage.

This system can operate in both inverter and rectifier mode and can supply a passive AC system. As an example, it can start up an AC system after a fault. The converter can independently regulate the real and reactive power transfer. The converter voltage phase angle mostly controls the active power and the reactive power is dependent on the voltage magnitude. The converter can act as a motor or generator without mass and can provide either capacitive or inductive reactive power. The converter controls the AC current and consequently does not contribute to the AC short circuit current.

The PWM converter is an ideal device for energy transmission, because it can supply passive network and several converters can be connected in parallel, which permit tapping the system at towns or other loads.

The IGBTs are liquid cooled. Snubber circuits control the voltage distribution within a valve, when several IGBTs are connected in series. The PWM system can be built indoors, because only small filters and capacitors are needed for the system operation.

The DC cable network will have disconnect switches at each station to sectionalize the system in case of cable fault. A disconnect switch will be installed in the positive and negative cables. Also grounding switches will be placed at each station. The concept is demonstrated on Figure 4.

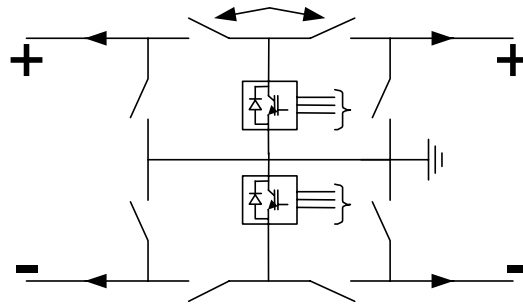


Figure 4. DC cable switchgear.

System Rating

The typical rating of the system is around +/- 80-90kV and 300-500A, which makes the complete system suitable to transmit power of 2* 24 MW- 2*45 MW. This is roughly the double of the power required for Alaska. At +/- 50 kV, the power range is 2*15MW- 2*25MW. The feasibility level costs of a +/- 50kV DC system with 300A converters and cables are tabulated in Figure 5.

The reduction of the DC voltage requires the reduction of the number of IGBTs connected in series. Simultaneously, the reduction of the voltage significantly lowers the cost of the cable. We propose the selection of +/- 25kV cable with a current rating of 400-500A. This will result in a converter rating of $2*25kV * 500A = 25MW$. The feasibility level costs of a +/- 25 kV DC system with 500A converters and cables are tabulated in Figure 6.

Each converter should have the same rating, which would reduce the necessary number of spare parts and would simplify the maintenance and control.

APPENDIX D

Non-Federal/Federal Contributions Towards the Southeast Alaska Intertie Project

APPENDIX D
Non-Federal / Federal Contributions Towards the Southeast Alaska Intertie Project⁽⁵⁾

Source: Southeast Conference. (Unaudited)

		Award				
Intertie Segment	Non-Federal Contribution	Amount	Date	Federal Grant Contribution	Amount	Year
Swan-Tyee	State of Alaska DCRA Grant/Department of Energy	\$4,000,000	11/18/1994	Department of Energy	\$9,900,000	6/10/1998
Swan-Tyee	State of Alaska - Alaska Energy Authority	\$4,443,587	4/20/1999	Department of Energy	\$1,996,000	9/11/2001
Swan-Tyee	State of Alaska - Department of Administration	\$4,684,262	3/30/1994	USDA - Jobs in the Woods	\$2,000,000	8/16/2001
Swan-Tyee	State of Alaska - Department of Administration	\$2,560,000	7/1/1995	Denali Commission	\$5,000,000	2001
Swan-Tyee	Ketchikan Gateway Borough - SE Economic Disaster Relief	\$5,000,000	2001	US Forest Service	\$2,500,000	2002
Swan-Tyee	Four Dam Pool/State of Alaska Debt Reimbursement ⁽¹⁾	\$20,000,000	Anticipated	Dept of Energy - Indian Energy Group	\$2,908,000	2002
Swan-Tyee	Four Dam Pool Power Agency ⁽²⁾	\$5,000,000	Anticipated	Dept of Energy - SE Intertie Authorization funds ⁽³⁾	\$5,000,000	2003
	Total	\$45,687,849		Department of Energy - Redirected funds ⁽³⁾	\$2,800,000	2003
Juneau - Hoonah	AEL&P Contribution - N. Douglas T-line	\$1,988,829	2000-2003			
Juneau - Hoonah	AEL&P Contribution - N. Douglas T-line	\$400,000	Anticipated			
Juneau - Hoonah	AEL&P Contribution - Lake Dorothy Hydro	\$1,426,831	1996-2003			
Juneau - Hoonah	AEL&P Contribution - Lake Dorothy Hydro	\$33,573,169	Anticipated			
Juneau - Hoonah	Private contribution - Substations - Hawk Inlet & Mine	\$2,000,000	Anticipated			
	Total	\$39,388,829				
Prince of Wales	AP&T - Black Bear Hydro Plant	\$10,507,411	Completed 9/1995			
Prince of Wales	AP&T - Black Bear Hydro to Craig T-Line	\$1,521,139	Completed 9/1995			
Prince of Wales	AP&T - Black Bear Lake to Kasaan T-Line	\$1,573,549	Completed 6/01	Federal - Black Bear Lake to Kasaan T-Line	\$947,720	2001
Prince of Wales	State of Alaska to AP&T - Black Bear Lake to Kasaan T-Line	\$488,280	Completed 6/01			
	Total	\$14,090,379		Total	\$947,720	
Upper Lynn Canal	AP&T - Goat Lake Hydro Project	\$12,195,840	Completed 1997	Federal - Submarine cable - Skagway to Haines	\$1,000,000	August-98
Upper Lynn Canal	AP&T - Submarine cable - Skagway to Haines	\$5,292,180	Completed 1998	Federal - Planned Kasidaya Creek Hydro Project	\$4,809,000	2003
Upper Lynn Canal	AP&T - Planned Kasidaya Creek Hydro	\$2,991,000	In Progress			
	Total	\$20,479,020		Total	\$5,809,000	
Project-Wide	Legislative Grant to SE Conference for Intertie Development	\$150,000	2003			
Project-Wide	Legislative Grant to SE Conference for Intertie Development	\$160,000	2004			
Project-Wide	Acres Report #97-01 - feasibility study	⁽⁴⁾	1997			
Project-Wide	State Grant to SE Conference - legal entity formation	⁽⁴⁾	2001			
	Total	\$310,000				
Total All Southeast Alaska Projects		\$74,268,228		Total All Southeast Alaska Projects	\$38,860,720	

Notes:

⁽¹⁾ Bonds or debt to be issued by the Four Dam Pool Power Agency and reimbursed by the State of Alaska.

⁽²⁾ Contribution by Four Dam Pool pursuant to provisions of Loan & Security Agreement between State of Alaska and Four Dam Pool Power Agency.

⁽³⁾ Funds have been appropriated but not yet received by KPU. Appropriation amount is approximate.

⁽⁴⁾ Because a fire destroyed some past records at the SE Conference offices, these amounts currently under research.

⁽⁵⁾ Does not include FY/04 Federal Appropriations for projects.