Southeast Alaska Integrated Resource Plan
Black & Veatch's Errata Sheet

Volume 2 – Technical Report

Section 2

Page 2-1, Section 2.1, Third Paragraph, Last Line. Change "will continue" to "will likely continue".

Page 2-5, Section 2.3.4, End of Second Paragraph. Delete "." and add "based on average monthly energy. Average monthly energy for integrated resource planning is typical, but can slightly underestimate average diesel generation."

Page 2-6, Figure 2-3. Figure 2-3 has been revised and is attached.

Page 2-6, Section 2.4, Third Paragraph, Third Line. After "members." add "Appendix F provides a list of the stakeholder meetings."

Page 2-7, Section 2.5, First Paragraph, Third Line. Change "seven" to "eight".

Section 3

Page 3-3, Section 3.2.1, First Issue, Second Paragraph, Sixth Line. Change "most" to "many" and delete "(outside of Juneau, Ketchikan, and Sitka)".

Page 3-3, Section 3.2.1, Third Issue, Title. Change "Inflexible Utility Business Structure" to "Future Role of SEAPA May Need to Evolve".

Page 3-3, Section 3.2.1, Third Issue. Replace paragraph with the following. "A joint action agency, Southeast Alaska Power Agency (SEAPA), operates as a generation and transmission entity serving southern Southeast Alaska. SEAPA is not regulated by the Regulatory Commission of Alaska (RCA), but is governed by its Board of Directors which is made up of its member utilities. SEAPA currently provides service to Petersburg, Wrangell, and Ketchikan. As the region moves forward, there may be a need for SEAPA to evolve in terms of the services that it provides, the assets that it operates, and the communities and other entities to which it provides those services."

Page 3-4, Section 3.2.3, First Paragraph, Second Line. Change "electric space" to "electric resistance space" and after "heating." add "Some of these conversions have even received State grant funding."

Page 3-6, Section 3.2.8, First Paragraph, Beginning With Third Line. Change "9.82" to "9.83", "2009" to "2010", "15.09" to 14.76", and "2009" to "2010".

Page 3-8, Section 3.2.11, Third Issue, Fourth Line. After "reduced." Insert "SEAPA and IPEC are able to spread these risks among their members, but other utilities in the region do not have the same ability to share their risks with other utilities."

Section 4

Page 4-2, Figure 4-1. Delete the dot to the right of Sitka.

Page 4-11, Third Paragraph, First Line. Change the first sentence to read "Ketchikan Public Utilities (KPU) buys power from SEAPA pursuant to a Power Sales Agreement."

Page 4-15, Section 4.1.25, Fourth Paragraph, First Line. Change the first sentence to read "Petersburg Municipal Power & Light buys the vast majority of its power from SEAPA pursuant to a Power Sales Agreement."

Page 4-19, Section 4.1.32, Third Paragraph, First Line. Change first sentence to read "Wrangell Municipal Light & Power (WMLP) buys the vast majority of its power from SEAPA pursuant to a Power Sales Agreement."

Page 4-20, Section 4.2, No. 2, Third Line. Change "Lake Tyee" to "Tyee Lake".

Page 4-25, Section 4.2.1.1, First Paragraph, Fifth Line. Put a period after "1981" and delete "and provides power to both Wrangell and Petersburg."

Page 4-25, Section 4.2.1.1, First Paragraph, Sixth Line. Delete sentence beginning with "Excess energy".

Page 4-25, Section 4.2.1.1, Second Paragraph, Second Line. Change "pipeline" to "concrete arch dam".

Page 4-25, Section 4.2.1.1, Third Paragraph, Second Line. Change "largely state-grant" to "largely Federal and State grant"

Page 4-25, Section 4.2.1.1, After Third Paragraph. Insert new paragraph "SEAPA sells power to Petersburg, Wrangell, and Ketchikan under the terms of a Long Term Power Sales Agreement. Energy generated from Tyee Lake is first dedicated to Petersburg and Wrangell. Energy from Swan Lake is first dedicated to Ketchikan. Petersburg, Wrangell, and Ketchikan must purchase their Firm Power Requirements in excess of existing generation in operation by 1985 under the terms of the Long Term Power Sales Agreement."

Page 4-25, Section 4.2.1.3, First Paragraph, First Line. Put a period after "systems" and delete remaining of sentence.

Page 4-26, Section 4.2.1.5, First Paragraph, First Line. Change "Kennercott" to "Helca".

Page 4-27, Section 4.2.1.7, First Paragraph, Ninth Line. After ‘system.” Insert new sentence “In 2011, the transmission line was extended to connect Coffman Cove.”

Page 4-27, Section 4.2.1.7, First Paragraph, Tenth Line. Delete “Coffman Cove in 2011 and”.

Page 4-32, Table 4-3, Tenakee 1. Change “1992” to “2006” and “0.125” to “0.088”.

Page 4-32, Table 4-3, Tenakee 2. Change “1993” to “2006” and “0.125” to “0.088”.

Page 4-32, Table 4-3. Add to the bottom of the table “Tenakee 3, 2006, 0.064”.

Page 4-34, Section 4.2.3.1.1, Second Paragraph, Third Line. Delete “and”.

Page 4-34, Section 4.2.3.1.1, Second Paragraph, Fourth Line. Change “Associates.” to Associates, and a 2011 update by D. Hittle & Associates.”

Page 4-34, Section 4.2.3.1.1, Fourth Bullet, Fourth Line. Change “AATP” to “SATP”.

Page 4-34, Section 4.2.3.1.1, Fourth Bullet, Sixth Line. Change “Narrow” to “Narrows”.

Page 4-35, First Paragraph, Fourth Line. Change “required.” to “required. This is Option 1A in the 2011 update. In the 2011 update, a higher cost option (Option 1B) was included which is based on helicopter construction.”

Page 4-35, First Paragraph, Fifth Line. Change “report.” to “report. Black & Veatch also reviewed the 2011 cost update which was provided without narrative.”

Page 4-35, First Paragraph, Twelfth Line. Change “will be” to “will not be”.

Page 4-35, Figure 4-5. Figure 4-5 has been revised and is attached.

Pages 4-36 through 4-38, Table 4-4. Table 4-4 has been revised and is attached.

Page 4-39, First Paragraph, Third Line. “Change “2010” to “2011”.

Page 4-39, First Paragraph, Fourth Line. Change “Option 2 results in a savings of $5.9 million in 2009 dollars.” to “Option 1, which assumes the DOT road is constructed, results in a savings of $5.7 million in 2011 dollars excluding interest during construction. The 2011 update shows a $3.4 million savings without the DOT road and $5.1 million savings with the DOT road, all in 2011 dollars excluding interest during construction if a directional bore is used in place of the submarine cable.”

Page 4-39, First Paragraph, Fourth Line. Delete “If the Alaska” through the end of the paragraph.

Page 4-47, First Paragraph Below Table 4-9. Add the following to end of the paragraph “Local bonding is under way and a community commitment is pending, reducing the additional funding requirements to $1.0 million.”

Page 4-52, Table 4-15. Delete "AP&T Transmission Line AEA Renewable Energy Fund Grant Round 5 Application $1,200,000".

Page 4-52, Table 4-15. Change "$6,861,499" to $8,061,499".

Page 4-52, Second Paragraph Below Table 4-15, Third Line. Change "signed and the Round 5 Renewable Energy Fund Grant has not been awarded." To "signed. Authorized loans are being negotiated which will cover remaining funding requirements."

Page 4-54, Last Paragraph. Add following sentence at end of paragraph "Both applications have been recommended for award."

Page 4-59, Section 4.3.1, Third Paragraph, First Line. Change "diversify" to "restructure".

Page 4-60, Section 4.3.1.2, First Paragraph, Second Line. After "Mitkof Island." Insert "The utility purchases power from SEAPA under the terms of a Power Sales Agreement." and delete "utility's".

Page 4-60, Section 4.3.1.2, First Paragraph, Third Line. Change ". The Tyee project" to "which".

Page 4-60, Section 4.3.1.3, First Paragraph, Fourth Line. Change "WMLP obtains the" to "WMLP purchases power from SEAPA under the terms of a Power Sales Agreement. The".

Page 4-60, Section 4.3.1.3, First Paragraph, Fourth Line. Change "through SEAPA from the" to "is provided by SEAPA's".

Section 8

Page 8-11, Table 8-5, Coeur Alaska Kensington Mine, Power Required. Add footnote (1) "Wayne Zigarlick of Coeur Alaska Kensington Gold Mine indicates that after their paste plant is completed and fully operating, their load will be 8-9 MW.

Page 8-12. Delete note to typist at bottom of page.

Page 8-56, First Bullet, Third Line. Delete "made".

Page 8-56, First Bullet, Fourth Line. Change "and development" to "and also associated with the development".

Page 8-56, First Bullet, Fifth and Sixth Lines. Change "for forecasting purposes a new" to "the potential".

Page 8-56, First Bullet, Sixth Line. Change "A 60 percent load" to "Assuming a 60 percent".

Page 8-56, First Bullet, Seventh Line. Change "factor has been assumed resulting in total annual" to "factor, results in potential annual".

Page 8-56, First Bullet. Delete last two sentences and add "This potential new load has not been included in the Reference Scenario forecast due to uncertainty with respect to its timing and even its ultimate development. If the potential load were to develop, there is uncertainty as to whether it would be served from the grid or by dedicated facilities."

Page 8-64, First Bullet. Delete and replace with "A potential new 2 MW mine load was identified with a projected 2016 operation date. Assuming a 60 percent load factor, the potential annual energy requirements would be 10,512 MWh. This specific potential new load has not been included in the Reference Scenario forecast due to uncertainty with respect to its timing and even its ultimate development. If the potential load were to develop, there is also uncertainty as to whether it would be served from the grid or by dedicated facilities."

Page 8-111, Section 8.11.1.1. After first paragraph, insert new paragraph "Subsequent to the issuance of the Draft Southeast Alaska IRP, Elfin Cove provided historical data on peak demand, net energy sold, and number of customers."

Page 8-111, Section 8.11.1.1, 2011-2015 – Short Term. Add the following sentence to the end of the second paragraph "The subsequent historical data shows the number of customers decreasing from 74 in 2004 to 69 in 2010."

Page 8-111, Section 8.11.1.1, 2011-2015 – Short Term. Add the following sentence to the end of the third paragraph "The subsequent historical data shows the energy sales have decreased from 319 MWh in 2004 to 250 MWh in 2010."

Section 9

Page 9-7, First Paragraph. Replace paragraph with the following paragraphs:

> "The Bradley Lake funding model combines an equity contribution from the State of Alaska equal to 50 percent of the turnkey project costs and 50 percent of the turnkey cost through tax-exempt financing via State-sponsored tax-exempt bonds. Tax-exempt bonds were available to the project due to the ownership by the AEA. The Bradley Lake Agreement provides for Excess Payments equal to the average annual debt service that commence once the bonds have been paid in full. The final bond payment is expected in year 30 of the project (2021), which will trigger the Excess Payments in year 31 that continue until original termination date of the agreement in year 50 of the project (2041). All purchasers have the opportunity to renew for an additional 40 years (or whatever the remaining expected life expectancy is). The Excess Funds payments to the State are to be deposited in the Railbelt Energy Fund to support the construction of a high-capacity transmission system from Fairbanks to the Kenai Peninsula. The take-or-pay Power Sales Agreement provides security from each utility participant for the project revenue bonds.
>
> The Power Sales Agreement also establishes the Bradley Lake Project Management Committee (BPMC) that consists of participating utilities and the AEA to govern the

operations and maintenance of the Bradley Project. The BPMC is required to establish a Renewal and Contingency Fund to provide funds for approved project modifications and repairs as part of the Bond Resolution. Operations and maintenance of Bradley Lake is provided under contract with Homer Electric. Dispatch and scheduling of the project electrical output is by Chugach Electric's dispatch center.

Based on the five series of bonds issued to date, the average annual debt service is $12.3million. The initial equity contribution by the State drastically reduced the on-going effects of interest-during-construction on the debt.

The Bradley Lake Project has a nameplate capacity of 126 MW and produces approximately 375,000 MWh of energy per year."

Section 10

Page 10-6, Last Paragraph. Add the following to the end of the paragraph "Black & Veatch and HDR have broadly characterized the potential projects as "storage" or "run-of-river" in Table 10-2. These broad characterizations may be subject to change as additional information is developed on the potential projects."

Page 10-13, Figure 10-2. Haines to Skagway transmission line should be shown as submarine cable.

Page 10-23, Section 10.5, First Paragraph. Add the following sentence to the end of the paragraph "The estimated energy costs in Table 10-5 are based on the 30-year fixed charge rate in Table 6-1."

Page 10-24, Table 10-5. Table 10-5 has been revised to include Estimated Energy Cost and is attached.

Page 10-36, Table 10-7. Revise the rankings for Indian River as follows. Development Level - 2, Licensing/Permitting - 1, Constructability/Reliability Access - 3, Operating Reliability - 1, Project Line Maintenance - 1.

Section 11

Page 11-4, Section 11.1.4. Add the following new paragraph at the end of the section. "Subsequent to publication of the Draft Southeast Alaska IRP a notice of the Draft Supplement to Update Analysis in the Programmatic EIS to Address Roadless Concerns; Consideration for Lease Approval, Bell Island Geothermal Leases was published in the Federal Register on May 18, 2012."

Page 11-5, Section 11.2, Second Paragraph, Fifth Line. Change "the current state of the rule would make it difficult to construct wind" to "the uncertainty associated with the rule adds uncertainty to potential wind."

Page 11-8. After first paragraph, add the following paragraph "Subsequent to the issuance of the Draft Southeast Alaska IRP, the Kake, Alaska Wind Resource Report was published on January 6, 2012. Black & Veatch's comments on the report are as follows. The Kake wind power data as presented is from well regarded measuring equipment. The placement of anernometers at 20 m and 34 m provides one less data set and requires greater extrapolation to hub height than industry standards, though the wind resource measured seems worthy of further review. Positive indicators include the wind power density benefiting from high air density, seasonal resource variation correlating with load variation, and the consistency of wind direction evidenced by the wind rose. In the next phase of analysis, a potential wind site developer would give greater consideration to specific turbine locations that would have less turbulent winds. These may be hilltops as mentioned in the report, but these potential sites would need to be selected based on constructability and ability to bring generated power to the load. Power production at the site would benefit from additional turbine height beyond the 37 m hub height of the 100 kW Northwind 100 B model turbine identified. Further wind speed investigation may be warranted for potentially higher hub heights using alternative technology such a lidar or sodar, if towers and associated turbines would be available in the market for those higher hub heights."

Page 11-14, First Paragraph, Second and Third Lines. Change "Project received partial" to "Project was recommended for partial".

Page 11-15, Figure 11-12. Delete all sawmills except Viking.

Page 11-16, Above Section 11.7. Insert following paragraph "Small biomass gasifiers are currently under development, but have not reached a demonstrated commercial status. Converting biomass gas to electricity also is subject to technical challenges at small scales. The biomass gasification technology is still developing and has not yet demonstrated that it will provide reliable power at significantly lower costs than diesels."

Page 11-18, Section 11.9. Add following paragraph at the end of section "SEACC recently completed a performance evaluation at a small residential solar photovoltaic (PV) in Angoon as a part of the Sustain Angoon Demonstration Project: Photovoltaic Installation. The evaluation calculated payback period of 11.5 years based on the pre-PCE rates. Based on the data in the evaluation and eliminating the cost of the battery back-up system, Black & Veatch estimated the 2011 cost of energy for the system to be $597/MWh which compares to the diesel generation cost of $255/MWh presented in Table 12-12. Behind the meter dispersed generation such as the Sustain Angoon Demonstration Project obtain savings based on the retail electric rate, but the majority of the non-fuel cost savings would in turn increase the non-fuel cost for other customers PV prices have been declining and as stated above the solar PV alternative should be monitored, but its current high price precludes it from further consideration in the Southeast IRP at this time."

Page 11-20. Add new section as follows "11.10.1.4 Geothermal - Subsequent to publication of the Draft Southeast Alaska IRP, a notice of the Draft Supplement to Update Analysis in the Programmatic EIS to Address Roadless Concerns, Consideration for Lease Approval, Bell Island Geothermal Leases was published in the Federal Register on May 18, 2012."

Page 11-28, Section 11.11, First Paragraph, Seventh Line. Change “purportedly” to “potentially”.

Page 11-28, Section 11.11, Second Paragraph, First Line. Delete “supposedly”.

Page 11-28. Add the following paragraph at the bottom of the page “Another potential technology for long-term storage could be pumped storage. Normally pumped storage projects are designed for daily storage or at the most weekly storage. For a project to have significant long-term storage, it would need a very large upper reservoir. Costs for pumped storage can be high depending upon the specific situation. Black & Veatch did not identify any potential sites in Southeast Alaska that appear to be good candidates for long-term pumped storage.”

Section 12

Page 12-5, Section 12.3, First Paragraph, Eighth Line. Change “Forest is” to “Forest in the Inventoried Roadless Area is”.

Page 12-5, Section 12-3, First Paragraph, Ninth Line. Delete “significantly”.

Page 12-8, Figure 12-2. The line from Haines to Skagway should be submarine cable.

Page 12-9, Section 12.5.1, First Paragraph, Ninth Line. Change “Hawks” to “Hawk”.

Page 12-9, Section 12.5.1, First Bullet. Change “Hawks” to “Hawk”.

Page 12-9, Section 12.5.1, Sixth Bullet. Change “Hawks” to “Hawk”.

Page 12-9, Section 12.5.2, First Paragraph. Fifth Line. Change “Lake Tyee” to “Tyee Lake”.

Page 12-9, Section 12.5.2, First Paragraph, Seventh Line. Change “69” to “115”.

Page 12-15, After Figure 12-5. Add paragraph, “After the issuance of the Draft Southeast Alaska IRP Report, Polarconsult Alaska, Inc., issued a draft report for Phase II of a study, funded by the Denali Commission, to develop a low-power HVDC transmission technology suitable for rural Alaska. According to Polarconsult, the Phase II findings indicate that the HVDC transmission systems developed under this program will significantly reduce the cost of Southeastern interties. Black & Veatch has not conducted an independent evaluation of this study but agree this option warrants more detailed consideration in the years ahead.”

Page 12-16, Section 12.5.4, First Paragraph, Fourth Line. After “experience.” Insert “Black & Veatch independently estimated the submarine cable portions of the transmission interconnections.”

Page 12-18, Section 12.5.5.1, Title. Change “Hawks” to “Hawk”.

Page 12-18, Section 12.5.5.1, First Paragraph, Fourth Line. Change “Hawks” to “Hawk”.

Page 12-19, Fourth Paragraph, Third Line. Change “Hawks” to “Hawk”.

Page 12-20, Table 12-2, Engineering, Permitting, Admin. Delete “(30 percent)”.

Page 12-20, Table 12-2, Contingency. Delete “(20 percent)”.

Page 12-23, Table 12-3, Engineering, Permitting, Admin. Delete “(30 percent)”.

Page 12-23, Table 12-3, Contingency. Delete “(30 percent)”.

Page 12-26, Table 12-4, Engineering, Permitting, Admin. Delete “(30 percent)”.

Page 12-26, Table 12-4, Contingency. Delete “(30 percent)”.

Page 12-29, Table 12-5, Engineering, Permitting, Admin. Delete “(30 percent)”.

Page 12-29, Table 12-5, Contingency. Delete “(30 percent)”.

Page 12-31, Table 12-6, Engineering, Permitting, Admin. Delete “(30 percent)”.

Page 12-31, Table 12-6, Contingency. Delete “(30 percent)”.

Page 12-34, Table 12-7, Engineering, Permitting, Admin. Delete “(30 percent)”.

Page 12-34, Table 12-7, Contingency. Delete “(30 percent).

Page 12-36, Table 12-8, Engineering, Permitting, Admin. Delete “(30 percent)”.

Page 12-36, Table 12-8, Contingency. Delete “(30 percent)”.

Page 12-38, Table 12-9, Engineering, Permitting, Admin. Delete “(30 percent)”.

Page 12-38, Table 12-9, Contingency. Delete “(40 percent)”.

Page 12-39, Table 12-10, SEI-1A. Change “Hawks” to “Hawk”.

Page 12-39, Table 12-10, SEI-6. Change “Hawks” to “Hawk”.

Page 12-40, Table 12-11, SEI-1A. Change “Hawks” to “Hawk”. Change “2,8002” to “2,802”.

Page 12-40, Table 12-11, SEI-6. Change “Hawks” to “Hawk”.

Page 12-41, Table 12-12, Title. Change to “Results of Transmission Interconnection Evaluation – Initial Economic Evaluation Case”.

Page 12-41, Table 12-12, SEI-1A. Change “Hawks” to “Hawk”.

Page 12-41, Table 12-12, SEI-6. Change “Hawks” to “Hawk”.

Page 12-42, Figure 12-14, Title. Change “Hawks” to “Hawk”.

Page 12-45, Figure 12-17, Title. Change “Hawk’s” to “Hawk”.

Page 12-51, After Second Paragraph. Insert following paragraph "Table 12-12 presents the estimated 2011 cost for transmission on a $/MWh basis for the interconnections evaluated. This transmission cost represents the estimated wheeling costs to serve each of the subregions or communities connected by the proposed interconnections presented in Figures 12-14 through 12-22. These wheeling costs range from $262 to $8,125/MWh. Cost for associated energy would be in addition to the wheeling cost."

Page 12-51, Bottom of Page. Insert following paragraph "Section 601 of Public Law 106-511 is presented below. SEC. 601. SOUTHEASTERN ALASKA INTERTIE AUTHORIZATION LIMIT. Upon the completion and submission to the United States Congress by the Forest Service of the ongoing High Voltage Direct Current viability analysis pursuant to United States Forest Service Collection Agreement #00CO-111005-105 or no later than February 1, 2001, there is hereby authorized to be appropriated to the Secretary of Energy such sums as may be necessary to assist in the construction of the Southeastern Alaska Intertie system as generally identified in Report #97-01 of the Southeast Conference. Such sums shall equal 80 percent of the cost of the system and may not exceed $384,000,000. Nothing in this title shall be construed to limit or waive any otherwise applicable State or Federal law."

Page 12-51, Following Above Paragraph. Insert following paragraph "If the necessary appropriations are made, the funds could improve the benefit-cost ratios from a State perspective, but would not change them from a public benefit perspective. The maximum level of assistance of $384 million is much less than current estimates to complete the remaining portion of the Southeast Alaska Intertie. From a practical standpoint, Black &Veatch believes that it will be difficult if not impossible to obtain this funding for the interconnections, but nevertheless, it represents a possible source of funding."

Page 12-52, Table 12-13, Title. Change to "Results of Transmission Interconnection Evaluation – Public Benefit Case".

Page 12-52, Table 12-13, SEI-1A. Change "Hawks" to "Hawk".

Page 12-52, Table 12-13, SEI-6. Change "Hawks" to "Hawk".

Page 12-58, Section 12.8.4, After Last Bullet. Insert the following paragraph "One advantage to the AK-BC Intertie is that once it is in place, if power is available, it can be imported immediately."

Page 12-61, Section 12.9, Before the Last Sentence. Insert the following paragraph "The interconnection from Skagway to Whitehorse could also support mining loads that might develop in Canada. The interconnection might be economical if the loads were large enough and they could be supplied by low-cost hydro projects developed in the Southeast. However, there is uncertainty associated with both the mine development and the hydro project development. "

Section 13

Page 13-12, Table 13-1, Weather, Cooling/Heating. Change “ASHP-SEER 16” to “ASHP”.

Page 13-16, Table 13-3, Weather, Cooling/Heating. Change “ASHP-SEER 16” to “ASHP”.

Page 13-21, Figure 13-1, Residential. Change “ASHP-SEER 16” to “ASHP”.

Page 13-22, Figure 13-2, Residential. Change “ASHP-SEER 16” to “ASHP”.

Page 13-23, Figure 13-3, Residential. Change “ASHP-SEER 16” to “ASHP”.

Section 14

Page 14-2, Section 14.2, Fourth Line. Change “will generally decrease with oil or biomass. Resistance space heating with oil is more expensive than with electricity generated by hydro, but is less expensive than electricity generated by diesel. Biomass space heating is lower in cost than either electric resistance space heating with hydro (obviously including the capital cost for new hydro units) and with oil.” to “decreases as the cost of heating decreases. For instance, if a home is heated with biomass, the dollar savings will be less than if the home were heated with oil.”

Page 14-2, Section 14.2, Eighth Line. Delete “as with electric space heating”.

Section 15

Page 15-3, First Paragraph, Sixth Line. Change “electric for” to “electric resistance heating for”.

Page 15-3, After First Paragraph. Insert the following new paragraph “If the conversion to electric space heating were all to be by heat pumps, the additional electric loads above the Reference Scenario Load Forecasts in Figures 15-1 through 15-8 would be approximately one-half to one-third of the increase in Figures 15-1 through 15-8.”

Pages 15-6, Figure 15-9. Add “Social/Political” to third leg of triangle.

Page 15-9, Figure 15-10, Title. Change “Comparative Costs” to “Comparative Fuel Costs”.

Page 15-9, Fourth Line. Change “spacing” to “space heating”.

Page 15-10, Table 15-2, Title. Change “MBtu” to “MMBtu”.

Page 15-10, Table 15-2, SO_x. Change “0.0016” to “0.0016(4)”.

Page 15-10, Table 15-2, Add Footnote. “(4)Based on Ultra Low Sulfur No. 2 Oil.”

Page 15-10, Section 15.5, End of First Paragraph. Insert "The conversion program estimate is an estimate of the savings that might be achieved if a major program were undertaken. Key to the estimate is the assumption that all the capital cost associated with conversion would be provided by State or other assistance. Thus the customers would not have out-of-pocket capital expense associated with converting to pellets and would have significantly lower operating costs. With such aggressive assumptions, a high level of penetration of conversion could be expected. For this estimate a penetration of conversion from oil to pellets is assumed to be 80 percent over a ten-year period. While some people may think that such a penetration level is unrealistic, it is merely used to estimate the savings that might occur. The key assumption is that all capital costs of conversion are assumed to be provided to the customer and are included as costs in determining the potential savings. This would be similar to estimating what the penetration of electric vehicles would be if the State or some other organization were to pay the entire cost of the electric vehicle so that the customer would have no out-of-pocket expense. The penetration level would undoubtedly be very high. The actual penetrations associated with a pellet conversion program will need to be developed as part of the detailed program development. For comparison purposes, Black & Veatch has also presented the savings if the penetration level were 30 percent over ten years in Section 1.0."

Pages 15-11 through 15-14, Figures 15-11 through 15-18. Change "Displaced Oil – Space Heating" to "Displaced Oil – Spacing Heating 80 Percent Penetration"

Page 15-15, Beginning in Twelfth Line. Delete "with the projected savings in operating costs".

Page 15-15, Thirteenth Line. Change "reasonable. The" to "reasonable. Detailed market studies may result in lower penetration estimates. The".

Page 15-15, Fourteenth Line. Change "the pellet" to "the 80 percent pellet".

Page 15-15, Fourteenth Line. Change "Table 15-3. Table 15-3" to "Table 15-3. Lower penetration levels would result in proportionally lower savings. Table 15-3".

Page 15-15, Twenty-third Line. Change "estimate" to "estimated".

Page 15-15, Twenty-sixth Line. Change "$532" to "$227".

Page 15-15, End of Paragraph. Add "The capital costs in Table 15-4 are assumed to be provided through State funding; however, detailed market studies may indicate that significant levels of conversion may take place with the capital cost of pellet space heating only being partially subsidized. Further market studies may indicate that service providers may fund all or part of the capital costs in return for contracts with customers to provide the pellets."

Page 15-15, Table 15-3, Title. Change "Savings from Pellet Conversion Program" to "Savings from Pellet Conversion Program – 80 Percent Conversion".

Page 15-16, Table 15-4. Revised Table 15-4 is attached.

Page 15-18, Section 15.7, First Paragraph Below Bullets, Third Line. Change "produce up to about 30,000 tons" to "produce 30,000 tons or more".

Page 15-18, Section 15.7, First Paragraph Below Bullets, Fifth Line. Change “program about” to “program, the equivalent of about”.

Page 15-18, Section 15.7, First Paragraph Below Bullets, Sixth Line. Change “fot” to “for”.

Page 15-18, Section 15.7, First Paragraph Below Bullets, Eight Line. Change “size. Sealaska” to “size. The cost of electricity and access to transportation are also considerations in siting pellet mills. Sealaska”.

Page 15-18. Add following paragraph to bottom of page “Other infrastructure to store and deliver pellets will need to be developed. The type of infrastructure need will vary by community.”

Page 15-19, Table 15-6, Title. Change “Estimated Pellet Consumption by Subregion” tp “Estimated Pellet Consumption by Subregion – 80 Percent Conversion”.

Page 15-20, Table 15-7, Title. Change “ Annual Pellet Consumption Southeast Region” to “Annual Pellet Consumption Southeast Region – 80 Percent Conversion”.

Page 15-20, Section 15.8, Third Line. Change “breakeven cost” to “breakeven energy cost”.

Page 15-20, Section 15.8, Sixteenth Line. Change “heating and” to “heating for communities where the oil price is higher than the breakeven price with electricity and”.

Page 15-21, Title. Change “Breakeven Costs” to “Breakeven Energy Costs”.

Page 15-22, Figure 15-20. The revised Figure 15-20 is attached.

Section 16

Page 16-14. After Second Paragraph. Insert the following new paragraph “On May 24, 2011, the final judgment reinstating the Roadless Area Conservation Rule as to the Tongass National Forest states that, “Nothing in this judgment shall be construed to prohibit otherwise lawful road construction, road construction, or cutting or removal of timber if and when approved by the U.S. Forest Service to effectuate the following projects: (1) The Whitman Lake Hydroelectric Project as licensed by the Federal Energy Regulatory Commission on March 17, 2009; (2) The Kake-Petersburg Intertie, as described in the Notice of Intent to prepare an Environmental Impact Statement published in the Federal Register on May 7, 2010; (3) Rainforest Aerial Tram, as described in the Decision Notice and Finding of No Significant Impact Issued by the U.S. Forest Service on December 14, 2010; (4) Greens Creek Exploratory Drilling, as described in the Decision Memo ‘2011 Surface Exploration Annual Work Plan’, issued by the U.S. Forest Service on April 8, 2011; (5) Greens Creek Geotechnical, as described in the Decision Memo ‘Geotechnical and Hydrologic Drilling Investigations’ issued by the U.S. Forest Service on April 8, 2011; (6) Greens Creek Tailings Expansion, as described in the Notice of Intent to prepare an Environmental Impact Statement for the project published in the Federal Register on October 5, 2010; (7) Cascade Point Road/Glacier Highway Extension, as described in the U.S. Forest Service Record of Decision issued on December 22, 1998; (8) Blue Lake Hydroelectric Expansion, as described in the Federal Energy

Regulatory Commission Notice of Application Accepted for Filing, Project No. 2230-044, April 8, 2011; (9) Little Port Walter hydropower project, as described in the application dated April 2, 2008, from the National Marine Fisheries Service to the U.S. Forest Service for a special use authorization; (10) Swan Tyee Intertie, as described in the U.S. Forest Service Record of Decision issued August 1997 and the Secretary of Agriculture's August 11, 2010, redelegation memorandum; (11) Bokan Mountain Exploration Plan, as described in the proposed Plan of Operations dated March 15, 2011, submitted by Rare Earth One, LLC, to the U.S. Forest Service; and (12) Niblack Mine Exploratory Drilling, as described in the Decision Memorandum issued by the U. S. Forest Service on September 25, 2009." The final judgment further states, "Nothing in this judgment shall be construed to prohibit any person or entity from seeking, or the U.S. Department of Agriculture from approving, otherwise lawful road construction, road construction, or the cutting or removal of timber for hydroelectric development pursuant to the standards and procedures set forth in the Federal Power Act 16 U.S.C. §§ 791-823d. Such developments include but are not limited: (1) Takatz Lake Hydroelectric Project, Federal Energy Regulatory Commission No. P-13234; (2) Schubee Lake Hydroelectric Project, Federal Energy Regulatory Commission Preliminary Permit No. P-13645; (3) Lake Shelokum Hydroelectric Project, Federal Energy Regulatory Commission Preliminary Permit No. P-13281; (4) Soule River Hydroelectric Project, Federal Energy Regulatory Commission Nos. P-12615 and P-13528; (5) Port Frederick Tidal, Federal Energy Regulatory Commission Preliminary Permit No. P-13512; and (6) Cascade Creek Hydroelectric Project, Federal Energy Regulatory Commission No. P-12495. The list of projects and activities herein is not a judgment that they, or any other projects or activities in the Tongass National Forest, would otherwise violate the term of the Roadless Area Conservation Rule. Nothing herein shall be construed as a judgment about whether projects and activities not listed herein do or do not violate the Roadless Area Conservation Rule."

Page 16-18, Table 16-6, Title. Change "MBtu" to "MMBtu".

Page 16-18, Table 16-6, SO_x. Change "0.0016" to "0.0016[(4)]".

Page 16-18, Table 16-6. Add the following footnote "[(4)] Based on Ultra Low Sulfur No. 2 Oil".

Pages 16-22 through 16-26, Section 16.3.3. Black & Veatch has revised Section 16.3.3 in response to comments regarding heat pumps to better place heat pumps in the proper context. In addition, Table 16-9 in Section 16.3.3 has been replaced to eliminate confusion over the breakeven energy cost between pellets and heat pumps. The revised Section 16.3.3 is attached.

Page 16-28, Last Paragraph on Page, First Line. Change "significant" to "potential".

Page 16-30, Table 16-10. Add the following note to the table "Note 1. The PCE only applies to the first 500 kWh of residential consumption each month. It does not apply to commercial customers other than community buildings."

Section 17

Page 17-4, Section 17.1.2.1, Second Paragraph, Second Line. Change “prices. In general, these recent” to “prices. Actual oil prices often exhibit volatility about fuel price projections. Periods of higher prices are often followed by periods of lower prices. In general, recent”.

Page 17-6, Table 17-1, SEI-1A. Change “Hawks” to “Hawk”.

Page 17-6, Table 17-1, SEI-6. Change “Hawks” to “Hawk”.

Page 17-7, Section 17.1.2.5, First Paragraph, Third Line. Delete “, primarily due to the Roadless Rule,”.

Page 17-7, Section 17.1.2.5, First Paragraph, Fourth Line. After “facilities.” Add “Much of this uncertainty stems from the Roadless Rule. While there is disagreement with respect to the extent that the Roadless Rule limits hydroelectric facility development, nevertheless, the uncertainty associated with the Roadless Rule negatively affects development.”

Page 17-7, Last Paragraph, First Line. Change “region will” to “region and one 20 MW storage project located in the Juneau region will”.

Page 17-9, Table 17-3, 2017. Change “Ketchikan Storage” to “SEAPA Storage”.

Page 17-9, Table 17-3, 2028. Change “Ketchikan Storage” to “SEAPA Storage”.

Page 17-9, Table 17-3, 2033. Change “Ketchikan Storage” to “SEAPA Storage”.

Page 17-9, Table 17-3, 2044. Change “Metlakatla Storage” to “SEAPA Storage”.

Page 17-9, Table 17-3, 2046. Change “ Ketchikan Storage” to “SEAPA Storage”.

Page 17-9, Table 17-3, 2048. Change “Kake Run-of-River” to “SEAPA Run-of-River”.

Page 17-9, Table 17-3, 2049. Change “Petersburg Run-of-River” to “SEAPA Run-of-River”.

Page 17-9, Table 17-3, 2050. Change “Petersburg Run-of-River” to “SEAPA Run-of-River”.

Page 17-9, Table 17-3, 2052. Change “ Wrangell Run-of-River” to “SEAPA Run-of-River”.

Page 17-10, Table 17-3, 2053. Change “Wrangell Run-of-River” to “SEAPA Run-of-River”.

Page 17-10, Table 17-3, 2054. Change “Kake Run-of-River” to “SEAPA Run-of-River”.

Page 17-10, Table 17-3, 2055. Change “Wrangell Run-of-River” to SEAPA Run-of-River”.

Page 17-10, Table 17-3, 2056. Change “Tyee Lake Run-of-River” to “SEAPA Run-of-River”.

Page 17-10, Table 17-3, 2057. Change “Tyee Lake Run-of-River” to “SEAPA Run-of-River”.

Page 17-10, Table 17-3, 2058. Change “Metlakatla Storage” to “SEAPA Storage”.

Page 17-10, Table 17-3, 2059. Change "Tyee Lake Run-of-River" to "SEAPA Run-of-River".

Page 17-10, Table 17-3, 2060. Change "Kake Run-of-River" to "SEAPA Run-of-River".

Page 17-13, Table 17-5. Add "Bell Island" to SEAPA Specific Project Needs More Development.

Page 17-13, Table 17-5. Add "Kake Wind" to SEAPA Specific Project Needs More Development.

Page 17-14, Section 17.1.2.8, Second Paragraph, Fifth Line. At end of line, add "These mini split heat pumps do not require ducts, but may require multiple units in a house, increasing cost."

Page 17-15, Fourth Paragraph, Fourth Line. Change "the conversion" to "the 80 percent conversion".

Page 17-15, Fourth Paragraph, Fifth Line. Change "532" to "227".

Page 17-15, Fifth Paragraph, First Line. Change "program is" to "program with 80 percent conversion is".

Page 17-15, Fifth Paragraph, Second Line. Change "532" to "227".

Page 17-16, Section 17.1.2.9 After Second Paragraph Below Bullets. Add the following paragraph "Another issue for consideration in the detailed DSM/EE program development is that these utilities with higher diesel and non-fuel costs are in the PCE program. Savings in energy consumption can reduce PCE payments by the State if customers are using less than the PCE threshold of 500 kWh per month. These reduced PCE payments may be a source of funding for the DSM/EE programs. Also if the savings in PCE payments could be utilized to off-set non-fuel costs, more programs would be cost-effective under the RIM test for high cost utilities. These, as well as a number of other considerations, will need to be included in the detailed program development."

Page 17-19, Section 17.1.2.11, Second Line. Put a period after 17-8 and delete the remainder of the paragraph and add the following sentence "The additional funds are net of current and on-going funding requests.

Page 17-19, Table 17-8. Table 17-8 has been revised and is attached.

Page 17-21, Table 17-9, SEAPA, 2017. Change "Ketchikan" to "SEAPA".

Page 17-21, Table 17-9, SEAPA, 2017. Change "Ketchikan" to "SEAPA".

Page 17-21, Table 17-9, SEAPA, 2033. Change "Ketchikan" to "SEAPA".

Page 17-21, Table 17-9, SEAPA, 2046. Change "Ketchikan" to "SEAPA".

Page 17-21, Table 17-9, SEAPA, 2048. Change "Kake" to "SEAPA".

Page 17-21, Table 17-9, SEAPA, 2049. Change "Petersburg" to "SEAPA".

Page 17-21, Table 17-9, SEAPA, 2050. Change "Petersburg" to "SEAPA".

Page 17-21, Table 17-9, SEAPA, 2051. Change “Petersburg” to “SEAPA”.

Page 17-21, Table 17-9, SEAPA, 2052. Change “Wrangell” to “SEAPA”.

Page 17-21, Table 17-9, SEAPA, 2053. Change “Wrangell” to “SEAPA”.

Page 17-21, Table 17-9, SEAPA, 2054. Change “Kake” to “SEAPA”.

Page 17-21, Table 17-9, SEAPA, 2055. Change “Wrangell” to “SEAPA”.

Page 17-21, Table 17-9, SEAPA, 2056. Change “Tyee Lake” to “SEAPA”.

Page 17-21, Table 17-9, SEAPA, 2057. Change “Tyee Lake” to “SEAPA”.

Page 17-21, Table 17-9, SEAPA, 2058. Change “Metlakatla” to “SEAPA”.

Page 17-21, Table 17-9, SEAPA, 2059. Change “Tyee Lake” to “SEAPA”.

Page 17-21, Table 17-9, SEAPA, 2060. Change “Kake” to “SEAPA”.

Page 17-21, Table 17-9, Upper Lynn Canal, 2056. Change “Alaska P&T” to “Upper Lynn Canal”.

Page 17-21, Table 17-9, Upper Lynn Canal, 2059. Change “Alaska P&T” to “Upper Lynn Canal”.

Page 17-22, Table 17-10, SEAPA, 2028. Change “Ketchikan” to “SEAPA”.

Page 17-23, Table 17-11, SEAPA, 2044. Change “Metlakatla” to “SEAPA”.

Page 17-26, First Paragraph, Fifth Line. Change “1.4” to “2.4”.

Page 17-26, First Paragraph, Fifth Line. Change “program to” to “program (80 percent conversion) to”.

Page 17-26, Table 17-14. Pellet Space Heating Program Total has been revised. The revised Table 17-14 is attached.

Page 17-27, Section 17.2.1.1, Second Line. Change “operation.” To “operation based on current and on-going funding requests.”

Page 17-27, Section 17.2.1.1, Third Line. Change “143.1” to “76.9”.

Page 17-27, Section 17.2.1.1, Third Line. Delete remainder of paragraph after “$143.1 million.”

Page 17-27, Table 17-15. Table 17-15 has been revised and is attached.

Page 17-28, Section 17.2.1.2. First Paragraph, Eighth Line. Change “heating as” to “heating (80 percent conversion) as”.

Page 17-28, Section 17.2.1.2, First Paragraph, Ninth Line. Change “742” to “515”.

Page 17-28, Section 17.2.1.2, First Paragraph, Last Line. Change “2.0” to “1.8”.

Page 17-28, Section 17.2.1.3, First Paragraph, Last Line. Change “23.4” to “18.4”.

Page 17-29, Table 17-16. Table 17-16 has been revised and is attached.

Pages 17-29 Through 17-32, Table 17-17. Table 17-17 has been revised and is attached.

Page 17-33, Table 17-18, Hydroelectric Project-specific High Level Reconnaissance Studies. Change “20 studies” to “ Approximately 20 studies”.

Page 17-33, Table 17-18, Hydro Project-specific FERC License Application Preparation. Change “10 projects” to “5 projects”.

Page 17-33, Table 17-18, Hydro Project-specific FERC License Application Preparation. Change “10,000,000” to “5,000,000”.

Page 17-33, Table 17-18, Support Tidal/Wave Technology Development. Change “Support Tidal/Wave Technology Development” to “Support Development of New Technologies (e.g., Tidal and Wave Power)”.

Page 17-34, Table 17-18, Total. Change “23,425,000” to “18,425,000”.

Page 17-35, Section 17.2.2, First Paragraph, Sixth Line. Change “69.6” to “64.4”.

Pages 17-36 Through Pages 17-38, Table 17-19. Table 17-19 has been revised and is attached.

Page 17-39, Table 17-20. Table 17-20 has been revised and is attached.

Page 17-39, First Paragraph, First Line. Delete “in Metlakatla”.

Page 17-39, First Paragraph, Fifth Line. Change “program is” to “program (80 percent conversion) is”.

Pages 17-41 through 17-43, Table 17-21, PELLET CONVERSION COSTS. Add following footnote “(1)Based on 80 percent conversion”.

Page 17-44, Table 17-22, BIOMASS. Add following footnote “1)Based on 80 percent conversion”.

Page 17-45, Section 17.2.4, Fourth Line. Change “Gartina Falls” to “Blue Lake”.

Pages 17-46 through 17-48, Table 17-23, PELLET CONVERSION COST. Add following footnote “(1)Based on 80 percent conversion”.

Page 17-49, Table 17-24, BIOMASS. Add following footnote “(1)Based on 80 percent conversion”.

Page 17-49, Second Paragraph, Second Line. Change “period would” to “period, based on 80 percent conversion, would”.

Pages 17-51 through 17-53, Table 17-25, PELLET CONVERSION COSTS. Add following footnote “(1)Based on 80 percent conversion”

Page 17-54, Table 17-26, BIOMASS. Add following footnote "[(1)]Based on 80 percent conversion".

Page 17-54, Last Paragraph, First Line. Change "program is" to "program (80 percent conversion) is".

Pages 17-57 through 17-59, Table 17-27, PELLET CONVERSION COSTS. Add following footnote "[(1)]Based on 80 percent conversion".

Page 17-60, Table 17-28, BIOMASS. Add following footnote "[(1)]Based on 80 percent conversion".

Page 17-60, First Paragraph, Sixth Line. Change "program is" to "program (80 percent conversion) is".

Page 17-60, Last Paragraph. Second Line. Change "A subsidiary of AEL&P" to "AJT Mining Company"

Page 17-60, Last Paragraph, Fifth Line. Delete the rest of the paragraph after "Juneau area."

Pages 17-62 through 17-64, Table 17-29, PELLET CONVERSION COSTS. Add following footnote "[(1)]Based on 80 percent conversion".

Page 17-65, Table 17-30, BIOMASS. Add following footnote "[(1)]Based on 80 percent conversion".

Page 17-65, First Paragraph, Eight Line. Change "program is" to "program (80 percent conversion) is".

Pages 17-67 through 17-69, Table 17-31, PELLET CONVERSION COSTS. Add following footnote "[(1)]Based on 80 percent conversion".

Page 17-70, Table 17-32, BIOMASS. Add following footnote "[(1)]Based on 80 percent conversion".

Page 17-70, First Paragraph, Third Line. Change "program is" to "program (80 percent conversion) is".

Pages 17-72 through 17-74, Table 17-33, PELLET CONVERSION COSTS. Add the following footnote "[(1)]Based on 80 percent conversion".

Page 17-75, Table 17-34, BIOMASS. Add following footnote "[(1)]Based on 80 percent conversion".

Page 17-75, First Paragraph, Third Line. Change "program is" to "program (80 percent conversion) is".

Pages 17-76 through 17-83, Space Heating Graphic, Change "Displaced Oil – Space Heating" to "Displaced Oil – Space Heating, 80 Percent Penetration".

Section 18

Page 18-1, Section 18.1, Second Paragraph, Fourth Line. Change “and conversion” to “and 80 percent conversion”.

Page 18-1, Figure 18-1. Figure 18-1 has been revised and is attached.

Page 18-2, Section 18.2, First Paragraph, Eighth Line. Change “48.59” to “52.94”.

Page 18-2, Section 18.2, First Paragraph, Ninth Line. Change “56.81” to “61.16”.

Page 18-3, Section 18.3.3, First Paragraph, Third Line. Change “is” to “would have been”.

Page 18-3, Section 18.3.3, First Paragraph, Fourth Line. Change “will” to “would”.

Page 18-3, Section 18.3.3, First Paragraph, Fourth Line. Change “remaining. The” to “remaining. Subsequent to the publication of the Draft Southeast Alaska IRP, their Round 5 grant was denied. The”.

Page 18.3, Section 18.3.3, First Paragraph, Fifth Line. Change “10” to “25”.

Page 18-3, Section 18.3.3, First Paragraph, Sixth Line. Change “10” to “25”.

Page 18-3, Section 18.3.3, First Paragraph, Seventh Line. Change “90” to “75”.

Page 18-4, Section 18.6, First Paragraph, Second Line, Change “532.1” to “227”.

Page 18-4, Section 18.6, First Paragraph, Third Line. Change “million compared” to “million for 80 percent conversion compared”.

Page 18-4, Section 18.6, First Paragraph, Fifth and Sixth Lines. Change “but to” to “but probably not to”.

Section 19

Page 19-3, Section 19.2.1, Third Bullet. Change “wind, geothermal” to “wind, solar, geothermal”.

Page 19-5, Table 19-1. Table 19-1 has been revised and is attached.

Page 19-15, Top of Page. Insert new section “19.2.3.2.5 Generation Resources-Solar”.

Page 19-15, Above Section 19.2.3.2.5. Insert new Table 19-7 which is attached.

Page 19-15, Section 19.2.3.2.5, Title. Change “19.2.3.2.5” to “19.2.3.2.6”.

Page 19-15, Section 15.2.3.2.5, Table 19-7, Title. Change “19-7” to “19-8”.

Page 19-16, Section 19.2.3.2.6, Title. Change “19.2.3.2.6” to “19.2.3.2.7”.

Page 19-16, Section 19.2.3.2.6, Table 19-8, Title. Change "19-8" to 19-9".

Page 19-17, Section 19.2.3.2.7, Title. Change "19.2.3.2.7" to "19.2.3.2.8".

Page 19-17, Section 19.2.3.2.7, Table 19-9, Title. Change "19-9" to "19-10".

Page 19-19, Section 19.2.3.2.8, Title. Change "19.2.3.2.8" to "19.2.3.2.9".

Page 19-19, Section 19.2.3.2.8, Table 19-10, Title. Change "19-10" to "19-11".

Page 19-20, Section 19.2.3.2.9, Title. Change "19.2.3.2.9" to "19.2.3.2.10".

Page 19-20, Section 19.2.3.2.9, Table 19-11, Title. Change "19-11" to "19-12".

Page 19-21, Section 19.2.3.3, Table 19-12, Title. Change "19-12" to "19-13".

Section 20

Page 20-4, Seventh Bullet, First Line. Change "Whether" to "The manner in which".

Page 20-7, Number 9, Second Bullet, Third Line. Change "heating in" to "heating based on 80 percent conversion in".

Page 20-8, Table 20-1, Optimal DSM/EE, Biomass, and Other Renewables Case. Change "Case" to "Case[(1), (2)]".

Page 20-8, Table 20-1, Optimal DSM/EE, Biomass, and Other Renewables Case. Change "2,030" to "1,725".

Page 20-8, Table 20-1. Add footnotes, "[(1)]Includes optimized hydro and transmission." and "[(2)]Assumes 80 percent biomass conversion."

Page 20-8, Second to Last Paragraph, Third Line. Change "analysis" to "analysis."

Page 20-8, Last Paragraph, Fifth Line. Change "that" to "than".

Page 20-9, Table 20-2, OPTIMAL DSM/EE, BIOMASS AND OTHER RENEWABLES CASE. Change "BIOMASS AND" to "BIOMASS (80 PERCENT) AND".

Pages 20-11 and 20-12, Table 20-3, Second and Third Tables, OPTIMAL DSM/EE, BIOMASS AND OTHER RENEWABLES CASE – SAVINGS RELATIVE TO STATUS QUO CASE. Change "BIOMASS AND" to "BIOMASS (80 PERCENT) AND".

Page 20-29, Table 20-5. Table 20-5 has been revised and is attached.

Pages 20-34 through 20-36, Table 20-6. Change "Biomass" to "Biomass – 80 percent conversion" in all occurrances.

Page 20-34, Table 20-6, SEAPA, Kake-Petersburg Interconnection. Change “48.6” to “52.9”.

Page 20-34, Table 20-6, SEAPA, Biomass. Change “139.4” to “36.7”.

Page 20-34, Table 20-6, Admiralty Island, Thayer Creek Project. Change “13.0” to “6.0”.

Page 20-34, Table 20-6, Baranof Island, Blue Lake Hydro. Change “47.5” to “1.0(1)”.

Page 20-35, Table 20-6, Prince of Wales, Reynolds Creek Hydro. Change “5.5(2)” to “0.0(1)”.

Page 20-35, Table 20-6, Prince of Wales, DSM/EE. Change “0.0(3)” to “0.0(2)”.

Page 20-35, Table 20-6, SEAPA, Biomass. Change “166.0” to “42.1”.

Page 20-36, Table 20-6. Delete footnote (2).

Page 20-36, Table 20-6. Change “(3” to “(2)”.

Page 20-41, No. 15. Revise No . 15 to read “ Support further development of emerging technologies (e.g. tidal and wind power) to encourage the development of additional resource options to provide the region with additional future generation options.”

Page 20-41, No. 16. Revise No. 16 to read “ Develop a standard power sales agreement (PSA) that could be used by project proponents and the potential purchasers (e. g. utilities) of a project’s power as the starting point for negotiations. Financing of potential projects will not occur without a clear identification of who will buy that power, and the terms and conditions associated with the sale. The existence of a standard PSA will quicken the time required to negotiate an agreement and lower the related costs.”

Page 20-41, No. 17. Add at the end of No. 17 the following “Over a number of years, and as a result of thousands of hours of negotiation and litigation among industry stakeholders, the FERC has developed and implemented a standard OATT which governs the terms and conditions of service for transmission service in the lower-48 states. While transmission service in Alaska is not under the jurisdiction of the FERC, Black & Veatch believes that the FERC OATT should be the starting point for the development of a transmission open access policy for the region and State.”

<u>Section 21</u>

Page 21-1, Section 21.1, Table 21-1. Table 21-1 has been revised and is attached.

Page 21-2, Section 21.2,1, Table 21-2. Table 21-2 has been revised and is attached.

Page 21-2, Section 21.2.2, Table 21-3. Table 21-3 has been revised and is attached.

Page 21-3, Section 21.2.3, Table 21-4. Change “ Biomass Conversion Program” to “80 Percent Biomass Conversion Program”.

Page 21-3, Section 21.2.4, Table 21-5. Change “ Biomass Conversion Program” to “80 Percent Biomass Conversion Program”.

Page 21-4, Section 21.2.5, Table 21-6. Change “ Biomass Conversion Program” to “80 Percent Biomass Conversion Program”.

Page 21-4, Section 21.2.6, Table 21-7. Table 21-7 has been revised and is attached.

Page 21-5, Section 21.2.7, Table 21-8. Change “ Biomass Conversion Program” to “80 Percent Biomass Conversion Program”.

Page 21-6, Table 21-9, Hydroelectric Project-specific High Level Reconnaissance Studies. Change “20” to “Approximately 20”.

Page 21-6, Table 21-9, Hydroelectric Project–specific FERC License Application Preparation. Change “10” to “5” and change “$10,000,000” to “$5,000,000”.

Page 21-6, Table 21-9, Total. Change “$23,425,000” to ‘$18,425,000”.

Volume 3 - Appendices

Page E-1, Appendix E. Appendix E has been replaced with the attached Appendix E.

End of Report. Add new Appendix F which is attached.

Southeast Alaska Integrated Resource Plan
Black & Veatch's Errata Sheet

Attachments

Figure 2-3 Elements of Stakeholder Involvement Process

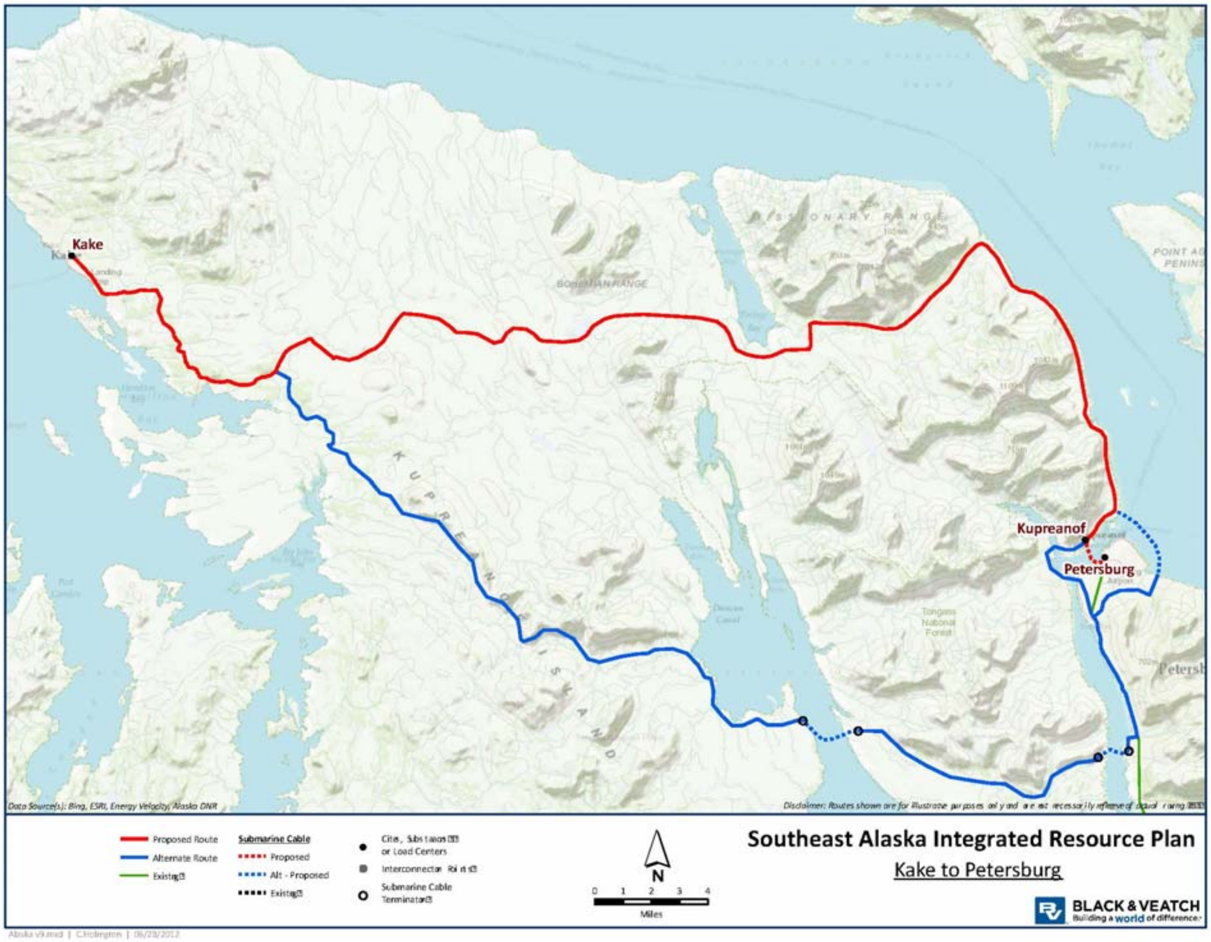


Figure 4-5 Proposed Petersburg to Kake Interconnection (Northern and Center-South Routes)

Table 4-4 Estimated Cost of Project Development and Construction

	ESTIMATED COSTS
Overhead Line	
Material and Freight	
Poles	$1,759,290
Conductor	$1,508,947
Insulators	$911,771
Guys and Hardware	$597,175
Fiber Optic Cable (ADSS 24 Strand)	$557,728
Subtotal - Materials	$5,334,912
Labor	$12,286,950
Incidental and Other Direct Costs	
Camp Cost/ Food / Lodging	$1,636,905
Rockdrills and Blasting Materials	$361,693
Equipment and Tools	$814,082
Fuel and Maintenance	$814,082
Barge and Landing Craft	$205,433
Air Transportation	$102,716
Helicopter Use	$563,847
Mobilization and Demobilization	$617,391
Bond and Insurance	$184,671
Subtotal - Incidental and Other Direct Costs	$5,300,819
Subtotal - Overhead Line	$22,922,681
Clearing and Road Construction	
Clearing with Timber Credit	$2,186,547
Road Construction - Forested Areas	$2,571,187
Road Construction - Muskeg Areas	$1,571,341
Subtotal	$6,329,075

	ESTIMATED COSTS
Submarine Cable - Wrangell Narrows S1-S2	
Cable - 3-500 kcmil copper bundled, 69-kV, 24 fiber strands	$2,186,547
Installation	$5,026,544
Marine Survey	$115,829
Shipping	$879,645
Mob/Demob	-
Transition Structures	$347,487
Subtotal	$9,422,864
Petersburg Tap Switchyard	
Civil Site Prep and Foundations	$84,140
Ground Grid and Fencing	$41,524
Bus Works	$38,245
Control Cable and Conduit	$25,133
SCADA and Control Interface	$20,762
Sectionalizing Switch (2)	$88,511
Disconnect Switches	$41,524
Breaker and CT	$114,736
Relaying, PT	$43,709
Revenue Metering	$54,636
Installation Labor	$104,902
Station Service and Battery	$104,902
Shunt Reactor and Disc SW	-
Subtotal	$762,723
Kake Substation	
Civil Site Prep and Foundations	$157,353
Ground Grid and Fencing	$52,451
Bus Works	$39,338
Control Cable and Conduit	$38,245
SCADA and Control Interface	$45,895

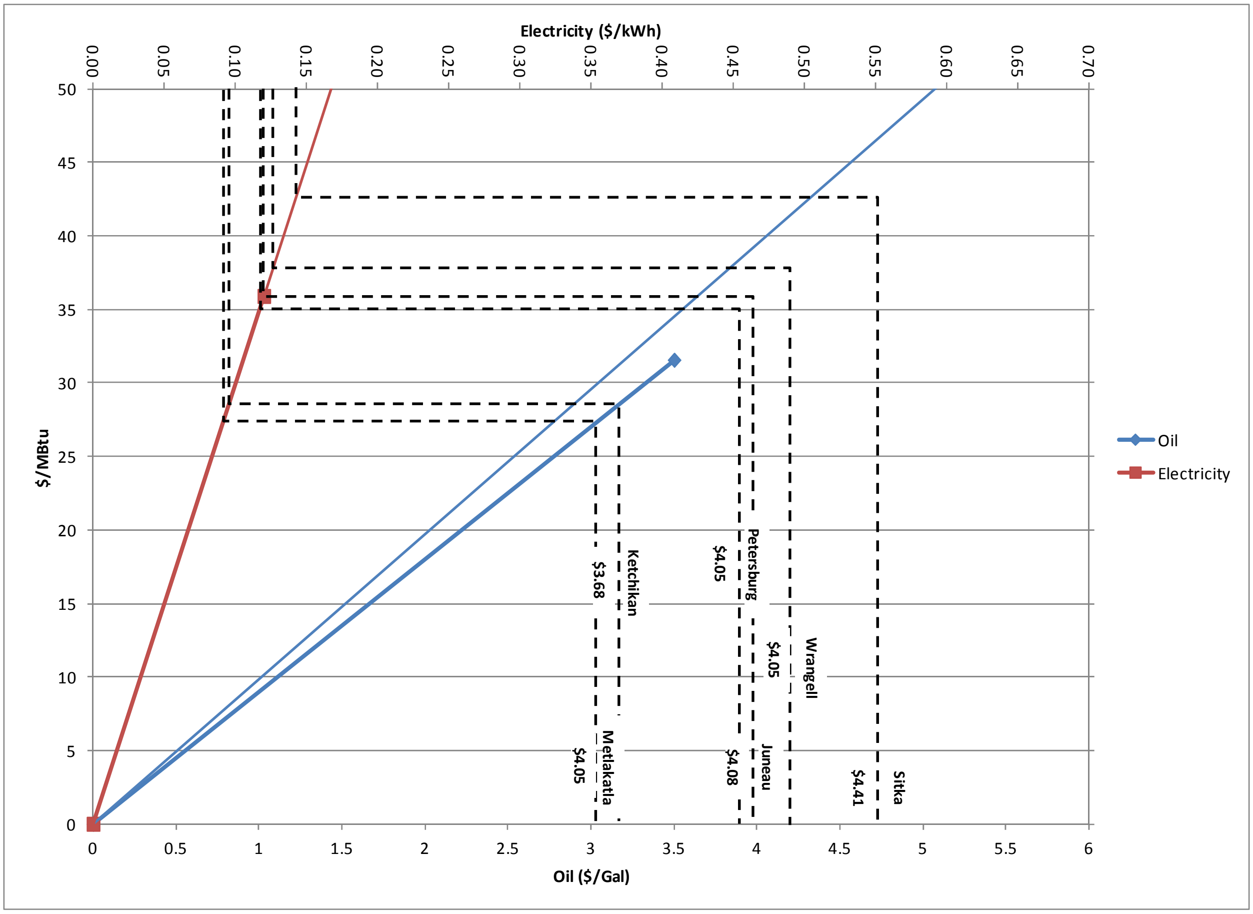
	ESTIMATED COSTS
Fuses/Switches	$45,895
Transformer -69/12.5-kV, 2.5 MVA, Relaying, LA, etc.	$314,705
Voltage Regulators/Bypass Switches	$39,338
Recloser/Disconnect Switch	$39,338
Relaying PT	$41,524
Installation Labor	$104,902
Station Service and Battery	$78,676
Subtotal	$997,660
Total Direct Costs	$40,435,002
Indirect Costs	
Construction Management (4 percent of Direct Costs)	$2,182,800
Owners Administration (4 percent of Direct Costs)	$2,182,800
Subtotal - Indirect Costs	$4,365,600
Contingency at 15 percent	$6,720,000
Interest During Construction (5.5 percent)	$1,417,000
Total Project Cost	$52,938,000

Table 10-5 Generic Hydro Projects

CAPACITY MW	CAPITAL COST $M	ANNUAL O&M $1,000	IDC 5.5% $1,000	R&R $1,000	$/KW	CAPACITY FACTOR	ANNUAL ENERGY MWH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ESTIMATED ENERGY COST CENTS/KWH
RUN-OF-RIVER																				
1	$11	$200	$920	$103	11000	0.45	3,978	258	231	247	391	544	369	189	182	353	508	380	326	30.5
STORAGE																				
1	$16	$200	$1,338	$103	16000	0.66	5,771	703	599	447	423	464	369	351	369	300	412	601	735	28.1
5	$46	$900	$3,847	$516	9200	0.66	28,856	3513	2996	2233	2114	2318	1845	1753	1843	1502	2058	3006	3675	18.1
10	$75	$900	$6,272	$1,032	7500	0.66	57,712	7026	5992	4466	4229	4636	3690	3507	3685	3004	4116	6012	7349	14.1
20	$97	$900	$8,112	$2,064	4850	0.66	115,424	14052	11983	8931	8458	9273	7379	7014	7371	6007	8232	12024	14699	9.5
25	$108	$900	$9,031	$2,580	4320	0.66	144,280	17566	14979	11164	10572	11591	9224	8767	9213	7509	10291	15030	18374	8.6

Table 15-4 Southeast Alaska Annual Capital Costs - Heating Conversion to Pellets (80 Percent Conversion)

YEAR	SEAPA	ADMIRALTY ISLAND	BARANOF ISLAND	CHICHAGOF ISLAND	JUNEAU AREA	NORTHERN REGION	PRINCE OF WALES	UPPER LYNN CANAL	TOTAL
2012	6,955,590	143,994	2,663,683	313,738	11,379,543	780,689	1,339,824	1,624,722	**18,246,192**
2013	7,079,598	108,636	2,644,399	417,040	12,016,390	749,208	1,549,550	1,828,249	**19,313,473**
2014	7,372,301	249,470	2,825,901	327,381	12,675,742	828,232	1,757,105	1,839,606	**20,503,438**
2015	7,557,004	146,091	2,916,306	320,320	13,315,782	800,462	2,096,373	2,290,523	**21,885,857**
2016	7,737,575	107,117	3,019,677	503,357	13,953,371	894,554	2,122,167	2,152,772	**22,753,014**
2017	7,965,045	149,018	2,976,295	327,887	14,495,078	849,210	1,937,947	2,048,874	**22,784,129**
2018	8,095,153	222,484	3,180,577	285,577	15,136,673	926,034	1,989,936	2,087,342	**23,828,622**
2019	8,390,072	104,382	3,157,551	418,921	15,930,901	900,927	2,008,591	2,143,628	**24,664,900**
2020	8,725,485	156,312	3,252,278	296,444	16,578,970	988,953	2,159,921	2,243,688	**25,676,566**
2021	8,924,411	104,019	3,482,222	298,618	17,373,076	1,011,902	2,130,914	2,543,899	**26,944,650**



Note: Assumes 80 percent efficiency for oil and 98 percent efficiency for electricity. Assumes 138,690 Btu/gal for oil.

Figure 15-20 Comparison of Breakeven Oil Prices for Conversion to Electric Space Heating (Energy Only)

16.3.3 Heat Pump Options (Air-source and Ground-source)

Another option for the provision of residential space heating instead of traditional electric furnace heating is the use of a heat pump system. A brief discussion of heat pump options is provided below, including the recently released results of a 15-year study evaluating the feasibility of heat pumps operating in Alaska.

The heat pump technology transfers energy from the outside air, ground, or water into a home and can also reverse the transfer. A heat pump brings warm air into the home during heating season and can take heat out of the home during cooling periods. To perform work, heat pumps use an intermediate fluid called a refrigerant that absorbs heat as it vaporizes and releases the heat when it is condensed. The two most common types of heat pumps are air-source and ground-source heat pumps (GSHPs).

The air-source heat pump is the most common type of unit installed in the United States due to its low cost relative to the ground-source system, its reliability, and its economy compared to the traditional alternative of heating a home with an electric or gas-fired furnace and cooling with an air conditioning unit. Figure 16-1 illustrates the conceptual operation of the air-source heat pump. When in cooling mode, the heat pump evaporates a refrigerant in the indoor coil; as the liquid evaporates it pulls heat from the air in the house. After the gas is compressed, it passes into the outdoor coil and condenses, releasing heat to the outside air. The pressure changes caused by the compressor and the expansion valve allows the gas to condense at a high temperature outside and evaporate at a lower temperature indoors.

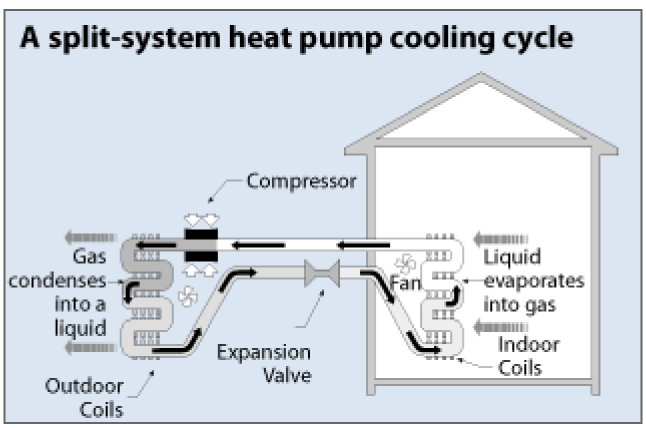


Figure 16-1 Air-Source Heat Pump Cooling Cycle[30]

A typical savings in electricity of 30 to 40 percent is achievable for most U.S. locations using air-source heat pump technology.[31] However, the efficiency of air-source heat pumps in the heating mode decreases significantly at low temperatures, making them uneconomical or marginal for colder climates. Typically air-source heat pumps have a coefficient of performance (COP) of around 3.0 at moderate temperatures. The COP reduces as the temperature decreases and hence the typical savings of 30 to 40 percent instead of a 67 percent savings that would be associated with a

[30] From http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12620, accessed September 28, 2011.

[31] From http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12610, accessed September 27, 2011.

COP of 3.0. According to the U.S. government, "although air-source heat pumps can be used in nearly all parts of the United States, they do not generally perform well over extended periods of sub-freezing temperatures." In regions with subfreezing winter temperatures, it may not be cost effective to meet all your heating needs with a standard air-source heat pump."[32] Air source heat pumps typically have resistance heating as back-up for use when the temperature becomes cold enough that the heat pump is no longer effective. When the resistance heating is in effect, it can place a significant strain on the utility system which is already facing peak loads from the low temperatures. Even if hydro generating units have the capacity to handle the increased load from the resistance heating being used, the distribution systems may not be capable of these additional loads. Air-source heat pumps generally require a ducted system. While there are many specifics associated with the costs of heating systems, air-source heat pump systems would be on par with oil-fired boilers, electric resistance boilers, and pellet furnaces and would be more expensive than baseboard resistance heat. Air-source heat pump systems are not as suitable for replacing oil boiler systems due to the need for ducts.

There are newer systems, and systems in development, that aim to overcome the problems associated with heat pump operation in colder climates, but these will likely require a higher upfront cost than common air-source heat pumps. These mini-split heat pumps (MSHPs) have the advantage that they are ductless. They also have higher SEERs and COPs. However, according to the Laboratory Test Report for Fujitsu 12RLS and Mitsubishi FE12NA Mini-Split Heat Pumps[33], these MSHPs have several issues that must be resolved before MSHPs can achieve broad market penetration in the U.S. MSHPs are likely more expensive than high SEER forced air systems particularly when installed in an average size house which will typically require multiple indoor units. Also some homeowners may not prefer MSHPs for aesthetic reasons and thus they may not be able to be installed in every room potentially resulting in reduced comfort.

While the MSHPs can operate at lower temperatures, their output and COPs reduce significantly at lower temperatures. Figures 16-2 and 16-3 present the COP test results for the Fujitsu 12RLS and Mitsubishi FE12NA respectively. A similar result occurs for heating with the heating capacity reducing substantially with decreasing temperatures. Figures 16-4 and 16-5 present the heating capacity test results for the Fujitsu 12RLS and Mitsubishi FE12NA, respectively. The decreasing heating capacity with decreasing temperature results in greater capacity and corresponding greater cost required to meeting heating requirements. In general, it is Black & Veatch's opinion that the capital cost of MSHPs are higher than comparable electric boilers, oil boilers, and pellet furnaces. While a COP of 3.0 is typically used in economic comparisons of heat pumps, the COP over the actual heating range will likely be less than 3.0 for MSHPs which have higher COPs than air-source heat pumps. When actual end-use data becomes available for Southeast Alaska, more detailed evaluation of the efficiency of heat pumps, both air source and MSHPs, will be necessary to determine their cost-effectiveness as part of DSM/EE or space heating program.

[32] From http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12620, accessed September 27, 2011.

[33] Laboratory Test Report for Fujitsu 12RLS and Mitsubishi FE12NA Mini-Split Heat Pumps, U.S. Department of Energy, Energy Efficiency & Renewable Energy, Building Technologies Program, September 2011.

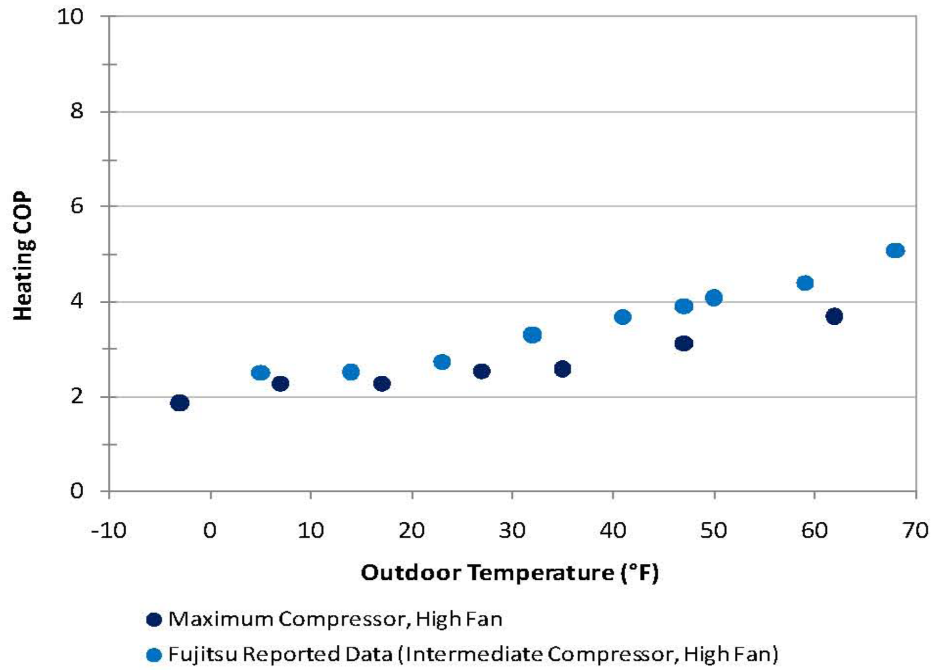


Figure 16-2 Fujitsu 12RLS Heating COP Compared to Manufacturer-Reported Data (70°F Return Temperature)

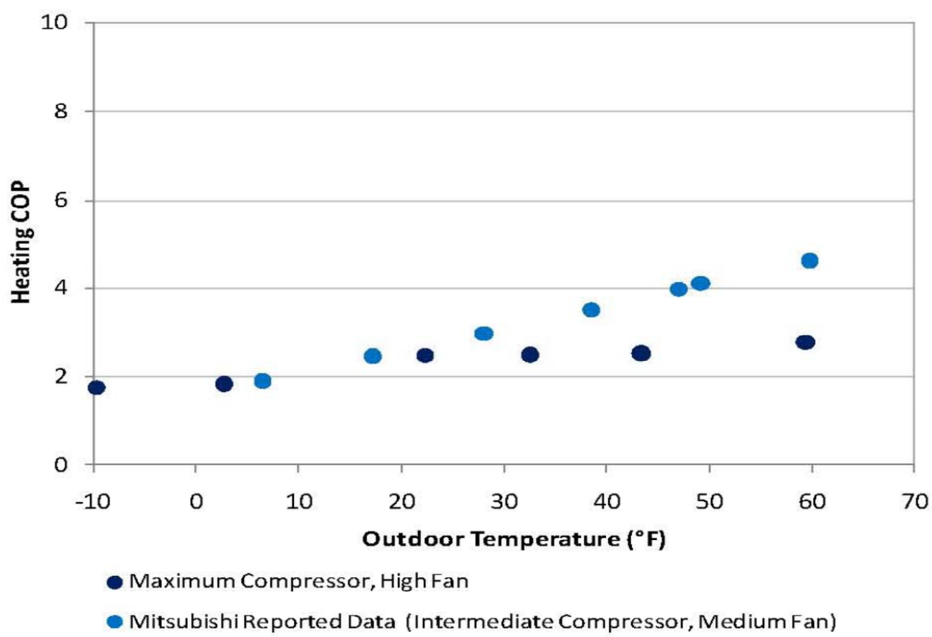


Figure 16-3 Mitsubishi FE12NA Heating COP Compared to Manufacturer-Reported Data (70°F Return Temperature)

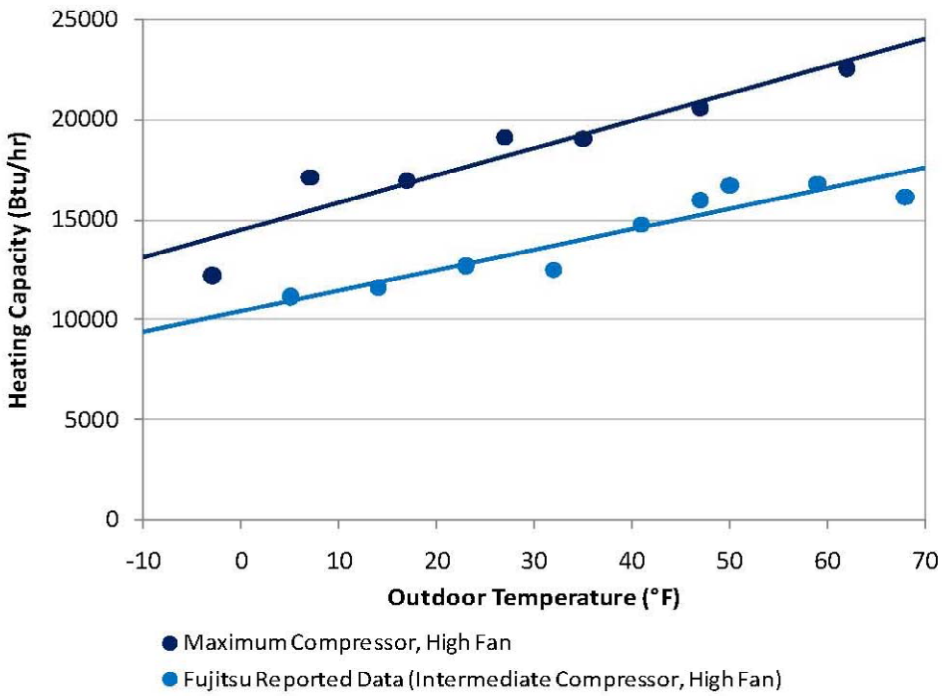


Figure 16-4 Fujitsu 12RLS Maximum Steady-State Heating Capacity Compared to Manufacturer-Reported Data (70°F Return Temperature)

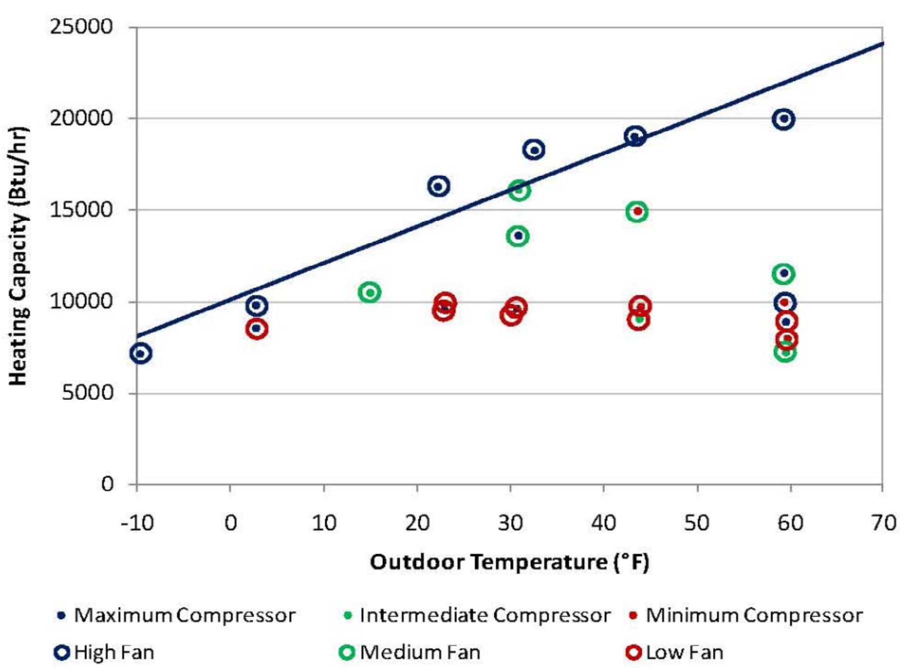


Figure 16-5 Mitsubishi FE12NA Heating Capacities (70°F Return Temperature)

While potentially promising, Black & Veatch does not view MSHPs as being sufficiently demonstrated to commit to an extensive program involving their installation at this time. They certainly aren't demonstrated to the extent that air-source heat pumps, ground source heat pumps, and pellet stoves have been demonstrated. Other designs may be available and developing, but they will have difficulty overcoming the fundamental laws of thermodynamics during cold weather.

The GSHP is more costly to install than an air-source heat pump but it achieves a higher efficiency and is more suitable for application in colder climates such as Alaska. In Sweden, for example, 30 percent of the homes have GSHP systems.[34]

GSHPs collect the natural heat of the ground through a "loop" or series of hard plastic (usually polyethylene) tubes that are installed below the ground or, sometimes, submerged in a pond, lake, or seawater. The tubes are filled with a moving fluid that carries the transferred heat into the home where the heat pump's compressor and heat exchangers convert the heat to a higher temperature (when in heating mode) and release the heat into the home, usually through a blower and duct system. It is the near-constant temperature of the ground around the loop system (depending on location, the ground temperature at a depth of 6 feet in the U.S. is between 45° and 75° F) that allows the GSHP to operate more efficiently than an air-source heat pump in the winter and other heating periods.[35]

Depending on location and other factors, a GSHP can use 25 to 60 percent less electricity than conventional alternatives according to the U.S. government and, depending on location, is usually able to recover the higher initial investment cost over a 2- to 10-year period through lower utility bills.[36] Ground-source systems also have the benefit of being very reliable and a typical loop system will be guaranteed 25 to 50 years by the manufacturer. Currently, about 50,000 GSHPs are installed in the U.S. each year.

In 2011, a 15-year study of the economics of GSHPs in Alaska was completed by the Cold Climate Housing Research Center and the Alaska Center for Energy and Power. The locations studied were Fairbanks, Anchorage, Juneau, Bethel, and Seward. The study - "*Ground-Source Heat Pumps in Cold Climates: The Current State of the Alaska Industry, a Review of the Literature, a Preliminary Economic Assessment, and Recommendations for Research"* - determined the net present value (NPV) cost of heating with various options in the five cities evaluated. The NPV at each location was the discounted value of capital, fuel, electric, and other operating costs over a 15-year period, using a 3 percent discount rate. The results are summarized in Table 16-8 and indicate that the relative economics of heat pumps in Alaska are highly dependent upon the cost of the primary heating alternatives of electric resistance heating, oil-fired boilers, oil-fired laser vented heaters and, in Anchorage, natural gas heating.

[34] From "Ground-Source Heat Pumps in Cold Climates: The Current State of the Alaska Industry, a Review of the Literature, a Preliminary Economical Assessment, and Recommendations for Research", May 31, 2011, page iii. The report was prepared for the Denali Commission by the Alaska Center for Energy and Power and by the Cold Climate Housing Research Center. The report can be found on-line at http://www.cchrc.org/.

[35] From http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12640, accessed September 27, 2011.

[36] Ibid, and http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12670.

Table 16-8 NPV Cost of Ground-Source Heat Pump Options in Five Alaskan Cities

CITY	GROUND HEAT PUMP	ELECTRIC RESISTANCE	OIL-FIRED BOILER OR HEATER	NATURAL GAS
Juneau	$56,300 to $61,500	$82,500	$68,000 to $74,800	NA
Anchorage	$79,100 to $86,400	$114,100	NA	$37,900 to $44,600
Fairbanks	$76,900 to $87,300	$161,800	$85,300 to $90,500	NA
Bethel	$158,100 to $185,700	$414,900	$65,500	NA
Seward	$50,500 to $55,000	$71,100	$57,000 to $62,200	NA

Source: *Ground-Source Heat Pumps in Cold Climates: The Current State of the Alaska Industry, a Review of the Literature, a Preliminary Economical Assessment, and Recommendations for Research*, May 31, 2011, by the Cold Climate Housing Research Center and the Alaska Center for Energy and Power, p. 29.

In Bethel, the high cost of electricity ($0.54/kWh after the first 500 kWh each month) caused the cost of electric resistance heating to be most costly, followed by GSHPs and then by oil-fired heaters.[37] Thus, even though the ground-source heating option was economical compared to full reliance on resistance heating, the partial reliance of the ground-source heating option for supplemental heat from electric sources harmed the overall economics relative to the oil-fired heater option.

In Anchorage, natural gas heating was the least-cost option evaluated, followed by ground-source heating and electric resistance heating. In Juneau and Seward, GSHPs were lowest in overall cost, compared with electric resistance heating and oil-fired boilers. Finally, in Fairbanks, heat pumps were slightly lower in NPV cost than an oil-fired alternative while electric resistance heating was significantly higher than these two options.

The implication for Southeast Alaska is that, while GSHPs seem to be a viable option for Juneau and for communities with moderate electricity costs, many of the smaller communities having a high cost of electricity may be more comparable to the study economics for Bethel, and heat pumps may be marginal or uneconomic in such locations. Related specifically to Southeast Alaska, the study concluded the following about GSHPs:

> GSHP systems are more viable where electricity costs are relatively low and heating costs are relatively high. Juneau, included in the economic analysis, displayed this relationship. These results can be roughly extrapolated to many other communities in Southeast Alaska that utilize hydropower.[38]

[37] From *"Ground-Source Heat Pumps in Cold Climates: The Current State of the Alaska Industry, a Review of the Literature, a Preliminary Economical Assessment, and Recommendations for Research"*, May 31, 2011, p. 23.
[38] Ibid, p. viii

The study also surveyed studies of GSHPs in Alaska. The survey contained two studies for Juneau. In one of the studies the COP ranged from 2.25 to 2.5 and the other study had a COP of 2.0. Thus in both of the studies surveyed, the COPs for GSHPs were significantly below the COP of 3.0 typically used in heat pump comparisons. The study that was completed May 31, 2011 surveyed all known residential GSHP installations in Alaska. Only one installation was identified in the Southeast in Juneau. The study also estimated the capital cost of GSHPs, oil boilers, and baseboard electric heat in Juneau. The capital cost of the GSHP was 2.3 times the cost of the oil boiler and 8.9 times the cost of the baseboard electric heat.

GSHPs are also alternatives for larger commercial buildings and have had a greater penetration in commercial buildings in the Southeast that the residential penetration presented in the above study. In Black & Veatch's view, GSHPs for both residential and commercial applications represent demonstrated commercial technology. The only barrier to their installation is economics driven by high capital cost. When additional end-use data becomes available in the Southeast, additional detailed study should be conducted before GSHPs are considered as part of a DSM/EE or space heating program.

Table 16-9 presents the break-even electric cost of pellet space heating with heat pumps only considering energy costs and <u>not</u> capital costs. Table 16-10 presents the cost of electricity for the various communities. A comparison between the two tables indicates the communities in which heat pumps can be cost effective with pellet space heating on an energy basis. When the capital cost of heat pumps is considered for MSHPs and GSHPs, heat pumps become less competitive. The average COP for air source heat pumps lowers significantly when the periods of electric resistance heating are considered during colder temperatures. It is likely that the detailed marketing studies discussed in Section 15 will indicate that there will be opportunities for heat pumps in some markets from an economic stand-point if rate structures are not modified to reflect the costs of supplying additional electricity to serve electric space heating conversion. For communities that do not have access to low cost hydro generation, heat pumps will not be cost effective. In all cases electric space heating conversion will add electric load and consume hydro generation. Heat pumps will consume less energy than resistance heating, but may not consume less capacity if resistance back-up is needed at low temperatures.

Opportunities may exist to convert resistance heating to heat pumps. These types of conversions would actually reduce energy consumption, but may not reduce capacity requirements if electric resistance back-up is required. This type of conversion would best be conducted as part of the region's or a utility's DSM/EE program. This conversion was not evaluated in Section 13.0 since it would not pass the RIM test. The detailed market studies discussed in Section 13.0 would determine if a conversion program from electric resistance heat to heat pumps is feasible.

Table 16-9 Wood Pellet Energy Only Cost Comparison to Heat Pumps

PELLET PRICE	RESISTANCE HEAT COP 1.0	HEAT PUMP COP 2.0	HEAT PUMP COP 3.0
$250/ton Average lower 48 price, proxy for Southeast Alaska price with local pellet production	6.5 cents/kWh	13.0 cents/kWh	19.5 cents/kWh
$300/ton Current Sealaska price for buck delivery	7.8 cents/kWh	15.6 cents/kWh	23.4 cents/kWh
$375/ton Current price in 40 lb bags in Juneau	9.8 cents/kWh	19.5 cents/kWh	29.2 cents/kWh
Note: Assumes 80 percent appliance efficiency for wood pellets.			

Table 16-10 Electric Power Costs and Population Size for Municipalities and Participants in the Study

CITY	POPULATION	HOUSEHOLDS	POWER COST BEFORE PCE (C/KWH)	POWER COST AFTER PCE (C/KWH)
Angoon	459	167	56.1	19.8
Coffman Cove	176	89	49.5	18.6
Craig	1,201	470	21.3	14.5
Edna Bay	42	18		
Elfin Cove	20	13	52.3	19.8
Excursion Inlet	12	6		
Gustavus	442	212	39.2	25.5
Haines	1,713	782	21.9	14.7
Hollis	112	44	21.3	
Hoonah	760	305	56.1	19.8
Hydaburg	376	128	21.3	14.5
Hyder	87	48		
Juneau	31,275	12,187	12.0	
Kake	557	213	56.1	19.8
Kasaan	49	23	21.3	14.5
Ketchikan	8,050	3,259	9.6	
Klawock	755	297	21.3	14.5
Klukwan/Chilkat Valley	95	41	56.1	19.8
Kupreanof	27	15		
Metlakatla	1,405	493	9.2	
Meyers Chuck	21	9		
Naukiti	113	49	49.3	18.5
Pelican	88	41	41.7	18.0
Petersburg	2,948	1,252	11.8	
Saxman	411	120	9.6	
Sitka	8,881		14.2	
Skagway	920	410	21.9	14.7
Tenakee Springs	131	72	64.0	31.5
Thorne Bay	471	214	21.3	14.5
Whale Pass	31	20	52.2	22.7
Wrangell	2,369	1,053	12.6	
Yakutat	662	275	46.7	18.0

Source:

1. 2010 Census Data Table “Race, Hispanic or Latino, Age, and Housing Occupancy 2010: 2010 Census Redistricting Data (Public Law 94-171) Summary File” http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml
2. Statistical Report of the Power Cost Equalization Program, Fiscal Year 2010 (July 1, 2009-June 30, 2010, Twenty Second Edition, March 2011, Alaska Energy Authority. http://www.akenergyauthority.org/PDF%20files/FY10PCEreport.pdf.

Table 17-8 Committed Resources Costs

COMMITTED RESOURCE	TOTAL COST ($ MILLION)	EXISTING GRANTS ($ MILLION)	ADDITIONAL FUNDS REQUIRED ($ MILLION)
Kake-Petersburg Interconnection(1)	52.94	5.49	52.9
Ketchikan-Metlakatla Interconnection	12.72	4.50	8.2
Blue Lake Hydroelectric(2)	96.50	69.00	1.0
Gartina Falls Hydroelectric	6.33	0.85	5.5
Reynolds Creek Hydroelectric(3)	28.58	20.52	0.0
Thayer Creek Hydroelectric(4)	15.20	2.16	6.0
Whitman Lake Hydroelectric(5)	25.83	12.42	3.3

(1)Existing grants were for tasks not included in Total Cost.
(2)Existing grants include $20 million of bonds issued by Sitka and allocated to the project.
(3)Existing grants include expenditures by Haida Energy Inc. of $4,000,000 and Alaska Power & Telephone of $400,000.
(4)The amount shown under existing grants is the amount shown previously expended in the Round 5 application.
(5)Existing grants include KPU cash reserves $1,400,000.

Table 17-14 Space Heating Costs (2012 Cumulative Present Worth '1000)

REGION	OIL SPACE HEATING	PELLET SPACE HEATING PROGRAM 80 PERCENT CONVERSION			
		OIL COSTS	PELLET COSTS	PELLET CONVERSION COSTS	TOTAL
SEAPA	977,320	258,011	238,441	61,875	558,327
Admiralty Island	22,334	6,830	4,717	1,195	12,742
Baranof Island	460,426	121,745	98,280	23,655	243,680
Chichagof Island	58,459	13,753	11,950	2,806	28,509
Juneau Area	2,120,883	541,759	490,307	111,314	1,114,380
Northern	147,786	39,089	23,925	6,849	69,863
Prince of Wales	366,725	94,304	77,469	14,916	186,689
Upper Lynn Canal	347,271	90,274	67,919	16,287	174,480
Total Southeast Region	**4,501,204**	**1,165,765**	**1,013,008**	**238,897**	**2,417,670**

Table 17-15 Committed Resources

COMMITTED RESOURCE	ADDITIONAL FUNDS REQUIRED ($ MILLION)
Kake-Petersburg Interconnection	52.9
Ketchikan-Metlakatla Interconnection	8.2
Blue Lake Hydroelectric	1.0
Gartina Falls Hydroelectric	5.5
Reynolds Creek Hydroelectric	0.0
Thayer Creek Hydroelectric	6.0
Whitman Lake Hydroelectric	3.3
Total	**76.9**

Table 17-16 10 Year Capital Requirements ($1000)[1]

YEAR	SEAPA	ADMIRALTY	BARANOF	CHICHAGOF	JUNEAU	NORTHERN	POW	UPPER LYNN	TOTAL
2012	46,710	144	22,905	618	31,682	782	1,340	1,628	106,054
2013	7,249	109	2,695	418	12,218	751	1,550	1,837	26,827
2014	7,768	250	2,944	331	13,145	3,623	1,757	1,860	31,677
2015	8,385	147	3,162	327	14,298	810	2,097	2,334	31,560
2016	20,727	108	3,498	516	15,863	915	2,123	2,237	45,984
2017	10,857	151	3,836	351	17,930	19,434	1,940	2,199	56,697
2018	12,754	226	4,567	322	20,673	984	1,993	2,330	43,848
2019	14,821	109	5,072	469	23,578	981	2,013	2,478	49,520
2020	16,244	161	5,492	355	38,331	1,467	2,164	2,634	66,849
2021	16,894	109	5,858	360	26,862	1,111	2,136	2,958	56,288
Total	**162,407**	**1,513**	**60,028**	**4,066**	**214,579**	**30,857**	**19,113**	**22,495**	**515,058**

(1) Includes 80 percent conversion from oil space heating to pellets.

Table 17-17 50 Year Capital Requirements ($1000)[1]

YEAR	SEAPA	ADMIRALTY	BARANOF	CHICHAGOF	JUNEAU	NORTHERN	POW	UPPER LYNN	TOTAL
2012	46,710	144	22,905	618	31,682	782	1,340	1,628	106,054
2013	7,249	109	2,695	418	12,218	751	1,550	1,837	26,827
2014	7,768	250	2,944	331	13,145	3,623	1,757	1,860	31,677
2015	8,385	147	3,162	327	14,298	810	2,097	2,334	31,560
2016	20,725	108	3,498	516	15,863	915	2,123	2,237	45,984
2017	10,857	151	3,836	351	17,930	19,434	1,940	2,199	56,697
2018	12,754	226	4,567	322	20,673	984	1,993	2,330	43,848
2019	14,821	109	5,072	469	23,578	981	2,013	2,478	49,520
2020	16,244	161	5,492	355	38,331	1,467	2,164	2,634	66,849
2021	16,894	109	5,858	360	26,862	1,111	2,136	2,958	56,288
2022	8,262	5	2,464	472	9,843	103	6	429	21,584
2023	855	1	255	7	43,003	11	0	44	44,176
2024	884	1	264	7	1,055	11	0	46	2,268
2025	915	1	273	7	1,092	11	0	47	2,347
2026	1,787	1	283	466	1,130	12	0	49	3,729
2027	6,415	1	293	7	1,170	12	0	51	7,949
2028	1,013	1	303	8	1,211	13	0	52	2,601
2029	1,048	1	314	8	1,254	4,360	0	54	7,039
2030	1,084	1	325	8	18,509	14	0	56	19,997
2031	1,121	1	336	8	1,343	14	6,118	58	9,001
2032	1,160	1	348	9	1,391	15	0	60	2,984

YEAR	SEAPA	ADMIRALTY	BARANOF	CHICHAGOF	JUNEAU	NORTHERN	POW	UPPER LYNN	TOTAL
2033	1,200	1	360	9	1,440	15	0	19,904	22,929
2034	1,241	1	19,745	9	40,234	16	0	64	61,311
2035	1,284	1	386	21,719	1,543	16	0	66	25,016
2036	1,326	1	399	10	1,592	17	0	68	3,414
2037	1,370	1	412	1,810	1,643	17	0	71	5,324
2038	23,217	1	426	11	1,696	18	0	73	25,442
2039	1,460	1	440	11	1,750	18	0	75	3,757
2040	1,508	1	454	11	1,806	19	695	78	4,573
2041	15,381	1	469	727	1,864	20	0	80	18,543
2042	14,497	1	485	12	1,924	20	2	83	17,023
2043	1,661	1	501	12	1,986	21	8,724	85	12,991
2044	194,846	1	518	13	2,049	6,794	2	88	204,310
2045	1,771	1	535	13	2,115	22	2	91	4,549
2046	1,829	1	552	13	2,183	23	2	94	4,697
2047	1,889	1	571	14	2,253	24	2	97	4,849
2048	1,950	1	590	894	2,325	25	2	100	5,886
2049	2,014	1,661	609	15	2,399	32,863	2	103	39,666
2050	2,080	1	629	15	2,476	26	2	107	5,336
2051	111,014	1	64,687	16	304,120	27	2	110	479,978
2052	2,218	1	672	1,006	2,638	28	2	114	6,678
2053	2,290	1	694	17	2,722	29	2	117	5,873
2054	2,365	1	717	17	2,810	30	2	55,492	61,434

YEAR	SEAPA	ADMIRALTY	BARANOF	CHICHAGOF	JUNEAU	NORTHERN	POW	UPPER LYNN	TOTAL
2055	-	1	741	18	2,900	31	1,084	125	4,899
2056	41,682	2	765	1,133	2,993	32	2	129	46,737
2057	2,605	2	790	19	3,089	33	2	134	6,672
2058	2,690	2	817	19	3,188	34	2	138	6,889
2059	2,778	2	844	20	3,290	10,586	2	142	17,663
2060	2,868	2	871	21	45,172	1,290	2	147	50,374
2061	2,962	2	900	21	3,504	37	2	152	7,581
	630,950	**3,219**	**166,068**	**32,699**	**745,282**	**87,563**	**35,777**	**101,569**	**1,803,126**

(1) Includes 80 percent conversion from oil to pellets.

Table 17-19 SEAPA Subregion Capital Costs

YEAR	HYDROELECTRIC TYPE	HYDRO-ELECTRIC CAPITAL COST	DIESEL CAPITAL COSTS	ANNUAL DSM COSTS	PELLET CONVERSION COSTS(1)	OTHER ALTERNATIVES	TOTAL CAPITAL COST
2012			556,000	69,082	6,955,590		7,580,672
			20,220,000				20,220,000
			10,110,000				10,110,000
			3,489,000				3,489,000
			5,310,000				5,310,000
2013				169,869	7,079,598		7,249,467
2014				395,294	7,372,301		7,767,595
2015				828,495	7,557,004		8,385,499
2016			11,378,894	1,608,779	7,737,575		20,725,248
2017				2,892,325	7,965,045		10,857,370
2018				4,659,159	8,095,153		12,754,312
2019				6,431,005	8,390,072		14,821,077
2020				7,518,329	8,725,485		16,243,814
2021				7,969,961	8,924,411		16,894,372
2022				8,262,427			8,262,427
2023				854,857			854,857
2024				884,351			884,351
2025				914,857			914,857
2026			841,000	946,415			1,787,415
2027			5,435,748	979,064			6,414,813
2028				1,012,841			1,012,841

YEAR	HYDROELECTRIC TYPE	HYDRO-ELECTRIC CAPITAL COST	DIESEL CAPITAL COSTS	ANNUAL DSM COSTS	PELLET CONVERSION COSTS(1)	OTHER ALTERNATIVES	TOTAL CAPITAL COST
2029				1,047,784			1,047,784
2030				1,083,935			1,083,935
2031				1,121,335			1,121,335
2032				1,160,026			1,160,026
2033				1,200,055			1,200,055
2034				1,241,466			1,241,466
2035				1,284,309			1,284,309
2036				1,326,248			1,326,248
2037				1,369,559			1,369,559
2038			21,803,138	1,414,284			23,217,422
2039				1,460,472			1,460,472
2040				1,508,168			1,508,168
2041			1,310,250	1,557,424			2,867,674
			12,513,363				12,513,363
2042			12,888,764	1,608,289			14,497,053
2043				1,660,817			1,660,817
2044	SEAPA Generic - 10 MW	193,131,207		1,715,062			194,846,269
2045				1,771,080			1,771,080
2046				1,828,929			1,828,929
2047				1,888,668			1,888,668
2048				1,950,361			1,950,361
2049				2,014,070			2,014,070

YEAR	HYDROELECTRIC TYPE	HYDRO-ELECTRIC CAPITAL COST	DIESEL CAPITAL COSTS	ANNUAL DSM COSTS	PELLET CONVERSION COSTS[1]	OTHER ALTERNATIVES	TOTAL CAPITAL COST
2050				2,079,861			2,079,861
2051			1,760,867	2,147,804			3,908,671
			64,037,286				64,037,286
			32,018,643				32,018,643
			11,049,757				11,049,757
2052				2,217,967			2,217,967
2053				2,290,425			2,290,425
2054				2,365,251			2,365,251
2055							-
2056			2,041,327	2,522,322			4,563,649
			37,118,382				37,118,382
2057				2,604,730			2,604,730
2058				2,689,832			2,689,832
2059				2,777,716			2,777,716
2060				2,868,475			2,868,475
2061				2,962,200			2,962,200
Total		**193,131,207**	**253,882,419**	**105,136,035**	**78,802,234**	**-**	**630,951,895**

[1]Based on 80 percent conversion.

Table 17-20 SEAPA Subregion Capital Requirements ($ million)

	HYDROELECTRIC	DIESEL	DSM/EE	BIOMASS[1]	TOTAL
10 Year Total	0	51.1	32.5	78.8	162.4
50 Year Total	193.1	253.9	105.1	78.8	631.0

[1]Based on 80 percent conversion.

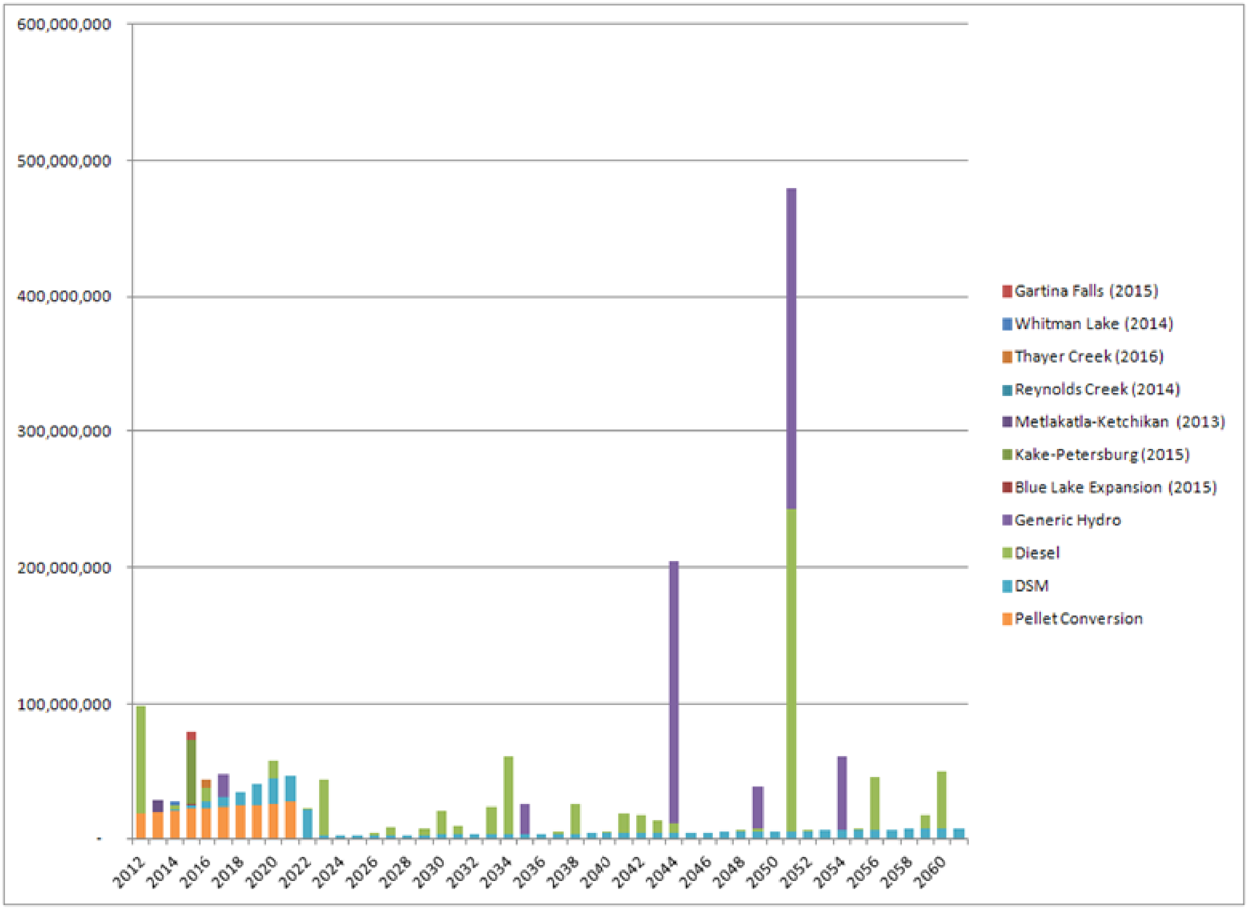


Figure 18-1 Southeast Alaska IRP Annual Capital Requirements

Table 19-1 Resource Specific Risks and Issues - Summary

RESOURCE	RELATIVE MAGNITUDE OF RISK/ISSUE							
	RESOURCE POTENTIAL RISKS	PROJECT DEVELOPMENT & OPERATIONAL RISKS	FUEL SUPPLY RISKS	ENVIRONMENTAL RISKS	TRANSMISSION CONSTRAINT RISKS	FINANCING RISKS	REGULATORY/ LEGISLATIVE RISKS	PRICE STABILITY RISKS
DSM/EE	Moderate	Limited	N/A	N/A	N/A	Limited - Moderate	Moderate	Limited
Generation Resources								
Diesel	Limited	Limited	Significant	Moderate	Limited	Limited	Moderate	Significant
Hydroelectric	Limited - Moderate	Moderate	N/A	Moderate	Moderate	Limited - Moderate	Limited	Limited
Biomass	Limited - Moderate	Limited	Moderate	Limited	N/A	Limited-Moderate	Limited	Limited-Moderate
Wind	Moderate	Moderate	N/A	Limited	Significant	Limited - Moderate	Limited	Limited - Moderate
Solar	Moderate	Moderate	N/A	Limited	Significant	Limited – Moderate	Limited	Limited - Moderate
Geothermal	Significant	Limited - Moderate	N/A	Limited - Moderate	Moderate – Significant	Limited – Moderate	Limited	Limited
Solid Waste	Significant	Moderate-Significant	N/A	Significant	Moderate	Limited – Moderate	Limited-Moderate	Moderate
Tidal/Wave	Limited	Significant	N/A	Significant	Moderate - Significant	Moderate – Significant	Moderate - Significant	Limited - Moderate
Coal	Significant	Moderate-Significant	Moderate	Significant	Significant	Significant	Significant	Moderate
Modular Nuclear	Limited	Significant	Moderate	Significant	Moderate	Significant	Significant	Moderate
Transmission	Limited	Significant	N/A	Moderate	N/A	Significant	Moderate - Significant	N/A

Table 19-7 Resource Specific Risks and Issues – Generation – Solar

RISK/ISSUE CATEGORY	DESCRIPTION	PRIMARY ACTIONS TO ADDRESS RISK/ISSUE
Resource Potential	• Total economic resource potential is unknown	• Complete regional economic potential assessment, including the identification of the most attractive sites
Project Development and Operational	• Delivery mechanism needs development (dispersed versus central station) • Lack of standard power purchase agreements for projects developed by IPPs and customers • Difficult to integrate into system	• Develop regional standard power purchase agreements • Develop regional competitive power procurement process to encourage IPP development of projects • Explore if synergies can be achieved for infrastructure with hydro projects
Fuel Supply	• Not applicable	• Not applicable
Environmental	• Site-specific environmental issues	• Comprehensive evaluation of site-specific environmental impacts at attractive sites
Transmission Constraints	• Operational issues if dispersed	• Develop interconnection requirements • Require that all proposed plant locations also include transmission infrastructure analyses and costs as part of any approval process
Financing	• Cost per kW can be significant	• Aggressively pursue available Federal funding for renewable projects
Regulatory/Legislative	• Region already exceeds state's renewable power targets	• Not applicable

Table 20-5 Committed Resources

PROJECT	DISCUSSION	TOTAL CAPITAL COST ($ MILLION)	ESTIMATED REMAINING CAPITAL COST ($ MILLION)
Blue Lake Expansion Hydro (Sitka, City of Sitka Electric)	Expansion will increase the capacity of the existing Blue Lake Hydro Project by an estimated 8 MW and increase the average annual energy from the project by approximately 34,500 MWh.	$96.5	$1.0 (Note 1)
Gartina Falls Hydro (Hoonah, IPEC)	New run-of-river project near Hoonah that will provide an estimated 0.44 MW of capacity and approximately 1,800 MWh of average annual energy.	$6.3	$5.5
Reynolds Creek Hydro (Hydaberg, Haida Energy and AP&T)	New storage project located that will provide an estimated 5 MW of capacity and approximately 19,300 MWh of average annual energy.	$28.6	$0.0 (Note 2)
Thayer Creek Hydro (Angoon, Kootznoowoo, Inc.)	New run-of-river project that will provide an estimated 1 MW of capacity and approximately 8,400 MWh of average annual energy.	$15.2	$6.0 (Note 3)
Whitman Lake Hydro (Ketchikan, KPU)	New storage project at an existing lake located that will provide an estimated 4.6 MW of capacity and approximately 15,900 MWh of average annual energy.	$25.8	$3.3 (Note 1)
Kake – Petersburg Intertie (Kwsan Electric Transmission Intertie Cooperative)	New 69 kV overhead and submarine cable transmission line connecting Kake and Petersburg.	$52.9	$52.9
Ketchikan – Metlakatla Intertie (Metlakatla Indian Community)	New 34.5 kV overhead and submarine cable transmission line connecting Ketchikan and Metlakatla.	$12.7	$8.2
	Totals	**$238.0**	**$76.9**

Notes:

1. Local bonding under way. Community request pending.
2. Authorized loans being negotiated.
3. $7.0 million Renewable Energy Round 5 award recommendation.

Table 21-1 Near-Term Implementation Action Plan – Capital Projects – SEAPA Subregion

CAPITAL PROJECTS		
DESCRIPTION	**TIME FRAME**	**ESTIMATED COST**

Committed Resources
• Kake-Petersburg Transmission Intertie (SEI-2)
  • Estimated total cost - $52,938,000
  • Previous grants – [1]
  • Remaining project cost - $52,938,000
• Ketchikan-Metlakatla Transmission Intertie (SEI-3)
  • Estimated total cost - $12,725,200
  • Previous grants - $4,500,000
  • Remaining project cost - $8,225,200
• Whitman Lake Hydroelectric
  • Estimated total cost - $25,830,000
  • Previous grants - $12,420,000
  • Remaining project cost - $13,400,000
	2013-2015
	
	2012-2013
	
	2012-2014
		$52,938,000
		
		$8,225,200
		
		$13,400,000

Replacement of Existing Diesel Generation Facilities	2012	$39,685,000
DSM/EE Programs	2012 2013 2014	$69,100 $169,900 $395,300
80 Percent Biomass Conversion Program	2012 2013 2014	$6,955,600 $7,079,600 $7,372,300
SEAPA Subregion Total (2012-2014)		**$136,290,000**

[1] The previous grants were not included in D. Hittle's estimated costs.

Table 21-2 Near-Term Implementation Action Plan – Capital Projects – Admiralty Island Subregion

CAPITAL PROJECTS		
DESCRIPTION	**TIMEFRAME**	**ESTIMATED COST**

Committed Resources
• Thayer Creek Hydroelectric
  • Estimated total cost - $15,201,100
  • Previous and pending grants - $9,201,100
  • Remaining project cost - $6,000,000
	2012-2016	$6,000,000

DSM/EE Programs	2012 2013 2014	$100 $100 $300
80 Percent Biomass Conversion Program	2012 2013 2014	$144,000 $108,600 $249,500
Admiralty Island Subregion Total (2012-2014)		**$6,502,600**

Table 21-3 Near-Term Implementation Action Plan – Capital Projects – Baranof Island Subregion

CAPITAL PROJECTS		
DESCRIPTION	**TIME FRAME**	**ESTIMATED COST**

Committed Resources
• Blue Lake Hydro
  • Estimated total cost - $96,500,000
  • Previous State funding - $49,000,000
  • Previous and pending bond net proceeds - $48,000,000
  • Remaining project cost - $1,000,000
	2012-2015	$1,000,000

Replacement of Existing Diesel Generation Facilities	2012	$20,220,000
DSM/EE Programs	2012 2013 2014	$20,800 $50,800 $118,100
80 Percent Biomass Conversion Program	2012 2013 2014	$2,663,700 $2,664,400 $2,825,900
Baranof Island Subregion Total (2012-2014)		**$29,563,700**

Table 21-7 Near-Term Implementation Action Plan – Capital Projects – Prince of Wales Subregion

CAPITAL PROJECTS		
DESCRIPTION	TIME FRAME	ESTIMATED COST

Committed Resources
• Reynolds Creek Hydroelectric
  • Estimated total cost - $28,581,500
  • Previous and pending grants and loans - $28,581,500
  • Remaining project cost - $0
	2012-2014	$0

DSM/EE Programs	2012 2013 2014	$100 $100 $200
80 Percent Biomass Conversion Program	2012 2013 2014	$1,339,800 $1,549,600 $1,757,100
Prince of Wales Subregion Total (2012-2014)		**$4,646,900**

APPENDIX E. Description of Strategist®

Black & Veatch used Ventyx's Strategist® optimal generation expansion model to evaluate the various alternatives and scenarios. Strategist® is a computer software system developed to support electric utility planning and decision analysis. In the Southeast Alaska IRP, Strategist® was used to evaluate supply-side resources, develop candidate resource plans, and conduct sensitivity analyses. Strategist® incorporates several modules, each designed for a specific application.

- Generation and Fuel (GAF)
- Load Forecast Adjustment (LAF)
- PROVIEW

A flexible control system ties the application modules together and automates data transfer from one module to another. A graphical user interface (GUI) serves as a menu-driven interface between the database, output results, and the user. The GUI allows quick examination of the data, full graphical capabilities, and immediate compilation of output results. The capabilities of each of these modules and their specific function are discussed in the following sections.

Generation and Fuel Module (GAF)

The Generation and Fuel Module (GAF) simulates power system operation using proven probabilistic methods. It provides production costs and generation reliability measures (i.e., reserve and emergency energy) that are essential to supply-side and demand-side planning. The GAF Module fulfills a strategic planning role in that it requires less computer resources than more detailed production costing models without sacrificing overall accuracy. All thermal generating units are dispatched using a computationally efficient probabilistic technique. Each generating unit is characterized with at least two capacity segments, corresponding heat rates, fixed and variable O&M expenses, maintenance requirements, and other operating specifications. The thermal unit segments are dispatched in economic order approximating the economic dispatch procedure of a system operator. The probabilistic dispatch technique yields production costs and system reliability indices. A built-in feature of the GAF Module is its generation expansion scheduling capability. Users can input targets for minimum reserve margins, maximum loss of load hours, maximum reserve margins, minimum renewable energy, and other necessary limits. The module also accepts an array of supply-side alternatives. The system will automatically schedule additions in such a way as to maintain the targets specified (see PROVIEW Module). Thermal units, hydro units, or purchase transactions may be included in the addition list.

Load Forecast Adjustment Module (LFA)

The Load Forecast Adjustment Module (LFA) is a multi-purpose tool for creating and modifying load forecasts and for evaluating demand-side management (DSM) programs. Using the LFA, a planner may address key issues related to future electricity demand and the impacts attributed to each customer group. Data is entered at the load group level and consists of a monthly forecast of non-coincident peak, energy requirements, and a typical annual shape. Once each load group has been processed, the resulting loads are transferred to the GAF Module. DSM programs can also be modeled in the LFA as load groups. Costs associated with these programs are input, as well as peak and energy reduction values. A load shape for the DSM program enables the LFA to modify the company load shape in all hours according to the effect the DSM program would have on energy use.

PROVIEW Module

The PROVIEW Module is a resource planning module which determines the least cost generation expansion plan for a utility system under a prescribed set of constraints and assumptions. PROVIEW incorporates a wide variety of expansion planning parameters, including alternative technologies, unit conversions, co-generators, unit capacity sizes, load management, marketing and conservation programs, fuel costs, reliability limits, environmental compliance options, and financial constraints in order to develop a coordinated integrated plan which would be best suited for the utility. PROVIEW works in concert with the GAF to simulate the operation of the utility system. Its optimization logic then determines the cost of reliability and the effects of adding resources to the system or modifying the load through DSM programs. PROVIEW provides numerous constraints for the user to reduce the number of options considered, including the maximum number of on alternatives to add, incremental number to add per year, minimum and maximum reserve margins, as well as others. Throughout the planning period, PROVIEW derives all of the possible combinations of supply-side alternatives that meet the selected constraints. Each plan is then subjected to an "end effects" calculation whereby the analysis approximates the capital and production cost of replacing the system (as it exists at the end of the planning period) in kind, for a given period beyond the planning period . The user has the choice of minimizing different costs when optimizing. Costs are accumulated by year in nominal dollars and then present valued for comparative analysis between plans. The planning period and end effects costs are summed to determine the study period cost of the plan. Plans are then ranked by their study period cost to determine the least-cost integrated resource plan.

APPENDIX F. Stakeholder Meetings

Organization	Location	Date
SEAPA	Ketchikan	February 10, 2011
Hoonah Wood Energy and District Heating Meeting	Hoonah	February 15, 2011
Tour of Icy Straits Mill	Hoonah	February 16, 2011
Tour of Geothermal Heated House	Juneau	February 16, 2011
Developers, Contractors, and Utilities	Juneau	February 16, 2011
IPEC	Juneau	February 16, 2011
Alaska Canada Energy Coalition	Juneau	February 17, 2011
SEAPA	Juneau	March 8, 2011
Southeast Conference Mid-Session Summit	Juneau	March 9-10, 2011
Petersburg Diesel Plant Tour	Petersburg	March 22, 2011
Blind Slough Tour	Petersburg	March 23, 2011
Petersburg Municipal Light & Power	Petersburg	March 23, 2011
Ketchikan Public Utilities	Ketchikan	March 24, 2011
Ketchikan Mayor and City Manager	Ketchikan	March 24, 2011
Alaska Ship & Drydock	Ketchikan	March 24, 2011
Mark Begich Town Hall Meeting	Ketchikan	March 24, 2011
Ketchikan Public Utilities	Ketchikan	March 25, 2011
Power Systems and Supplies of Alaska	Ketchikan	March 25, 2011
Kake Energy Workshop and Energy Fair	Kake	April 5, 2011
Kake Town Meeting	Kake	April 5, 2011
Kake School Presentation	Kake	April 5, 2011
Yakutat Power	Yakutat	April 7, 2011
Biomass Project Tour	Yakutat	April 7, 2011
Yakutat Wave Project Tour	Yakutat	April 7, 2011
Yakutat Diesel Plant Tour	Yakutat	April 7, 2011
Town Hall Meeting	Yakutat	April 7, 2011
Yakutat City Manager	Yakutat	April 8, 2011
Town Hall Meeting	Sitka	April 21, 2011
Alaska Wood Energy Conference	Fairbanks	April 24-27, 2011
SEAPA Board Meeting	Seattle	April 29, 2011
Town Hall Meeting	Ketchikan	May 23, 2011
Garn Boiler Tour	Thorne Bay	May 24, 2011
POWCAC Meeting	Coffman Cove	May 24, 2011
Haida Board Meeting	Hydaburg	May 24, 2011
Community Meeting	Hydaburg	May 24, 2011
Craig City Manager	Craig	May 25, 2011
Chip Boiler Tour	Craig	May 25, 2011
SEAPA	Ketchikan	July 11-16, 2011

Organization	Location	Date
City Assembly Meeting	Haines	July 26, 2011
Town Hall Meeting	Wrangell	August 15, 2011
Southeast Conference	Ketchikan	September 15-16, 2011
Rural Energy Conference	Juneau	September 30, 2011
SEAPA Board Meeting	Juneau	November 9, 2011
Governor's Energy Office	Anchorage	December 16, 2011
Legislator Briefing	Juneau	January 6, 2012
SEAPA	Juneau	January 6, 2011
Alaska House Energy Committee Hearings	Juneau	February 8 and 22, 2012
Southeast Conference Mid-Session Summit	Juneau	March 12-14, 2012