

**ALASKA STATE LEGISLATURE
HOUSE SPECIAL COMMITTEE ON ENERGY**

March 11, 2010
3:19 p.m.

MEMBERS PRESENT

Representative Bryce Edgmon, Co-Chair
Representative Charisse Millett, Co-Chair
Representative Nancy Dahlstrom
Representative Kyle Johansen
Representative Jay Ramras
Representative Pete Petersen
Representative Chris Tuck

MEMBERS ABSENT

OTHER LEGISLATORS PRESENT

Representative Carl Gatto
Representative Craig Johnson
Representative Bob Herron

COMMITTEE CALENDAR

OVERVIEWS ON COMPARATIVE RAILBELT ENERGY PROJECT ANALYSIS

- HEARD

PREVIOUS COMMITTEE ACTION

No previous action to record

WITNESS REGISTER

JIM STRANDBERG, Project Manager
Alaska Energy Authority (AEA)
Department of Commerce, Community, & Economic Development
(DCCED)
Anchorage, Alaska

POSITION STATEMENT: Discussed the Railbelt Integrated Resource Plan (RIRP) project, along with a PowerPoint presentation titled, "A Comprehensive Plan for the Alaska Railbelt; gave a PowerPoint presentation titled, "Susitna Hydroelectric Project."

KEVIN HARPER, Project Manager
Black & Veatch

Issaquah, Washington

POSITION STATEMENT: Participated in the PowerPoint presentation titled, "A Comprehensive Plan for the Alaska Railbelt."

BOB BUTERA, Civil Engineer

HDR Alaska

Anchorage, Alaska

POSITION STATEMENT: Assisted in the presentation titled, "Susitna Hydroelectric Project."

ERIC YOULD, Program Director

Chakachamna Hydropower Project

TDX Power, Inc.

Anchorage, Alaska

POSITION STATEMENT: Gave a PowerPoint presentation titled, "Chakachamna Status Report."

BOB SWENSON, Project Manager

Alaska In-State Gas Pipeline Project

Department of Natural Resources (DNR)

Anchorage, Alaska

POSITION STATEMENT: Gave a PowerPoint presentation titled, "In-State Gas Pipeline Project Update."

ETHAN SCHUTT, Vice President

Land and Energy

Cook Inlet Region Inc. (CIRI)

Anchorage, Alaska

POSITION STATEMENT: Gave PowerPoint presentations on Fire Island Wind and Underground Coal Gasification projects.

PAUL THOMSEN, Director

Policy & Business Development

Ormat Technologies, Inc. (Ormat)

Reno, Nevada

POSITION STATEMENT: Gave a PowerPoint presentation titled, "The Mount Spurr Geothermal Project."

ACTION NARRATIVE

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CO-CHAIR CHARISSE MILLETT called the House Special Committee on Energy meeting to order at 3:19 p.m. Present at the call to order were Representatives Millett, Edgmon, Dahlstrom, Petersen, and Johansen. Representatives Ramras and Tuck arrived as the

meeting was in progress. Also in attendance were Representatives Gatto, Johnson, and Herron.

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Overviews On Comparative Railbelt Energy Project Analysis

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CO-CHAIR MILLETT announced that the only order of business would be overviews on comparative Railbelt energy project analyses. The 20-minute overviews also include responses to seven questions that were posed by the committee to each of the invited participants.

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JIM STRANDBERG, Project Manager, Alaska Energy Authority (AEA), Department of Commerce, Community, & Economic Development (DCCED), noted that the state sponsored integrated planning process came about through the efforts of Representative Craig Johnson and Senator Joe Thomas; in fact, \$1 million was directed to this study, and \$1.5 million was directed to analysis of the Susitna Hydroelectric (hydro) project. Railbelt utilities also contributed to the completion of the plan. The goal of AEA was to create a plan useful within the Greater Railbelt Energy and Transmission Corporation (GRETC) concept, and supported by the Railbelt utilities. Mr. Strandberg explained that an integrated resource plan [for energy] is "a grouping of defined power generation and transmission line projects arrayed on a time schedule for development that will allow for leased, long-run costs of wholesale power at acceptable levels of reliability." The analysis also included fuel supply portfolios, as well as transmission analysis. Mr. Strandberg concluded that the role the Railbelt Integrated Resource Plan (RIRP) plays in the creation of GRETC is to define what energy projects, on an economic evaluation process, should be constructed for the future of the Railbelt. He presented slide 2 and said the Railbelt Electrical Grid Authority (REGA) was a business structure analysis funded by the legislature that formed the business model for GRETC, thus the major components for GRETC were the REGA study of business structure, and the RIRP that identified actions and projects.

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KEVIN HARPER, Project Manager, Black & Veatch, clarified the following four points regarding the plan: (1) an integrated resource plan is not a state energy plan; (2) it is a document that identifies the direction "the region ought to go," albeit not at a level of detail, such as the site for a wind project; (3) any integrated resource plan (IRP) should be updated every three to five years, especially as uncertainties and risks influence the results of the report; (4) there are four specific scenarios, 1A, 1B, 2A, and 2B. He further explained that the designation of "A" indicated "least-cost," and the designation "B" indicated "forced ... renewables," and thus determines whether there is incremental cost associated with achieving the target of 50 percent renewables by 2025. Further, scenario "1" assumes today's load and some growth, and scenario "2" assumes a load increase of 50 percent by 2025, and an increase of an additional 50 percent by the year 2040.

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MR. HARPER advised that one issue with energy for the Railbelt is its size; in fact, the Railbelt is too small to economically justify many of the proposed projects. He presented slide 3, Scenario 1A/1B, that illustrated the energy output by technology [source] over a 50-year period. Mr. Harper pointed out that the resource plans for scenarios 1A and 1B are the same, therefore, based upon today's load with some growth, there is no incremental cost associated with reaching the target of 50 percent renewables by 2025. In fact, 63 percent of the energy generation is by renewables by 2025. This percentage is achieved by the increase in hydro generation. Conversely, there is a corresponding reduction in the use of natural gas. Mr. Harper stressed that the least cost path is dependent on renewables, such as the Chakachamna hydro project, coming on-line. Importantly, natural gas remains a base-load source of generation.

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REPRESENTATIVE RAMRAS recalled that representatives from the Office of Fossil Energy, U.S. Department of Energy (DOE), identified natural gas as the "bridge fuel" for the next 50 years. He pointed out that on slide 3, natural gas is shown as a modest fraction of the projected energy portfolio. He asked whether the graph is reflective of gas pipeline projects such as Denali-The Alaska Gas Pipeline, the Alaska Gasline Inducement Act (AGIA), or in-state gas.

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MR. HARPER responded that slide 3 is based upon the base-case gas supply and price forecast. To develop the forecast, his company relied on currently published studies, discussions with state agencies, producers, and utilities, and a probabilistic-based analysis of supplies and prices. Looking at the supply of energy, the forecast was also based on the following: most recent forecasts from the Department of Natural Resources (DNR) on the resources remaining in the Cook Inlet; the assumption that a generic in-state pipeline will be operational in 2015-2016; the assumption that a source of imported liquefied natural gas (LNG) would be available for the short- and long-term.

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REPRESENTATIVE RAMRAS has heard that Black & Veatch wants to undermine discussion about an in-state gas pipeline.

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MR. HARPER relayed that the [forecasted] non-Cook Inlet supplies of natural gas are from the North Slope. He advised the issue is the assumption of the price of the gas; his firm assumed the price of the gas from the North Slope to Southcentral will reflect the world market price, "with world LNG prices as being essentially a cap, if you will, as to what prices would be." In Black & Veatch's assessment, there would be enough gas to meet the needs of the Railbelt, but at a market price. He opined those assumptions are also held by DNR.

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REPRESENTATIVE RAMRAS asked:

What kind of factors did you have for the importation of LNG? When do you see Alaska, which is so energy-rich, importing gas, and at what price are we going to import gas? And give me, [information] other than prevailing indices of world gas prices: I need you to break it down...

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MR. HARPER said the gas supply after 2015-2016 is essentially from Cook Inlet and the North Slope. The Cook Inlet pricing of new gas, plus the pricing of the North Slope gas, would be based

on world market prices; therefore, the gas supply does not include LNG long-term, except in the near-term as a bridge fuel.

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REPRESENTATIVE RAMRAS re-stated his question.

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MR. HARPER answered from 2015-2016 on, the gas is coming from Cook Inlet and the North Slope. The LNG price is used as a benchmark for what the price would be, after taking out transportation.

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REPRESENTATIVE RAMRAS asked whether Black & Veatch is advocating for the importation of LNG to Alaska.

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MR. HARPER said his firm has no position on that. In further response to Representative Ramras, he said the plan "essentially is in-state gas."

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MR. HARPER continued speaking about slide 3, and noted that the capital investment for this portfolio of projects is about \$9 billion over 50 years. Based on the assumptions used, the model chose large hydro, and the version chosen was the Chakachamna project over the Susitna project. However, he pointed out the Susitna project has been evaluated since the early 80's, and the cost estimates are "solid." The assumptions around Chakachamna, such as permitting and costs, were reviewed in a limited way, and he was unsure of their accuracy.

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REPRESENTATIVE GATTO assumed the Chakachamna project is simpler, easier, and cheaper, but results in less power.

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MR. HARPER further explained that the Susitna cost and output estimates used in the study were based upon a study done by HDR Alaska. HDR took work done in the 1980's, and determined the

impacts due to inflation. The HDR study also looked to "right size" the Susitna project for the region, because the 1980's work assumed the energy load for the Railbelt in 2010 would be 8,000 megawatts, and it is actually less than 1,000 megawatts.

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CO-CHAIR MILLETT asked for the reason the study chose a specific hydro project.

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MR. HARPER stated there are generic and specific identified projects in the portfolio. In the case of hydro, there was Susitna, Chakachamna, Glacier Fork, and three generic potential projects. It made sense to identify the projects that were under development; in fact, not including the identified projects has a negative effect on the quality of the work, especially for hydro, because the costs and operating parameters are site-specific. Mr. Harper then presented slide 4 that listed the generation projects in the preferred resource plan based upon scenario 1/B. These are the projects that would be operating and generating electricity by 2020. The first item was Demand Side Management/Energy Efficiency (DSM/EE) programs. He explained that DSM/EE programs were included because of the assumption that when residential or commercial customers reduce their use of energy by investing in a high efficiency appliance, there is an incremental cost. Also, there was the assumption that the utility, GRETC, or the state, will pay 50 percent of that cost. These DSM/EE programs equate to about 8 percent of the total energy requirements of the region. Although in certain states, energy efficiency is at 15-20 percent, the study uses an 8-10 percent rating for Alaska due to limited data, the isolated network, severe weather conditions, and the limited use of electric space heating. The next project was the Nikiski Wind project that is under development and would provide 15 megawatts of power. The next item was the Healy Clean Coal Project (HCCP).

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REPRESENTATIVE RAMRAS asked for the amount of the average kilowatt cost for the Railbelt that was used in the draft report.

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MR. HARPER said the draft report contained an error, and the actual estimate is an average, wholesale cost of power of 17.5 cents per kilowatt hour (kWh) in nominal dollars, or about 12 cents in 2009 dollars.

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REPRESENTATIVE RAMRAS asked when Black & Veatch caught the mistake.

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MR. HARPER said the mistake had no impact on the analysis in terms of the selection of the resources. The kWh estimate was calculated after the resources were selected and the models run, thus it did not impact the resource selections made in the draft, or the final report. In further response to Representative Ramras, he said the mistake was found when the draft report was released. The models were re-run to incorporate changes from the public comment period and the correction to the estimate.

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REPRESENTATIVE RAMRAS asked for the month and year of the period of the distortion to the models.

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MR. HARPER said there was no distortion in the models because "the calculation was done outside of the models and is an output." He further explained that the change was made within a six-week period when Black & Veatch went from the draft to the final report, and after a four-week public comment period. Mr. Harper returned to the list of preferred resource projects and said the Fire Island Wind project is expected to begin operations in 2012, providing 54 megawatts. The remainder of the projects are: the Southcentral Power Plant, that is being developed by Chugach Electric Association (Chugach Electric) and Anchorage Municipal Light & Power (ML&P), providing 180 megawatts; Glacier Fork Hydro that is expected in 2014, providing 75 megawatts; two municipal solid waste (MSW) projects that are expected in 2015 and 2017, providing 22 megawatts and 4 megawatts; Golden Valley Electric Association (GVEA) North Pole retrofit project; Mt. Spurr Geothermal projects expected in 2020 and 2022, providing 50 megawatts from Unit 1 and 50 megawatts from Unit 2. Also recommended was the parallel pursuit of the

Chakachamna/Susitna/Glacier Fork hydro projects. He reiterated that the next step for Susitna is development, and the next steps for Chakachamna and Glacier Fork are analyses to determine whether the projects can be built. The final item was a full list of 19 identified transmission projects that total \$1.6 billion. Slide 5 was a list of near-term transmission projects that are needed within the next five years to maintain the reliability of the existing system. The near-term transmission projects are: Soldotna-Quartz Creek transmission line for \$126 million; Quartz Creek-University transmission line for \$165 million; Douglas-Teeland transmission line for \$63 million; Lake Lorraine-Douglas transmission line for \$80 million; static-var compensators (SVCs); Southern Intertie study for \$1 million. Also included is a battery energy storage system (BESS) which is a generic program to address the issue of frequency regulation.

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MR. HARPER presented slide 6 that illustrated the 8 percent impact of DSM/EE programs on the required energy load. Slide 7 showed the wholesale cost of power, in 2010 dollars, for selected scenarios. He pointed out there are two sensitivity cases that have power costs less than the preferred resource plan 1A/1B. The first is the scenario that assumes there are no CO2 taxes; however, future CO2 taxes are included in the base-case. Mr. Harper advised that three years from now, the state will have a better sense of whether there will be CO2 federal legislation and the costs thereof. The other sensitivity case doubles the impact of DSM/EE on the energy load. Also shown on slide 7 was the sensitivity case with the cost of power using Susitna hydro instead of Chakachamna hydro; therefore, in 2025, under traditional utility ratemaking practices, there is a jump in the cost at the point Susitna comes on-line. Slide 8, he said, was the "capital gap slide." In conjunction with the report, AEA hired Seattle-Northwest Securities Corporation (SNW) to look at the ability of the current Railbelt utilities to finance future capital infrastructure, and to mitigate the rate impact thereof. The graph showed that the remaining high and low debt capacity of all of the six utilities together is \$2-\$4 billion. Also illustrated were the cumulative capital expenditures of the preferred resource plan that reach about \$9 billion in 2059. Therefore, the capital gap is a difference of about \$5 billion that according to SNW, the six utilities cannot finance independently.

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MR. HARPER presented slide 9 that was a comparison of costs between plan 1A/1B and plan 1A/1B with committed units. He described committed units as projects that are currently being planned or developed by the utilities, but that were not selected as regional resource projects, such as Healy Clean Coal and the Southcentral power plant. Mr. Harper explained that the utilities are moving forward with these projects because of the uncertainty about the formation of GRETC, or another regional entity. Although the chart shows a difference about \$450 million, the report concludes that the difference would be greater, because the independent utilities would not see the impact of the 8 percent DSM/EE. Moreover, the independent utilities may not be able to finance the needed \$1.6 million build-out to the transmission system. Finally, slide 10 showed the results of SNW's financial analysis on alternative financing available to the utilities. He reiterated that the utilities cannot "finance the future on their own." However, the base-case used standard capital market financing on all of the projects thus SNW considered the following alternatives: collection of a one cent per kilowatt ratepayer benefit surcharge; "pay-go" financing; construction work in progress (CWIP) financing; state financial assistance such as a \$2.4 billion zero-interest loan. He emphasized that SNW is not advocating for any of these alternatives. Mr. Harper then called attention to the results of the analysis: a base-case maximum rate of thirteen cents per kWh and average rate seven cents per kWh; an alternative case maximum rate of eight cents per kWh and average rate six cents per kWh. He stressed that these numbers represent the incremental cost associated with the capital of the projects only. Also, although the average rates are almost the same, the big difference in the maximum rate is tied to the cost of the Susitna hydro project in 2025. Mr. Harper concluded that there are options that allow the cost of the \$9.1 billion capital program to be spread out along generations.

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REPRESENTATIVE GATTO expressed his concern about ratepayers paying a one cent surcharge for years without receiving any benefit.

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MR. HARPER said the surcharge and CWIP would have ratepayers begin to pay before the project is running.

REPRESENTATIVE GATTO asked whether those who are charged without benefit could be reimbursed.

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MR. HARPER said that is a policy call.

REPRESENTATIVE GATTO asked where nuclear power fits in the plan.

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MR. HARPER acknowledged that nuclear power was considered as a small modular option, but was not chosen as a resource for the future, based on economics.

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REPRESENTATIVE GATTO heard that nuclear would cost less than eight cents per kWh, and has the other benefits of clean air, no CO2 capture, continuing base-load, and long life. He asked whether Black & Veatch decided to eliminate nuclear power from the study.

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MR. HARPER explained that there are two types of nuclear options, conventional and new technology. Conventional nuclear plants are too large for the Railbelt region. The newer technologies are promising, but are not commercially available based on cost estimates. He opined "it is a technology that's worth considering in the future, but it is not commercially economical, in our view."

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REPRESENTATIVE JOHNSON referred to slide 4 and asked for clarification on the process.

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MR. HARPER explained that the preferred resources were chosen based on the output of two specific models, both of which are based on economic selection. One model determined which resources are the best to build, and the other determined how much is used of each resource. Both models are based upon

assumptions with regard to capital, operating, and fuel costs for the different technologies.

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REPRESENTATIVE JOHNSON re-stated his question regarding when the estimated cost of power becomes part of the model.

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MR. HARPER said the five cent and seventeen cent estimates are calculations of what the total average wholesale cost of the entire resource plan is, based upon which resources are chosen, and how much the resources are used. That modeling comes from capital, operating, and fuel cost assumptions for each of the technologies. Therefore, the selection of resources was based upon many detailed economic assumptions for each technology. From there, came the calculation of the overall average cost of power, for example, the five cent and seventeen cent estimates. Mr. Harper said, "... this list says, that based upon the input assumptions that we use for all of the technologies, these are the most cost-effective resources to bring on in the first ten years of the plan."

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REPRESENTATIVE JOHNSON referred to slide 7, and asked for an explanation of the cost of the first year of Susitna, and the reduction of that cost after only one year.

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MR. HARPER advised that the curve in the cost for the Susitna project is the result of traditional ratemaking methodology in that ratepayers are not charged until a project is generating power. Therefore, in the initial year, there is a jump in the cost due to depreciation. Furthermore, a large hydro project such as Susitna has high up-front capital costs, and low ongoing costs. Regarding the selection of the resources, the model was based on 50 years, with a fixed-charge rate, and based upon the life of the technology. For example, for natural gas, the fixed-charge rate was based on 30 years, and for large hydro, the fixed-charge rate was based on 100 years; thus the capital costs are recovered within the appropriate time period. This led to the selection of Chakachamna, because the project was not as large as Susitna, but still has a 100-year period of recovery of capital in the economic analysis.

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REPRESENTATIVE JOHNSON asked for an explanation of the recovery term.

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MR. HARPER responded that the cost associated with capital is based on the life of the project. Therefore, the economics of Susitna and Chakachamna are based upon a 100-year recovery of capital cost. The modeling horizon was 50 years, and the model factors in the value of projects that extend beyond 50 years.

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REPRESENTATIVE JOHNSON observed this may be a comparison of apples and oranges.

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MR. HARPER opined there would not be a material change in resources selected for a model of 50 or 100 years.

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REPRESENTATIVE JOHNSON asked whether a model has been run based on a 1984 construction of Susitna.

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MR. HARPER said no. However, 2008 actual results from the individual utilities were used.

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CO-CHAIR EDGMON asked about the cost to update the model every three to five years.

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MR. HARPER observed that the model is not proprietary to Black & Veatch, and new files could be run for a fraction of the cost by the utilities, consultants, or GRETC, if staff is available.

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REPRESENTATIVE RAMRAS asked for the cost of the report. He also asked for additional testimony at a later date addressing the deliverability and cost of natural gas during the first five years.

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REPRESENTATIVE JOHNSON assumed the model was created at a time of extraordinary high costs of steel and labor.

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MR. HARPER assured the committee the report was not based at the peak of prices; however, a decline in prices will result in a lower total cost, but would not necessarily have a material effect on the choice of resources.

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REPRESENTATIVE JOHNSON asked whether the change in prices would cause projects to be added or removed from the list.

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MR. HARPER said he was unsure. He guessed that projects selected for the first 10 years would not change much.

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REPRESENTATIVE JOHNSON asked whether there are projects that are right at the line.

MR. HARPER said he was unsure without further study.

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REPRESENTATIVE JOHNSON encouraged additional research into projects that "were on the bubble."

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CO-CHAIR MILLETT read the seven questions posed to the invited presenters [original punctuation provided]:

- 1) Project timeline-completion date and the date power will be turned on:

- 2) Total cost of project and funding request (state revenue):
- 3) Transmission needs to grid - who pays?:
- 4) Cost of power to consumer (KWH):
- 5) Amount of power supplied to railbelt:
- 6) Likelihood of completion:
- 7) Permitting roadblocks-Environmental challenges:

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MR. STRANDBERG said he was representing AEA on the Susitna Hydroelectric (Hydro) Power Project. He pointed out that AEA was participating not as a project advocate, but as a project custodian. Mr. Strandberg reminded the committee that in the '80s, \$132 million was expended to develop the Susitna Hydro Power Project culminating in a Federal Energy Regulatory Commission (FERC) permit application. Although the project was halted by the legislature in 1986, remaining from the earlier study are conceptual designs, records, and records of extensive field work for environmental and geotechnical conditions in the Susitna basin. He noted that the work undertaken in the last two years has been to understand the body of the previous work, and from that AEA has developed a project concept and cost estimate that is right-sized for the needs of the Railbelt for the next 50 years.

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MR. STRANDBERG related that AEA has found the work done on the project in the '80s to be "durable and sound, and worthy of use as we, at the direction of the legislature, review this project." He noted that the Susitna Hydro Project is a high first-cost project, with significant power availability benefits and expansion capability. Relatively speaking, the project has low development risk. Mr. Strandberg also noted that the work done on the project was coordinated with the RIRP contractor, thus the parties used the demand curve over the 50-year period to look at the potential sizes of the projects proposed.

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BOB BUTERA, Civil Engineer, HDR Alaska, informed the committee HDR Alaska was contracted about two years ago to AEA to look at the Susitna hydro project. The first phase of the study began before the RIRP study, and his firm looked at the original project proposed in the '80s and reevaluated the cost estimate of \$5 billion. Mr. Butera noted the new study also included an additional 20 years of stream flow records. At the time of the RIRP process, HDR Alaska worked with Black & Veatch and AEA. The project is located about midway between the Southcentral and Fairbanks regions of Alaska, and would service all of the utilities in the Railbelt. Slide 4 was a map that illustrated three potential dam sites on the Susitna River: Watana Dam; Devil Canyon Dam; High Devil Canyon Dam. Slide 5 showed eight alternative projects for the river.

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MR. BUTERA presented slide 6 which was a chart summarizing the results of the study on the following factors: alternative; dam type; ultimate capacity of megawatts; construction cost in billions of dollars; energy generated in gigawatts per hour per year; schedule in years from the start of licensing. The Low Watana Expandable project was the option selected; in fact, it is basically the same project that was proposed in the mid '80s. The project has a rock fill dam, a 600 megawatt capacity, and a construction cost of just under \$5 billion in today's dollars. Slide 9 listed the following conclusions about the Susitna project: of the renewable resources it is the most studied and best understood; the project is considered to be technically feasible even when compared with new technology; there is potential to expand in stages and meet future loads; large hydro provides an energy source to stabilize the grid; environmental risks can be resolved, for example all of the projects are upstream of the passage of anadromous fish due to the Devil Canyon rapids; seismic risk is manageable through design; it is a long-term and stable source of power.

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REPRESENTATIVE GATTO observed that the river has a lot of silt. He expressed his concern about the accumulation of silt in the river, and potential damage to the turbines.

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MR. BUTERA said those issues were studied in the 1980's and the conclusion was that the heavy silt will drop out at the head of

the reservoir, and the small fines will reach the turbines; in fact, the storage of a reservoir is divided into active and dead storage, and the study estimated that less than 10 percent of the dead storage would be filled by silt in 100 years.

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MR. BUTERA then responded to the committee's questions. The project timeline is 15 years from the start of licensing, assuming there is no major litigation. The total cost of the Low Watana Expandable Dam project is just under \$5 billion. The project cost includes transmission to the grid at the existing power line from Anchorage to Fairbanks, and this power line would be upgraded by a separate project. The cost of power to consumers [is fifteen cents per kWh]. The amount of power supplied to the Railbelt is 2,600 gigawatt hours per year, which is about 40 percent of the current load. There is a high likelihood of completion. The next steps are to look at the design, and concurrently engage stakeholders, agencies, fish and wildlife [agencies], and communities. Mr. Butera concluded that the project must bring forward all of the work that was done in 1985, and look for new issues. This would be done by a "resource workgroup" working separately from the FERC process in order to understand the issues prior to the FERC application.

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REPRESENTATIVE JOHNSON asked whether financing was considered.

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MR. BUTERA said the study of financing was done through the RIRP.

REPRESENTATIVE JOHNSON asked whether the cost of carbon credits was included in the estimated power cost to consumers.

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MR. STRANDBERG said the cost is the "basic wholesale levelized ... power rate assuming 2,600 gigawatt hours of power produced over the year and the total construction cost, and it basically assumes a financing approach which ... is similar to the Bradley Lake model."

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REPRESENTATIVE JOHNSON referred to the "advantages, in terms of carbon, that hydro delivers." He asked whether there is an allowance for using carbon credits as a bonding mechanism to finance hydro projects.

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MR. STRANDBERG advised that the study did not go that far; in fact, there was an effort to keep the comparisons "apples to apples." An answer to Representative Johnson's question will be provided.

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REPRESENTATIVE JOHNSON expressed his understanding that the capital cost of a coal fired plant was figured without any consideration of upcoming carbon issues.

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MR. STRANDBERG explained that the integrated plan assumed a CO2 tax for all fossil fuels; however, there was no tax assumed for the renewable energy projects. Furthermore, the base-line analysis included CO2 and carbon taxes for all of the fossil fuel projects. The study looked at the possibility of no carbon tax in a sensitivity analysis, and in the data one can see the effect of a carbon tax on the cost of power.

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REPRESENTATIVE JOHNSON requested an opportunity to further explore this issue.

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ERIC YOULD, Program Director, Chakachamna Hydropower Project, TDX Power, Inc., informed the committee TDX Power is the electric utility that holds a FERC permit for the assessment and development of the Chakachamna Hydropower Project. The Chakachamna Hydropower Project was originally considered in the late 1940's by the Department of Interior|Bureau of Reclamation and by the U.S. Army Corps of Engineers in the late 1970's. The project was then considered by the Alaska Power Authority as an alternative to the Susitna dam project, along with Bradley Lake and other power generation projects. At that time, it was determined that Chakachamna and Bradley Lake were worthy projects; however, Bradley Lake was already authorized by the

federal government, thus Chakachamna was put on the shelf, although it was as economically desirable as Susitna. Mr. Yould explained that this project is a high head lake with a tap, and a power tunnel that brings water to a power plant at a lower elevation. The elevation at Chakachamna Lake is about 1,000 feet, and the project would tap the lake and bring the water through a 12-mile power tunnel to the underground powerhouse in the MacArthur drainage basin, thus developing 300 megawatts of power that is equal to about 25 percent of the use in the Railbelt today. The cost of the project is \$1.7 billion in today's dollars. Originally the project included a dam; however, the present project uses the lake as a reservoir without the construction of a dam. The powerhouse would be located 40 miles from the transmission line at the existing Chugach Electric Beluga substation. Mr. Yould displayed a map showing the Beluga substation, the natural gas transmission line under Cook Inlet to Anchorage, and the plan of development for the Chakachamna project. He noted that the project would divert about 80 percent of the water flowing into the Chakachamna Lake, which is a major environmental issue that must be investigated.

[5:06:06 PM](#)

MR. YOULD displayed a schematic figure of the intake and gate shaft section, and further described the lake tap and power tunnel. He pointed out that this technique has been done in Alaska at the Snettisham hydro dam, the Lake Tyee hydro plant, the Lake Dorothy hydro plant, and the Eklutna hydro power plant. The surface elevation of the lake would be drawn down to about 80 feet to accommodate winter power generation, and in the spring the lake would fill and stay full all summer. He displayed a plan of the powerhouse. In the winter, to ensure downstream flow and the successful migration of fish, there would be a two-mile long fish passage tunnel, but in the summer normal fisheries migration should continue without artificial means. On the issue of land ownership, he noted that most of the land around Chakachamna Lake and river is state land, except for Lake Clark National Park, and the transmission lines will cross over a portion of land owned by Cook Inlet Region, Inc., (CIRI).

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MR. YOULD further addressed the fish migration issue. There is a fish run up the Chakachamna drainage basin, and a 1982 study indicated 78,000 sockeye salmon entered the basin. He expressed confidence that this migration would be protected. Regarding

wildlife in the area, there are 56 species of birds and 16 species of mammals, and although none are on the endangered species list, the potential impact to the Beluga whale in Cook Inlet may become a factor. Geotechnical considerations in the area are the Castle Mountain fault, the Mount Spurr volcano, and the possible movement of four glaciers. He showed slides of the topography of the site of the vertical shaft and gated structure at the outlet of the lake, and the site of the McArthur powerhouse. Mr. Yould turned to the subject of development costs and stated that TDX Power has spent about \$2.5 million over the last three years. In addition, he estimated that a total of \$30 million is needed to complete the permitting process over a period of five years, including additional fisheries work. Beyond that, construction costs are estimated to be \$1.7 billion, including \$90 million for the transmission line. Mr. Yould concluded that using the AEA model—a 50-year assessment and 5 percent money, no equity, and set operational costs—the cost of power was in the range of six cents to eight cents per kWh. However, using expected higher costs of money, operations, and management, a more realistic estimate is nine cents per kWh. He opined that a net present worth levelized cost of power for Chakachamna is less than Susitna. The schedule for the project is as follows: five years for preliminary permits and the FERC licensing; forty-eight to fifty-four months for project construction; power on-line in 2019.

[5:16:08 PM](#)

REPRESENTATIVE JOHNSON asked for details about the 2006 FERC permit.

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MR. YOULD responded that in 2006, FERC issued a preliminary permit for a three-year exclusive right to assess the project. Although that permit expired in 11/09, TDX recently applied for and received a second permit for another three years.

[5:16:57 PM](#)

REPRESENTATIVE RAMRAS recognized Mr. Swenson for his work in geothermal energy.

[5:18:08 PM](#)

BOB SWENSON, Project Manager, Alaska In-State Gas Pipeline Project, Department of Natural Resources (DNR), said he accepted the project manager position in 1/10 and expressed his excitement about the project. Mr. Swenson advised that although this project is not far enough along in the process of cost estimation to have all of the answers to the committee's questions, all of the information will be provided as soon as possible, perhaps in May or June. He presented slide 2 which illustrated that the historical production of natural gas in the Cook Inlet levels off in the period between 2011 and 2012. Also shown are possible reserves based on analyses, well logs, and seismic data. Slide 3 showed the historical daily gas usage for power and heating in Southcentral. The demand for power ranged between approximately 370 million cubic feet per day (MMcf/d) in winter and 110 MMcf/d per day in summer. It is important to know that spikes in demand are a problem for producers and consumers, as it is very expensive to provide for deliverability all year when demand is fluctuating. In the late 1960's, an industrial infrastructure was developed to utilize the gas throughout the year and industry provided the basin with relatively inexpensive gas for many years. He mentioned his experience in resource assessments and displayed slide 4 which illustrated thirty-five trillion cubic feet (TCF) of natural gas reserves in the North Slope region, and two TCF of natural gas available in Cook Inlet, as of 2005. Slide 5 illustrated known gas reserves in the Prudhoe and Kuparuk regions, and many other possible gas reserves in the "gas-rich basin."

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REPRESENTATIVE RAMRAS observed that Anadarko Petroleum Corporation (Anadarko) has suspended drilling in the Gubik area.

[5:24:23 PM](#)

MR. SWENSON clarified that Anadarko is evaluating data acquired from wells recently drilled. Slide 6 illustrated undiscovered conventional gas potential of 119 TCF in the National Petroleum Reserve in Alaska (NPRRA) and other large potential areas offshore. Slide 7 illustrated potential gas hydrates in the North Slope area that could be up to 85 TCF. Mr. Swenson spoke of resource activity in sub-permafrost hydrates and shale gas.

[5:26:34 PM](#)

REPRESENTATIVE RAMRAS asked who is participating in the resource activity.

[5:26:47 PM](#)

MR. SWENSON answered Alaskans and the U.S. Geological Survey, along with the state. Mr. Swenson stressed the importance of infrastructure to the development of potential resources, and the small diameter gas pipeline would be part of that infrastructure. Slide 8 showed potential pipeline routes for a 24-inch diameter pipeline from the North Slope to Cook Inlet. He noted that the information presented is part of the work performed in the previous fiscal year, including a study of the Richardson Highway and Parks Highway spur routes, stand-alone routes, and pre-build. Slide 9 listed the purpose of the state's effort as follows: evaluate a stand-alone gas pipeline project that transports gas from the North Slope to tidewater in the Cook Inlet, with off-takes points for Fairbanks and resource development; provide a back-up plan for the large diameter gas line with spur lines to Southcentral for in-state use; reduce risk to potential project by acquiring major permits, determine cost of transport and economic feasibility; prepare permit and project data package to transfer project to pipeline developer. Mr. Swenson further explained that the methodology of the project is to reduce risk by defining costs, acquiring major permits, and acquiring letters of intent to bring buyers and sellers together and to let the marketplace decide the scope and timing. He related that the work completed includes alternative route analysis, the initial project description for permitting, the commercial group scoping document, the initial review of ENSTAR Natural Gas Company Capital Cost Estimate - Pipeline, and that all major permits have been applied for. The work underway includes updating pipeline cost estimates, developing cost of facilities and the cost of transport analysis, preparing detailed project descriptions, continued engineering support for the environmental impact studies (EIS) and rights-of-way (ROW) processes, identifying commercial entities to finalize costing and permitting for construction sanction, developing data package for full economic analysis, and working with the producer group and identifying new market potential.

[5:31:51 PM](#)

MR. SWENSON turned to the subject of facilities scenarios, and advised that one early option for the in-state gas pipeline was a line through the Gubic field. That option has now been identified as an alternate route, rather than the primary option. The focus now is on gas from the Prudhoe Bay Unit, under four scenarios. The chemistry of the gas from the

Foothills area is similar to Cook Inlet gas in that it is a methane gas and is dry and very clean, and is "pipeline ready essentially." Alternatively, the North Slope gas will require significant conditioning thus the project is looking at four different configurations of pipe that vary with gas handling facilities and gas cleaning facilities at the North Slope, or at Cook Inlet, as well as pulling untreated gas with stabilizers down the pipe. Mr. Swenson stressed that the facilities are very important in order to understand the different options and the associated costs. In addition, each scenario is evaluated at 250, 500, 750, and 1000 MMcf/d, thus the study will evaluate 16 different scenarios simultaneously. In response to a question from Representative Tuck, he said all of the scenarios take North Slope gas from the Prudhoe Bay Unit reserves.

[5:34:17 PM](#)

CO-CHAIR MILLETT asked whether the in-state gas pipeline study would include scenarios "way out of the AGIA requirement of nothing more than half a Bcf [transported] a day."

[5:34:52 PM](#)

MR. SWENSON clarified that the study looks at each scenario to see the volumes and the economics associated with each of the volumes. This is a back-up plan to the AGIA process; in fact, in the alternate analysis, it is clear the cost of the pipeline as a spur line is less than a stand-alone pipeline, however, there is a risk associated with the completion of AGIA. Therefore, Mr. Swenson stressed that even the 750 MMcf/d and 1 billion cubic feet per day (Bcf/d) evaluations must be considered in case the spur line does not work. He acknowledged that if a pipeline is built with AGIA, and the in-state line is completed first, there will be a penalty for gas over 500 MMcf/d.

[5:36:09 PM](#)

CO-CHAIR MILLETT asked how long the project would wait on the AGIA process.

[5:36:32 PM](#)

MR. SWENSON expressed his understanding that the current timeline shows the sanctioning date is 2014, following the first and second open season.

[5:36:55 PM](#)

CO-CHAIR MILLETT assumed the administration would wait to go forward on the in-state gas line until 2014.

[5:37:08 PM](#)

MR. SWENSON advised that the project will not wait at this time; however, if either AGIA or Denali - The Alaska Gas Pipeline, looks like it will be completed, this project slows down. He assured the committee this project will continue to "get the package, make the deal with the development companies and the North Slope producers and the Cook Inlet marketplace."

CO-CHAIR MILLETT observed that the state will not be making a decision on an in-state gas line for two years, and completion is nine years away.

[5:38:52 PM](#)

MR. SWENSON recommended looking at the cheapest way to transport gas from the North Slope to the Cook Inlet and points along the route. Therefore, right now the state must gather information and build models to decide what the costs will be. He opined the sanctioning points of the pipeline are the "end member of the decision process."

[5:40:12 PM](#)

CO-CHAIR MILLETT questioned whether the in-state gas line is really a priority for the administration.

[5:41:03 PM](#)

MR. SWENSON explained that the initial cost estimates will be done in July and the cost of service models will determine tariffs and the cost of natural gas in the basin. In July 2011, the project will be at the final stages of the EIS process. At that time decisions will be made on whether to continue in concert with the AGIA process or not. He opined the cost estimates are an important point of this decision.

[5:42:32 PM](#)

REPRESENTATIVE RAMRAS expressed his respect for Mr. Swanson. He stated he has concerns about Black & Veatch detailing the importation of LNG in its 50-year plan, and that the committee

has glossed over this point. He noted his desire for his community of Fairbanks, and all of the residents along the Yukon River, to migrate from diesel to gas, liquids, or propane as soon as possible. Representative Ramras commented on the House Finance Committee's removal of state money to fund the in-state gas pipeline. He remarked:

DNR is setting [Mr. Swenson] up in a very peculiar, impossible situation. For many of us AGIA is going to fail when we come out of July 31 with a heavily conditioned open season ... and in the meantime the price of oil closed at \$82 a barrel ... for that part of the state that is on an ever dwindling supply of natural gas, for those of us that are on diesel ... it's just part of a misery index ... and that doesn't even begin to consider our friends that live in rural Alaska ...

REPRESENTATIVE RAMRAS encouraged Mr. Swenson to realize that the state needs natural gas now, and to have the project ready to go in October 2010. He said:

And keep those guys at Black & Veatch out of your workroom, because they are just a hack job for DNR ... I watched them do it ... they should not have any access to our work products until Baker Engineering has delivered its work product to the legislature in June or July of this year.

[5:46:56 PM](#)

REPRESENTATIVE TUCK asked if the pre-build alternatives will begin in Cook Inlet and head north.

[5:47:32 PM](#)

MR. SWENSON said yes. He expressed his understanding that either the Richardson Highway or Parks Highway pipeline would be pre-built from Cook Inlet to meet the large diameter pipeline on its way to Alberta or Valdez. Prior to the opening of the large diameter line, if there is a market and there are producers in the Cook Inlet, the pre-built pipeline would supply gas into the Fairbanks region.

[5:48:04 PM](#)

MR. SWENSON directed his comments to Representative Ramras. He opined that the present time is similar to the 1960's in Cook Inlet, when the current marketplace could not support the supply of gas; however, although all of the options must be carefully considered, he agreed that time is of the essence. He said his orders, both from the legislature and the administration, are to proceed as quickly as possible. Mr. Swenson said the best engineers in Arctic pipeline design and building are working incredibly hard on the project.

REPRESENTATIVE JOHANSEN referred to slide 12, which listed work underway, and noted one task was to identify new market potential. He acknowledged that the report covered permits and the source of gas, but asked when the committee will find out about new markets and tenants that will help pay the tariffs for the pipeline.

[5:51:47 PM](#)

MR. SWENSON answered that new market potential is based on what can be done in the basin to increase the market, such as a gas to liquids (GTL) proposal and Agrium, Inc. He advised that this task will be worked on though FY 11; in fact, there will be a meeting with commercial groups to bring up the issues of the in-state gas market in the Cook Inlet region. He agreed that the per unit volumes of gas in any pipeline are very important for the cost-of-service analysis. Mr. Swenson anticipated discussion of how the state can encourage, and possibility incentivize, the development of large consumers in the basin in order to benefit those living in the Railbelt and on any distribution system.

[5:54:03 PM](#)

REPRESENTATIVE JOHANSEN re-stated his interest in the source of a sufficient market.

CO-CHAIR EDGMON observed that the project needs a private entity to build the pipeline, a demand for gas, and a supply of gas. He asked whether the state abandoning the AGIA effort and focusing on the in-state line, would push the project along.

[5:55:27 PM](#)

MR. SWENSON said he did not believe the answer was to abandon AGIA; however, more funds could be directed toward encouraging industry into the basin. The current plan is to put the package

together with the permits, preliminary engineering, and cost estimates, and encourage private development of the project. If not, the state will have to make sure that gas is available to the Railbelt region through incentivizing development, or by owning part of the pipeline. A significant portion of the information necessary for the policymakers to make this decision will be available on July 1.

[5:57:08 PM](#)

REPRESENTATIVE RAMRAS asked how often Mr. Swenson was in touch with Tom Irwin, Marty Rutherford, and Gene Therriault.

[5:57:27 PM](#)

MR. SWENSON answered that he talks with one of them once each week. He assured the committee of their support and provided an example of DNR's support.

[5:59:04 PM](#)

MR. SWENSON displayed slide 15 that listed the status of three permits. Slide 16 showed the current state share of the project was \$8.3 million for FY 10, and that \$6.5 million is requested for FY 11. Also, there will be a negotiated agreement with ENSTAR for the use of its data. All of the expenses are to be reimbursed upon transfer to a commercial entity. Regarding the project timeline, the target is 2016, providing there are no legal challenges or problems with facilities and ordering equipment.

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REPRESENTATIVE PETERSEN recalled that the chance of obtaining a permit to export gas from Alaska is "close to nil." He asked how this would affect the volume of the gas pipeline.

[6:01:25 PM](#)

MR. SWENSON acknowledged that one of the issues with the pipeline is the uncertainty about using the current LNG facility in order to use its permit that is "grandfathered in." He said he plans to talk with ConocoPhillips Alaska, Inc. Building a new facility either in Cook Inlet or Valdez will take time; in either case, the question of exporting natural gas to a foreign country must be addressed.

[6:02:46 PM](#)

CO-CHAIR MILLETT asked why there are two state agencies, the Alaska Natural Gas Development Authority (ANGDA), and the In-State Gas Pipeline Project, working toward the same goal, and whether they are sharing information or duplicating work.

[6:03:06 PM](#)

MR. SWENSON explained that he is working closely with ANGDA to be sure there is no duplication of effort. ANGDA is primarily focused on the spur lines and the line to Valdez off of the large diameter pipeline, with a spur route from Glennallen into the basin area. This project is focused on the stand-alone pipeline up the Parks Highway.

[6:04:22 PM](#)

REPRESENTATIVE JOHANSEN asked whether the timeline incorporates the construction of industry that will consume the gas.

MR. SWENSON pointed out that on slide 19 other facilities are listed under "Project Review & Sanction." In further response, he said that was in 2011 and 2012.

[6:06:45 PM](#)

REPRESENTATIVE JOHANSEN assumed that was the time other companies will look at building gas conditioning plants or new Alaskan industry and investment.

[6:07:16 PM](#)

MR. SWENSON indicated yes.

[6:08:17 PM](#)

ETHAN SCHUTT, Vice President, Land and Energy, Cook Inlet Region Inc. (CIRI), informed the committee Fire Island is located about three miles offshore of Anchorage. The wind project on the island consists of 36 1.5 megawatt GE wind turbine generators with a total nameplate capacity of 54 megawatts. The project has an approximate 33 percent capacity factor and the transmission interconnect is a 34.5 kilovolt (kV) dual transmission line to Chugach Electric's station on International Road. He continued to explain that the project will displace 1.5 billion cubic feet (Bcf) of natural gas per year and will

meet the electrical demand for thousands of households. Slide 4 was a map of the project layout showing the locations of wind turbines, roads, gathering lines, and the subsea portion of the transmission line that connects to the grid. Mr. Schutt relayed that the project has been considered by various entities in the past; however, CIRI believes that now is the time to build because the energy solutions for Southcentral are the same as for the nation: a diversified mix of energy products using as much domestic, renewable, and non-fuel as possible. He opined this project is the best chance to put a significant amount of non-fuel, new, electrical energy into the grid. He agreed with previous testimony that Southcentral and the Railbelt face imminent shortages of power. Coincidentally, the American Recovery and Reinvestment Act of 2009 provides federal financial incentives to renewable projects that are developed by private taxpaying entities, such as CIRI. In fact, federal funds will pay an incentive of about 30 percent of the capital costs of the Fire Island Wind project, and CIRI is committed to credit 100 percent of the federal dollars to the cost of the project thus ultimately benefitting ratepayers. He pointed out that the incentive funding also requires a stringent timeline for completion of the project. Project milestones for 2009 include: micrositing studies for the turbines, clearing, geotech for roads, borings at each turbine location, and substantial infrastructure. Slide 10 was the critical path timeline: 11/2009, fieldwork completed; 12/2009, geotech results; 3/2010, 35 percent design completion; 5/2010, integration/interconnection agreement; 6/2010, execute power purchase agreements. He noted that over 5 percent of the federal funding must be spent in 2010 to qualify, so CIRI will be constructing roads and preparing turbine sites. Tower erection, the installation and commission of the transmission line, and commercial operations are planned for the fourth quarter of 2011.

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CO-CHAIR MILLETT passed the gavel to Representative Johansen.

[6:15:43 PM](#)

REPRESENTATIVE PETERSEN asked whether the towers are similar to those in Kodiak.

REPRESENTATIVE JOHANSEN returned the gavel to Co-Chair Millett.

[6:16:07 PM](#)

MR. SCHUTT indicated yes. The machines are very large, industrial machines installed on 80 meter towers. He then turned to the underground coal gasification (UCG) project that is designed to produce an alternative power source by 2014. The project is an underground coal gasification facility that will produce synthesis gas (Syngas) sized to fuel a new 100 megawatt combined-cycle power plant. Syngas can be used to generate electricity and is an ideal feedstock for chemical manufacturing processes such as upgrading to natural gas through methanation, and Fischer-Tropsch synthetic liquid fuels. Slide 14 was a map showing the location of the project area that is on the west of Cook Inlet and northwest of the Beluga Power Plant and gas field. The UCG project area is roughly 24 square miles and is connected to existing infrastructure by road, but is not connected to Anchorage or the Mat-Su valley by road. Mr. Schutt indicated that transmission interconnect is not much of a hurdle for the project because of the power plant at Beluga. He presented slides of drill rig work on the project. Slide 19 listed four reasons CIRI is pursuing the project: (1) committed to a diversified source of energy; (2) believes the technology is on the verge of commercialization in North America; (3) believes the technology provides an environmentally responsible way to harness coal energy; (4) believes the technology provides a long-term supply of energy from a domestic resource at a reasonable price.

[6:19:12 PM](#)

REPRESENTATIVE RAMRAS observed that the state should pursue in-state gas with the same purposes.

[6:20:34 PM](#)

MR. SCHUTT explained that CIRI believes it can make a fair profit from providing reasonably priced energy to the domestic market; in fact, the profit motive is not to be impugned. Slide 20 displayed the current timeline for the project. At the present time, the first resource assessment hole is being drilled, and core samples are being collected. This is the first of six holes that will be drilled in the next six weeks for data on geology and coal resource. After that, the next round of drilling will be at a specific site for site characterization and project permit applications. At the same time, CIRI will undertake early-phase commercial negotiations with partners, investors, and off-takers. An advantage of producing Syngas is that it has many market opportunities, such

as feedstock for Agrium, Inc.; as a matter of fact Agrium can also use the CO2 that is produced as a by-product of coal gasification. Finally, commercial operations for the project are scheduled for early 2014.

[6:24:04 PM](#)

CO-CHAIR MILLETT asked whether there are other locations in the United States where this technology is being advanced.

[6:24:15 PM](#)

MR. SCHUTT responded that two projects have been announced for the Powder River basin in Wyoming, and there are three projects in Alberta, Canada. At this point, these are small research and development projects built with public money and grants. However, CIRI believes the technology is ready for commercial development.

[6:25:33 PM](#)

MR. SCHUTT displayed slide 21 that listed the development challenges to the project. The first challenge is that of carbon management, assuming there will be a carbon incentive or carbon tax. CIRI is committed to carbon management, even though carbon management is in the early phases of policy and technological development. The second challenge is that UCG is in an undefined regulatory regime, although CIRI has a good working relationship with DNR which is the primary permitting agency. Finally, because the technology has not been commercially deployed, financing structures will involve venture equity investors comfortable with risk, or loans from the U.S. Department of Energy (DOE). Opportunities for the project include access to previously inaccessible resources, and power plant emissions comparable to those from natural gas. In addition, the project has the potential to increase by 300-400 percent recoverable coal reserves on land owned by CIRI. Finally, the technology utilizes a modular-system design easily expanded to accommodate additional production volumes.

[6:29:18 PM](#)

MR. SCHUTT displayed slide 23 that showed CIRI land interests of joint ownership, surface interest, and subsurface interest in the Beluga coal field area. To the committee's question of the price of delivered energy, he did not say what the price of Fire Island electricity will be because CIRI is entering commercial

negotiations with the Railbelt utilities. He opined the price will be attractive to the utilities given that it will be for a fixed, 20-year term. Mr. Schutt said he expects to produce Syngas at a competitive price with current pricing on natural gas from Cook Inlet on an energy equivalent basis. He concluded that the project is not requesting any financial support from the state at this point.

[6:31:16 PM](#)

REPRESENTATIVE JOHANSEN asked about in-state markets for UCG products.

[6:32:01 PM](#)

MR. SCHUTT said the principal objective is to complete a commercial scale, first phase of a UCG facility and power plant. Ideally, the product will be produced with pricing attractive to Agrium. Agrium is a natural market and only requires a pipeline across Cook Inlet. Another product possible after further capital investment is methane, which would be marketed to ENSTAR.

[6:34:31 PM](#)

PAUL THOMSEN, Director, Policy & Business Development, Ormat Technologies, Inc. (Ormat), informed the committee Ormat is the largest developer of geothermal energy in the U.S., and owns and operates 520 megawatts of geothermal generation worldwide, mostly in the U.S. His firm has also supplied equipment for 1,300 megawatts of generation in 24 countries for geothermal development. Ormat is a vertically integrated company that designs and manufactures turbines, owns and operates power plants and negotiates power purchase agreements, and provides drilling and resource assessment in-house. Currently, his firm is developing six projects in the U.S., and employs over one thousand people. He displayed slide 5 that was a map showing Ormat's geothermal locations in 71 countries. Mr. Thomsen pointed out that Ormat began in Alaska in 1975 by supplying remote power units to the Trans-Alaska Pipeline System (TAPS). He explained that Ormat has developed projects from 250 kilowatts to up to 160 megawatts located on remote site such as volcanic areas and Arctic environments. Slide 7 illustrated Ormat's business in Alaska from 100 remote power units in 1975, and the first geothermal unit tested at Manley Hot Springs in 1979. Slide 9 was a diagram of an air-cooled binary geothermal power plant. Mr. Thomsen explained that hot water brought up

from the ground heats a secondary working fluid in a heat exchanger, and the brine is reinjected into the ground. The closed system does not allow evaporation, so there is no release into the atmosphere. The working fluid, which is isopentane, vaporizes, thus building up pressure to spin a turbo-expanding turbine, and produce electricity. The working fluid is cooled by air and recycled through to provide continuous power "whether the sun is shining or the wind is blowing." The key attributes of geothermal technology are a base-load capacity factor of 95 percent, and competitive costs with a long-term fixed contract. Ormat has proven the technology by 10,000 megawatts deployed worldwide. Further, this project insulates ratepayers from volatile fossil fuel prices; in fact, there should be no variation in the price of heat coming from the reservoir. The closed loop system produces near zero emissions, and there is no water consumption at an air-cooled facility. In addition, there is minimal surface and visual impact as a typical plant covers about five acres, and the well area can be reclaimed after drilling and capping. During construction, many jobs are available; however, operating jobs are limited to a few highly paid positions at the site. Mr. Thomson displayed slide 12 which was a map showing Mount Spurr, the Beluga Power Plant, Tyonek, Anchorage, and the land area leased to Ormat from the state. The site of the power facility would be on the eastern section of the leased area with wells sited throughout.

[6:41:42 PM](#)

MR. THOMSEN displayed slide 13 that illustrated the project timeline, and noted that Ormat purchased the leases in 10/2008 for \$3 million. Non-intrusive exploration work began in 2009, and the drilling of slim holes and production wells will begin in the summer of 2010, with full exploration drilling in 2011. The goal is to have the project generating power by 2016. He estimated the total cost of a 50 megawatt project to be \$250-\$300 million. The funding requested to date was a matching grant from the renewable energy grant program in the amount of \$1.9 million, which Ormat considers to be a commitment from AEA to be a partner in the project. The project will also need about 40 miles of transmission to reach the Beluga Power Plant. Mr. Thomsen assumed the transmission infrastructure would be built by a utility, or the state, given the proximity of other projects. The cost of power to the utility is expected to be eleven cents to fourteen cents per kWh depending on the royalty rate on the leases and whether there are state incentives. With no incentives and royalty rate of 10 percent on gross sales, a power purchase agreement rate of about fourteen cents per kWh is

needed to make the project "pencil." It is estimated that the reservoir will produce between 50 megawatts and 100 megawatts of power which is equal to about 416 gigawatt hours per year.

[6:46:03 PM](#)

MR. THOMSEN turned to the subject of the project's likelihood of completion. Looking at the technology, he said there was no technology risk because Ormat has a track record for the construction of geothermal power plants. Considering business, he acknowledged the project needs to reduce the price in order to execute a power purchase agreement; however, the utilities are interested. Ormat considers the likelihood of adequate resource to be moderate, due to insufficient data. There have been no roadblocks or major challenges to permitting identified so far. He concluded that through contact with the Railbelt utilities and local participants, Ormat has received a great deal of support for developing the project in order to supply an alternative base-load energy resource to the Railbelt.

[6:48:11 PM](#)

REPRESENTATIVE RAMRAS asked for the temperature at Mount Spurr.

[6:48:36 PM](#)

MR. THOMSEN replied that the best temperature for the technology is in the range of 300-500 degrees Fahrenheit. Because Mount Spurr is a volcanic resource, Ormat expects to find sufficient heat as the binary technology allows for the use of lower temperatures.

[6:49:45 PM](#)

REPRESENTATIVE RAMRAS described the situation in the community of Naknek.

[6:50:10 PM](#)

MR. THOMSEN observed that Ormat is always interested in selling its technology to third parties. He opined that Ormat would be interested in bidding for a project in Naknek when the community is ready.

[6:50:38 PM](#)

REPRESENTATIVE RAMRAS encouraged Mr. Thomsen to schedule a site visit.

[6:51:55 PM](#)

MR. THOMSEN said he and the senior geologist would be happy to visit the site at Naknek.

[6:52:31 PM](#)

REPRESENTATIVE JOHANSEN asked whether Mr. Thomsen was familiar with Bell Island.

[6:53:02 PM](#)

MR. THOMSEN said no.

REPRESENTATIVE JOHANSEN observed that Bell Island is directly connected to an intertie system with the potential to connect to a community with 85 percent unemployment. He also encouraged site visits by Ormat.

MR. THOMSEN said Ormat was very interested in building the first geothermal project on tribal or Native land. Ormat's corporate structure is that 25 percent of its revenue comes from the sale of equipment, and 75 percent from the sale of electricity, thus it is very interested in facility development.

[6:54:21 PM](#)

CO-CHAIR MILLETT announced the co-chairs will produce a side-by-side comparison of the projects for the committee.

[6:55:18 PM](#)

REPRESENTATIVE PETERSEN observed that a lot of information was received to help the committee make decisions.

[6:55:28 PM](#)

REPRESENTATIVE JOHANSEN noted that Mount Spurr and Chakachamna Hydro are two projects in the same area. He expressed concern that CIRI and the in-state gas pipeline are pursuing the same limited market.

[6:56:48 PM](#)

REPRESENTATIVE RAMRAS stated that he wants a commitment from Black & Veatch.

[6:57:03 PM](#)

CO-CHAIR EDGMON relayed that Bush Alaska would be interested in paying fourteen cents per kWh for electricity. He pointed out the legislature is debating energy policy legislation and hopefully funding streams as each project requires some participation by the state, and in addition to the gas pipeline, projects in outlying areas are also very important. Co-Chair Edgmon would like to continue the conversation with the presenters at the Rural Alaska Energy Conference in April.

[6:58:28 PM](#)

CO-CHAIR MILLETT announced upcoming hearings and expressed her appreciation for the presentations and the opportunities for energy in Alaska. She noted that her constituents in the Railbelt need to hear when there will be additional power coming into the grid.

ADJOURNMENT

There being no further business before the committee, the House Special Committee on Energy meeting was adjourned at 6:58 p.m.