

**ALASKA STATE LEGISLATURE
HOUSE RESOURCES STANDING COMMITTEE**

January 27, 2012

1:05 p.m.

MEMBERS PRESENT

Representative Eric Feige, Co-Chair
Representative Paul Seaton, Co-Chair
Representative Peggy Wilson, Vice Chair
Representative Alan Dick
Representative Neal Foster
Representative Bob Herron
Representative Cathy Engstrom Munoz
Representative Berta Gardner
Representative Scott Kawasaki

MEMBERS ABSENT

All members present

COMMITTEE CALENDAR

OVERVIEW(S): UPDATE: RENEWABLE ENERGY PROJECT AND TECHNOLOGY

- HEARD

PREVIOUS COMMITTEE ACTION

No previous action to record

WITNESS REGISTER

JEANNIE JOHNSON, Airport Manager
Juneau International Airport
Juneau, Alaska

POSITION STATEMENT: Presented an update and answered questions on the installation of the Geothermal Heat Pump System at Juneau International Airport.

CATHERINE FRITZ, AIA
Airport Architect
Murray & Associates, P.C.
Juneau, Alaska

POSITION STATEMENT: Provided a PowerPoint presentation titled "Juneau International Airport Geothermal Heat Pump Project" and answered questions about the project.

DOUG MURRAY, Consulting Engineer
Murray & Associates, P.C.
Juneau, Alaska

POSITION STATEMENT: Answered questions during the discussion of the geothermal heat pump system at Juneau International Airport.

PAUL THOMSEN
ORMAT Technologies, Inc.
Reno, Nevada

POSITION STATEMENT: Presented a PowerPoint, "The Mount Spurr Geothermal Project," and answered questions about the project.

PATRICK WALSH
ORMAT Technologies, Inc.
Reno, Nevada

POSITION STATEMENT: Answered questions during discussion on "The Mount Spurr Geothermal Project."

TARA RIEMER JONES, PhD
President & CEO
Alaska SeaLife Center
Seward, Alaska

POSITION STATEMENT: Presented a PowerPoint, "Sea Water Heat Pump Project," and answered questions during the discussion.

DARRYL SCHAEFERMEYER, Operations Manager
Alaska SeaLife Center
Seward, Alaska

POSITION STATEMENT: Answered questions during discussion of the heat pump system at the Alaska SeaLife Center.

NANCI MORRIS-LYON
Board of Directors
Naknek Electric Association (NEA)
Naknek, Alaska

POSITION STATEMENT: Presented an update on the Naknek Geothermal Project.

DONNA VUKICH, General Manager
Naknek Electric Association (NEA)
Naknek, Alaska

POSITION STATEMENT: Answered questions during an update on the Naknek Geothermal Project.

DARRON SCOTT, President/CEO
Kodiak Electric Association, Inc. (KEA)

Kodiak, Alaska

POSITION STATEMENT: Provided a PowerPoint presentation on the Pillar Mountain Wind Project.

ETHAN SCHUTT, Senior Vice President
Land and Energy Development
Cook Inlet Region, Incorporated (CIRI)
Anchorage, Alaska

POSITION STATEMENT: Provided a PowerPoint presentation on the corporation's Fire Island Wind Project.

DOUG JOHNSON, Director
Alaska Business Development
Ocean Renewable Power Company (ORPC)
Anchorage, Alaska

POSITION STATEMENT: Presented a PowerPoint, "ORPC Alaska Update," on tidal power in Cook Inlet.

MONTY WORTHINGTON, Director
Project Development
Ocean Renewable Power Company (ORPC)
Anchorage, Alaska

POSITION STATEMENT: Testified and answered questions during the ORPC presentation.

ACTION NARRATIVE

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CO-CHAIR PAUL SEATON called the House Resources Standing Committee meeting to order at 1:05 p.m. Representatives Seaton, Feige, Dick, Foster, Munoz, Herron, and Wilson were present at the call to order. Representatives Kawasaki and Gardner arrived as the meeting was in progress.

OVERVIEW(S): Update: Renewable Energy Project and Technology

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CO-CHAIR SEATON announced that the only order of business would be an update on renewable energy projects and technology throughout the state of Alaska. He said the focus would be on projects the legislature had an interest in funding.

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JEANNIE JOHNSON, Airport Manager, Juneau International Airport, introduced the architect and project manager for the Juneau International Airport Geothermal Heat Pump Project.

CATHERINE FRITZ, AIA, Airport Architect, Murray & Associates, P.C., introduced a PowerPoint presentation titled "Juneau International Airport Geothermal Heat Pump Project." She directed attention to slide 2, "Terminal Renovation Project Goals," and listed the three primary goals: reduce the operating costs, modernize the infrastructure, and improve the passenger airport experience. She stated that there was \$23 million available to address about \$50 million of problems. She moved on to slide 3, "Terminal Renovation Project Approach," stating that the project would be done in two phases; renovation and addition to the parts of the building that were newer than 1984, and replacement of any pre-1984 buildings, many of which dated to the original 1948 terminal. She explained that this would entail good design, rather than lots of design, and efficiency in all the decisions and operations. The renovation would make the facility modern and aesthetically pleasing by designing and constructing to a "high performance standard," a term established by the U.S. Department of Energy to describe the building infrastructure.

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MS. FRITZ gave a quick overview of slide 4, "Geothermal Heat Pump System Basics." She reported that vertical pipes were placed in the ground to about 350 feet, and then filled with fluid. The fluid would capture the heat of the earth, about 42 degrees, and then be pumped into the building to each of the electric heat pumps.

MS. FRITZ referred to slide 5, "Alaska Energy Authority Grant Funding," and reported that this funding request had been included in the February 2008 program for alternative energy and construction requests. She noted that the application had been prepared by Juneau staff, and did not require any outside grant writers, as the application rules were easy to follow. She shared that the grant was awarded in October 2008.

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MS. FRITZ continued on with slide 6 and slide 7, "Loop Field Construction," and reported that construction of the system began outside, under the small plane airfield, with 108 six inch borings, each 350 deep. She explained that each hole had two

pipes with a "U" assembly at the bottom, for a total of 16 miles of piping in the ground. This system captured the earth temperature of 42 degrees.

MS. FRITZ expanded on slide 8, "Pipe Fusion," which described that each seam and joint of the HDPE pipe was welded to create even greater strength, and a life expectancy for the pipe in excess of 100 years.

MS. FRITZ spoke about slide 9, "Into the Pump Room," explaining that the pipe system was consolidated into four main pipes before it entered the building. She stated that the fluid, 88 percent water and 12 percent methanol to prevent freezing, continually circulated to the heat pumps in the building. She described the digitally controlled three way valve that decided when the fluid was returned to the underground loop field to capture more heat.

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MS. FRITZ addressed slide 10, "Into the Ceilings," relaying that 28 heat pumps, each the size of a small refrigerator, were located in the ceilings.

MS. FRITZ moved on to slide 11, "Ice-Melt System," and described the three water-to-water pumps for the front sidewalk ice-melt system. She stated that the geo-thermal system was more cost effective than traditional diesel technology.

MS. FRITZ noted that the data on slide 12, "System Performance to Date," was preliminary and that "multiple years of complete system operations under varied demand conditions should be considered for comprehensive analysis." She compared the decrease of diesel usage in 2008, the year prior to heat pump installation, to 2011, and reflected on the savings of \$130,529. She also compared the increase in electrical usage from 2008 to 2011, an increased cost of \$15,554. She stated that the net direct fuel usage annual savings was \$114,985.

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MS. FRITZ pointed to slide 13, "Additional Benefits," which included: the cost of snow/ice removal operations had been reduced by approximately \$11,000 per year while providing safer public access to the terminal; the removal of the central heat/vent equipment had freed up valuable square footage areas inside the building for other uses; the heat pumps provided

improved air quality, including air-conditioning; the geothermal loop field had been sized to accommodate the proposed replacement of the pre-1984 terminal area, and also allowed for expansion if necessary in the future; and, the reduction in diesel contributed to a reduction in carbon emissions. She touted that the confidence gained through this installation had convinced the airport to use geothermal technology for the new Snow Removal Equipment facility.

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MS. FRITZ concluded with slide 14, "Geothermal is part of a holistic approach to design and construction," and stated that the geothermal heat pumps not only allowed conversion from diesel to a renewable hydroelectric source, but that they were also part of a holistic approach to the design and construction of the building. She declared that it was necessary to also look at other high performance standards, including insulation under slabs, heavy vapor barriers, insulation on the outside of buildings, and high quality glazing.

MS. FRITZ emphasized that the grant funding had made the project possible.

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CO-CHAIR FEIGE asked what the projected payback period was for the project.

MS. FRITZ replied that, other than the fuel savings, they had not calculated the other paybacks. She shared that the feasibility report had projected a payback of 10 years for the geothermal construction.

CO-CHAIR FEIGE, noting the relatively mild climate in Juneau, asked where else in Alaska this would be useful.

DOUG MURRAY, Consulting Engineer, Murray & Associates, P.C., replied that it would depend on the heat requirements of the building and its location. He shared that geothermal systems had been discussed in Anchorage and Fairbanks. He noted that, as the ground temperature goes down, the efficiency of the system goes down, and therefore, an analysis needed to be done for each project.

CO-CHAIR SEATON pointed out that cost competitive geothermal residences were being built in Homer, Alaska.

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REPRESENTATIVE P. WILSON, pointing out the new windows and insulation, asked if these could be factored into the savings.

MS. FRITZ agreed with Representative P. Wilson, stating that these were the variables which would need to be addressed with a more specific analysis. She noted that even though 12,000 square feet of open space had been added to the building, there was still savings.

REPRESENTATIVE KAWASAKI requested that Ms. Fritz speak about the renovation of the older facilities.

MS. FRITZ replied that this airport project combined 35,000 square feet of renovation with 12,000 square feet of new building. She reiterated that the key was a holistic approach to the building, not just conversion of fuel types, and that this would determine the cost feasibility.

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REPRESENTATIVE MUNOZ asked if the bonding authority on Phase 1 would extend to Phase 2, and what was the time line for Phase 2.

MS. FRITZ responded that the renovation project had been paid for in a rather unique way: \$10 million in local sales tax, \$8.5 million in passenger facility charges, and \$2.3 million in state funding, which included the \$513,000 energy grant. She clarified that there was not any bond indebtedness for this project. In response to Representative Munoz, she said that the airport was still in the planning of Phase II. She shared that the projected financing could include a percentage of Juneau sales tax and passenger facility charges.

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PAUL THOMSEN, ORMAT Technologies, Inc., directing attention to slide 11, "Mt. Spurr - Status & Estimated Timeline," stated that in October 2008 ORMAT leased 36,000 acres from the Department of Natural Resources (DNR) to develop the Mt. Spurr project. He detailed that non-intrusive exploration work was conducted in the summers of 2009 and 2010, with two 1,000 ft. deep exploration core holes being drilled in September 2010 and an additional 4,000 ft. deep exploration core hole being drilled in the summer of 2011.

MR. THOMSEN referred to slide 12, "General Lease Area: 3 Regions," depicting an overview of the three regions of the lease area.

MR. THOMSEN moved on to the geological map on slide 13, "Drilling Work Focused on Eastern Region," and noted that drill site 26-11 was the first deep well. He assured the committee that the well was in the eastern region along the Kid Fault, outside of the known volcanic hazardous zone. He stated that future work would be in the central region along the Crater Fault, and although more analysis was still needed before any drilling, it was thought to contain more geo-thermal resource.

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MR. THOMSEN spoke about slide 14, "Core Drilling 2010 and 2011," which pictured drilling sites, and slide 15, "Core collected - Donated to DNR/DGGS," which pictured the cores that had been removed from the holes.

MR. THOMSEN moved on to slide 16, "Results to Date," stating these were the "heart of our presentation today, to give you the update." He explained that the "results from the exploration work were encouraging that there's the potential geothermal resource at commercial depth, however, we don't think we're gonna be able to find it economically in the eastern region." He went on to say that ORMAT would direct future exploration in the central region. He listed three criteria, slide 17, "Status and Next Steps," to fulfill: can volcanic hazard be mitigated, can road access and transmission line be connected at reasonable cost, and was there a reasonable likelihood of finding a commercial resource. He shared that the time line had been pushed back two years, so that analysis would continue in 2012, with more drilling in 2013.

MR. THOMSEN moved on to slide 21, "Additional Appropriated Funds," and noted that although ORMAT had received a direct fiscal appropriation of \$14.5 million dollars in FY 2012, the change in the project scope would necessitate its use in 2013.

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CO-CHAIR SEATON agreed that locating the geothermal resource and determining the permeability was difficult. Noting that Apache Oil was currently conducting 3-D seismic on the west side of

Cook Inlet, he asked if this would be valuable for ORMAT in identifying the underlying structure and geothermal resource.

PATRICK WALSH, ORMAT Technologies, Inc., replied that 3-D seismic was valuable, in general, for exploration of oil, gas, and geothermal. He said it was very challenging to use in areas with high topographic relief, similar to the Mount Spurr region, but that ORMAT did use the technology in other areas. In further response, he agreed to look into a possible dovetail of work with Apache Oil.

CO-CHAIR SEATON expressed disappointment that the exploration on the eastern side was not commercially viable.

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TARA RIEMER JONES, PhD, President & CEO, Alaska SeaLife Center, presented a PowerPoint, "Sea Water Heat Pump Project," and referring to slide 2, "Alaska SeaLife Center," said that the mission of the SeaLife Center was to generate and share scientific knowledge to promote understanding and stewardship of Alaska's marine ecosystems. She listed the programs to include: research, education, rescue and rehabilitation, and the visitor exhibits. Moving on to slide 3, "Alaska SeaLife Center," she reported that the Center was an economic driver in the Seward community, and, as the largest private employer in Seward and the 11th largest private employer on the Kenai Peninsula, it employed about 90 full time employees.

DR. JONES directed attention to slide 4, "Sea Water Heat Pump Project," and spoke about the strong support of these partnerships, which included the City of Seward, Kenai Fjords National Park, the Alutiiq Pride Shellfish Hatchery, and the University of Alaska Fairbanks School of Fisheries & Ocean Sciences.

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DR. JONES stated that one goal for the project was to reduce the carbon footprint, slide 4, "Goals = Reduce Energy Cost & Carbon Emissions." She reported that the Alaska SeaLife Center covered 115,000 square feet, and that it had large power demands, as it pumped a lot of water. She noted that there were two oil fired boilers and one electric boiler, and that the winter heating oil demand could exceed 500 gallons per day, and up to 132,000 gallons per year. She said the peak annual heating costs were \$463,000.

DR. JONES moved on to slide 5, "Sea Water Heat - Sweden & Norway," explaining that the concept of using heat from seawater had been used in fjords in Sweden and Norway for more than 20 years. Pointing to slide 6, "Seward Sea Water Heat Resource," she stated that Seward was a perfect location for this project, as Resurrection Bay stored a lot of solar heat year round and the water was usually above 36 degrees. Viewing slides 7 - 10, "Technology Overview," she explained that the heat pump was using the heat contained in the water to increase the heat in the building. She noted that, as electricity was necessary to run the heat pump, the coefficient of performance (COP) was an important metric and it was derived by taking the amount of heat produced by the pump and divided by the power necessary to run the heat pump. She shared that the expected COP was 3.1 - 3.6 for the heat pumps. She shared that the two installed heat pumps were each larger than a small refrigerator, and could be operated and supported with automated controls, while monitored from the internet.

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DR. JONES, referring to slide 11, "Project Financial Evaluation," relayed that the capital cost to date was \$833,300, which was paid by grants from the Denali Commission and the Alaska Energy Authority (AEA). She listed the annual heating oil savings to be \$212,738, but shared that there were that this did not comprise some of the additional costs to the heat pump system, including glycol pumping, electricity for the heat pumps, and routine operations and maintenance. She projected the net annual savings to be \$100,000, and predicted a 6.7 year payback period. She confirmed that the annual CO2 production was lowered by 1.3 million pounds.

DR. JONES shared slides 12 and 13, "Overall System Operator Screen," which portrayed a real time screen view of the heat pump system on January 21, 2012. She noted that the calculations included temperature differentials and flows. She pointed to the savings of 11.46 gallons of fuel per hour and 275 gallons per day. After paying for the additional electricity, the net savings would be a \$643 each day. She agreed that the savings would fluctuate during the year.

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DR. JONES reviewed slides 14 - 19, "Actual Installation," which depicted the heat pumps, sea water exchangers, circulation

pumps, and the heat exchangers for the air handlers and domestic hot water.

DR. JONES, addressing slide 20, "Alaska Application," declared that this technology would work in those coastal Alaska communities with ice free sea water and a large sea water intake. She referenced similar heat pumps at the National Oceanic and Atmospheric Administration (NOAA) facility at Lena Point in Juneau. She predicted an annual cost savings of \$100,000, a large reduction in carbon emissions, and a lower demand on the local utility grid.

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DR. JONES summarized slide 21, "Project Tasks & Timeline," and shared that although the final design had been completed on November 30, 2010, the equipment had been installed in March and April 2011, and the heat pumps were started up in July 2011, the commissioning and tying together of the systems was not yet completed. She mentioned that the TRACER screens were enabled in August 2011, and that the data monitoring was currently being integrated.

DR. JONES concluded with slide 22, "Project Status," and shared that \$183,000 in funding had been received from the Murdock Foundation to connect the sea water heat pump system to the slab heat system, and to install a heat recovery system to utilize waste heat.

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CO-CHAIR FEIGE compared the use of glycol for the heat transfer fluid at the Alaska SeaLife Center with the use of a water and methanol mix at the Juneau International Airport, and asked about the advantages of each.

DARRYL SCHAEFERMEYER, Operations Manager, Alaska SeaLife Center, replied that the SeaLife Center used propylene glycol because of the environmental sensitivity of the facility. He described it as "a pretty safe material to use. It's basically vegetable grade. It's not going to harm animals or anything like that." He agreed with Representative Feige that it was a bit more expensive than other transfer fluids.

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CO-CHAIR FEIGE, observing the overall operator system screen, asked how much the intake temperature of the sea water varied and if it was possible to draw sea water from other locations.

MR. SCHAEFERMEYER replied that the intake system was fixed at a depth of 275 feet, and it was not feasible to adjust it. He explained that there were two 750 foot pipelines which siphoned the water into a large wet well, and then vertical turbines pumped the water throughout the building. The pump could supply 350 - 700 gallons per minute. In further response, he said that the temperature probably did not fluctuate at this depth.

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REPRESENTATIVE P. WILSON asked if there were any problems with the seawater intake system.

MR. SCHAEFERMEYER acknowledged that there were occasional problems common with salt water. He said that there was a special filter for silt, and that the legislature had provided funding for annual cleaning. In response to Representative P. Wilson, he confirmed that the system was now working smoothly.

CO-CHAIR SEATON pointed out that the pipes pumped directly into the SeaLife Center, which enhanced the efficiency of the system.

MR. SCHAEFERMEYER affirmed that there was also a cost factor to move the water around the building.

REPRESENTATIVE GARDNER asked where the pumps and heat exchangers were manufactured.

MR. SCHAEFERMEYER replied that these were manufactured in the U.S. but, since that time, the manufacturer had been purchased by a foreign company. He said that the steel pipe was manufactured in Korea.

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NANCI MORRIS-LYON, Board of Directors, Naknek Electric Association (NEA), congratulated the Seward SeaLife Center and the Juneau International Airport for their successes. She declared that NEA was currently at an impasse, and had been forced to file bankruptcy. She explained that NEA was required to do balanced drilling, as opposed to geothermal drilling. This had required the use of barite, which had plugged the hole and prevented an assessment of the resource.

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CO-CHAIR SEATON asked for an explanation of balanced and geothermal drilling.

MS. MORRIS-LYON explained that balanced drilling was required when drilling for oil and gas, and it required mud in the hole, rather than air pressure. She declared that this mud, when placed in the drilled hole, blocked the openings and fissures to heat and water. She stated that the State of Alaska had required that NEA use this drilling technique, and that NEA had been unsuccessful in flushing out the mud. She stated that members of the geothermal industry had researched and analyzed the project and suggested the most cost effective approach would be to side track drill on the current hole. She explained that the barite plug could not be removed, rendering the hole unusable, and not allowing an assessment of the resource.

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MS. MORRIS-LYON established that, as 70 percent of the necessary materials were already on site, the cost would be about \$3.2 million. The project could start with the arrival of the first barge, and the side track drilling would take four weeks to reach a point of assessment. She said federal funding was still readily available once this stage had been completed.

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MS. MORRIS-LYON emphasized that her community, less than 1,000 people, had already invested \$23 million into the project. She reported that the community spent \$5.7 million on fuel. She reiterated that NEA was only requesting \$3.2 million to do the side drilling in order to assess the viability of the project. She announced that, as Naknek was the economic engine for Bristol Bay, affordable, reliable energy was a necessity to build a future.

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MS. MORRIS-LYON stressed that NEA was struggling and had only 30 days to secure the \$3.2 million, or it would become necessary to submit a diesel-only energy plan. If that occurred, the drilling equipment would be sold and the project would be terminated. She confirmed that her presentation to the

committee was to glean any information. She cited the demand for geothermal energy as a resource for the future, and stated:

\$3.2 million, in reality, is a drop in the bucket compared to what's been spent in a lot of other areas when we've already got \$23 million on the table for it. It would give ya a lot of information on what the potential is in the whole area out there, if we could get this side track done.

CO-CHAIR SEATON expressed his understanding for the difficulty of reporting to a committee when there had not been success.

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CO-CHAIR FEIGE referred to the handout, "Naknek Geothermal Project Update," [Included in members' packages] and asked about the projected temperatures noted at the bottom of page one.

MS. MORRIS-LYON responded that the testing had varied and that the temperature tools did not work well in the barite. She explained that the drillers needed temperature estimates to determine the mud mixture. She confirmed the variability of the temperatures.

CO-CHAIR FEIGE asked what the natural gradient of rising temperature should be.

MS. MORRIS-LYON replied that she did not know.

CO-CHAIR FEIGE reflected that the drilling conditions were geologically challenging.

MS. MORRIS-LYON expressed her agreement.

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DONNA VUKICH, General Manager, Naknek Electric Association (NEA), affirmed that there were challenges. She relayed that, in the original hole at a depth of 11,300 feet, the cones had come off the bit, and it was not resolved. During the drilling of the first side track, the contractor had drilled into the original hole, and the second side track had become instable when it was left open too long.

CO-CHAIR FEIGE asked what leads NEA to believe it is going to have success with a third side track.

MS. VUKICH replied that NEA now had a better understanding of the project, would be hiring a different engineer, and would be using the technical team from the U.S. Department of Energy.

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REPRESENTATIVE HERRON asked to clarify that the State of Alaska had supplied \$1.25 million in general fund dollars.

MS. VUKICH confirmed this.

REPRESENTATIVE HERRON asked if the balance of the costs had been paid by NEA or with federal loans and grants.

MS. VUKICH replied that federal loans had paid the balance. She detailed that the \$1.25 million had been used in an unsuccessful attempt to clean the barite from the well, and later determined to not be a cost effective way to continue operations.

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REPRESENTATIVE HERRON asserted that this was a difficult situation. He asked if the bankruptcy courts would take into consideration any funding from the State of Alaska, which was budgeted but not yet awarded.

MS. VUKICH offered her belief that the court would consider any firm obligation for the money.

REPRESENTATIVE HERRON asked if the \$3.2 million would be sufficient funding "to confirm the resource."

MS. VUKICH reiterated that NEA currently had about 70 percent of the necessary material on hand to do the sidetrack. She said that it would take about 45 drilling days, and then an additional 4 weeks for the testing.

REPRESENTATIVE HERRON asked about the positions of the governor's office, the Department of Natural Resources (DNR), and the Alaska Energy Authority (AEA) for the request and the project.

MS. VUKICH replied that there had not been any support from the State of Alaska.

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REPRESENTATIVE MUNOZ inquired about the balance of the NEA debt.

MS. VUKICH replied that the total debt was about \$44.5 million.

REPRESENTATIVE MUNOZ asked about the \$0.09 rate increase recommended to cover the debt service obligations.

MS. VUKICH explained that the reorganization plan would vary from the total debt. She stated that the \$0.09 increase would pay the debt load, with a new rate of \$0.49 per kilowatt hour.

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CO-CHAIR FEIGE asked if NEA had approached any other entities in the Naknek area that would benefit from success with the project.

MS. VUKICH confirmed that NEA had approached other groups, but as NEA could not receive any more loans, they had requested grants from the native corporations and the fish processors.

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DARRON SCOTT, President/CEO, Kodiak Electric Association (KEA), Inc., presented a PowerPoint titled, "Pillar Mountain Wind Project Update," directing attention to slide 2, "Vision Statement." He stated KEA's goal: to produce 95 percent of energy sales with cost effective renewable power solutions by the year 2020. In other words, diesel would not be a major part of the KEA future.

MR. SCOTT reviewed slide 3, "Kodiak Electric Association, Inc." and conveyed that it was a locally owned cooperative, providing electricity to approximately 5800 meters. He said the KEA grid was not connected to any other grids, and its peak load was 26 MW with a minimum load of 11 MW. He declared that the Terror Lake Hydroelectric Plant, two 1.5 MW units, was the "backbone of our system," and pointed to the four diesel generating stations, total capacity of 33 MW, as the backup for the hydro facility. He reported that the Pillar Mountain Wind Project consisted of three 1.5 MW units.

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MR. SCOTT turned to slide 4, "Pillar Mountain Wind Project," and stated that it became operational in July 2009, and had met the expectations for 8 - 9 percent of KEA capacity.

MR. SCOTT directed attention to slide 5, "Project Financing." He reported that \$5 million came through the State of Alaska and the Renewable Energy Fund. He discussed the low interest financing to renewable projects for the \$12 million loan, and specified that the remaining \$4.4 million was financed directly by KEA.

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MR. SCOTT, addressing slide 6, "Operational Successes," stated that wind power could not be as controlled as hydroelectric or diesel. He explained that the wind generation was not run at full power continuously if the winds were variable. He lauded an economic analysis and an avian study prior to installation that had prepared KEA for all the variables. He shared that the availability was almost 98 percent, which included the down time for maintenance and service.

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MR. SCOTT, pointing to slide 7, "Savings," specified that the success was revealed in a savings of 2.2 million gallons of diesel fuel since the startup, which indicated a net savings of \$4.8 million. He shared that this savings signified that KEA had "basically broken even from the original investment [\$5 million] from the state."

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MR. SCOTT discussed slide 8, "Building on Success," and said that a slightly different addition to the wind project, Pillar Mountain High Penetration Wind Project, would be augmented by a third hydro turbine and used in conjunction with an extreme power battery storage system, slide 9, "Energy Storage System." He analyzed that the increased availability would bring the system to its goal of 95 percent renewable energy by the summer of 2013.

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CO-CHAIR SEATON clarified that the committee members were assessing the successes, not determining the budget and the funding.

REPRESENTATIVE GARDNER asked where the turbines were manufactured.

MR. SCOTT replied that the turbines were manufactured by General Electric, and that the various parts were made in Florida, Brazil, Oklahoma, and Canada.

REPRESENTATIVE MUNOZ asked if there was any community concern for the visual impact of the wind turbines.

MR. SCOTT opined that the community response had been supportive, and that the two major concerns, avian safety and disturbance to local berry picking, had been addressed.

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ETHAN SCHUTT, Senior Vice President, Land and Energy Development, Cook Inlet Region, Incorporated (CIRI), presented a PowerPoint, "Alternative energy solutions for Alaska," on CIRI's Fire Island Wind Project. He directed attention to slide 6, "Project Overview," and informed the committee that Fire Island was located offshore, about three miles west of the Anchorage airport. He noted that CIRI was the majority surface landholder on the island. Returning to slide 5, "Fire Island Wind Project," he pointed to the 33 permitted wind turbine sites on the island, with specific attention to the 11 turbine sites that were built in the first phase of the project, slide 7, "Project description." He stated that the project and its permits had been pursued for almost 10 years, and was "on track now for construction and first power by this fall of 2012." He reported that a 25 year, fully flat, fixed price term power purchase agreement was in place with Chugach Electric Association. He said that these wind turbines were very similar to those previously depicted wind turbines in Kodiak, with a 17.6 MW capacity. These turbines would meet about 32.8 percent net capacity, would serve 6,000 households, and would save about 0.5 billion cubic feet (bcf) of natural gas consumption.

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MR. SCHUTT moved on to slide 8, "Project Status Report," and reported that the cost recovery with Chugach Electric Association had been approved by the Regulatory Commission of Alaska (RCA), the contracts for all the major project components had been executed, the financing had been approved, and the construction for the transmission line was underway. He

described the transmission line, slide 9, "Transmission Interconnections," as a "12.5 mile, 34.5 kV double-circuit transmission line" with about 3.5 miles offshore. He reported that the State of Alaska had invested \$25 million in the project. He specified that the land based contractor was a local company, Northern Powerline Constructors, the marine construction contractor, Cruz Companies, was based in Palmer, Alaska, and that, upon completion of the transmission line, Chugach Electric Association would own and maintain the line. He shared that the balance of the on-island construction would be constructed by Delaney Construction Group, as shown on slide 10, "Balance of Plant Construction." He disclosed that Delaney also built the first phase of the earlier referenced Kodiak wind turbine project.

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MR. SCHUTT moved on to slide 11, "Project Schedule," and shared that the commercial contracts, the project financing, and the initial transmission line construction were all accomplished in 2011, while the final construction of the line and the turbines for delivery of commercial power would be completed by late September 2012.

MR. SCHUTT discussed slide 12, "Project supports Alaska energy goals," and stated that it aligned with many of Alaska's energy objectives, including private investment, local ownership and operation, local job creation, local contracts, energy supply diversification, long term energy price stability, and environmental responsibility.

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REPRESENTATIVE HERRON asked about the expected life of the entire project.

MR. SCHUTT, in response, assessed the turbine life to be 25 years, whereas most of the components of the turbine itself would have a longer life. He opined that, at the end of the 25 years, the technology will have evolved so that the power generating components could be replaced.

REPRESENTATIVE HERRON asked if the Fire Island site would be utilized for many decades.

MR. SCHUTT expressed his agreement.

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MR. SCHUTT addressed slide 13, "Stone Horn Ridge," and explained that this underground coal gasification (UCG) project was a technology that converted gas in situ into syngas, slide 15, "UCG: Proven, Clean Technology." He noted that this project had been undertaken by CIRI with no public financing.

REPRESENTATIVE KAWASAKI asked for a reconciliation of the statements on slide 15 that UCG was "a proven technology" and that it was "an emerging energy technology."

MR. SCHUTT replied that UCG had been deployed on a commercial scale about 15 times in the former Soviet Union, and studied by the Lawrence Livermore National Laboratory in California, so that it was proven. He offered that it was emerging as not often had it been used commercially in western countries.

REPRESENTATIVE DICK asked if there was any relationship with the coal process that Exxon was developing which the legislature had helped finance.

MR. SCHUTT responded that there was not any relationship.

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MR. SCHUTT explained slide 16, "Southcentral Alaska Energy," and detailed that the Cook Inlet was a massive, deeply buried coal basin and its access depended on this technology. He reported that the core drilling program by CIRI had confirmed significant volume for commercial scale, validated favorable geology, and verified a local market need consistent with the future energy needs of Southcentral Alaska.

MR. SCHUTT described slide 17, "Synthesis Gas," as "the product that comes out of the ground" and noted that once cleaned, can be combusted through a turbine or steam boiler into electricity. He allowed that it was possible to upgrade into methane, also known as synthetic natural gas.

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MR. SCHUTT pointed out that the "Stone Horn Ridge site," slide 18, was north of the Beluga River, about 40 miles west of Anchorage. He moved to slide 19, "Project History," and noted that the 13-hole core drilling, the wire line data program, the concept-level engineering and costing, and the initial

geological, rock mechanics and hydrogeological site model had all been completed.

MR. SCHUTT, summarizing slide 20, "Project Update and Next Steps," said that CIRI would next incorporate the seismic data to complete a model of the site geology and design a site characterization drilling program. After that, they would initiate a permitting process for site characterization and a baseline environmental data collection.

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CO-CHAIR SEATON announced that the presentation by Ahtna, Incorporated on the Geothermal Options would be postponed because no one was available to testify.

DOUG JOHNSON, Director, Alaska Business Development, Ocean Renewable Power Company (ORPC), presented a PowerPoint, "ORPC Alaska Update," and reported, slide 2, "Company Overview," that Ocean Renewable Power Company (ORPC) was formed in 2004 as a new technology company to develop tidal energy and hydrokinetic power systems in marine environments. He shared that ORPC had projects in Maine, Alaska, and Nova Scotia. He asserted, slide 3, "Maine Tidal Energy Project Schedule," that ORPC's first commercial project, in the Bay of Fundy, would be grid connected later in the spring 2012. He offered an overview of ORPC's economic impact, slides 4 & 5, "ORPC's Economic Impact in Maine," which listed 400 to 500 direct jobs with up to \$1 billion in direct investment in the industry.

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MR. JOHNSON directed attention to slide 6 "Impact of Tidal Energy in Alaska," and indicated the \$2 million grant to develop Cook Inlet tidal energy and power. He declared that, although Alaska was a different environment, there was a lot of knowledge that ORPC brought from its Maine projects.

MONTY WORTHINGTON, Director, Project Development, Ocean Renewable Power Company (ORPC), said that Alaska was a parallel story to what ORPC had done in Maine. He referred to slide 7, "ORPC's Economic Impact to Date in Alaska," which listed many of the ORPC business partners within Alaska.

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MR. WORTHINGTON acknowledged that the pilot project on East Foreland in Cook Inlet, slide 8, "East Foreland Project Layout," was an ideal site, as it had a robust current resource very close to a shore with significant transmission infrastructure already in place. He mentioned that a lot of field work had been completed during the previous summer, but that early ice had curtailed work, so there was still more data to be collected. Once the data was collected, the licensing process could be completed.

CO-CHAIR SEATON, referring to slide 9, "East Foreland Tidal Energy Project Deployment Schedule," asked whether the four TidGen Devices listed for the year 2014 would supply the 600 kW of power.

MR. WORTHINGTON affirmed this, then continued with slide 9, stating that the goal for installation was now 2014. He pointed to each phase, which would ultimately allow for a project output of 4950 kW. Directing attention to the Demonstration Phase, he explained that this would ascertain whether the cost of operating tidal energy in Cook Inlet would be competitive with current generation.

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REPRESENTATIVE DICK asked if there was any project concern for federal intervention due to beluga whale endangerment.

MR. WORTHINGTON relayed that the National Marine Fisheries Service (NMFS) had suggested to ORPC that the pilot project begin in an area that was less critical and less high value for the beluga. He said ORPC had a good working relationship with the agencies. He stressed that monitoring to prove there was not an impact on belugas was a key to the project.

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MR. JOHNSON affirmed that ORPC had just signed a joint development agreement with Homer Electric. He moved on to slide 10, "Comparing Tidal Energy Market Incentives," and observed that the State of Maine incentivized companies to enter the market with a Systems Benefit Charge to all utility users. He explained that up to 5 MW of tidal energy was put up for bid at the proposed rate of \$0.26 kWh, with a contract term of 20 years, an impact to rate payers of 15 cents each month. He reported that officials in Maine had determined the economic benefits of tidal energy to far exceed the minimal costs.

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MR. JOHNSON, directing attention to slide 11, "600kW Cook Inlet Power Cost Projections," said that the State of Alaska had currently invested \$2 million in this 600 kW tidal energy project, but the full funding would require about \$13 million. He shared that ORPC had currently committed about \$1.8 million to the project. He pointed out that an additional \$9.25 million was needed.

MR. JOHNSON said this was happening over a three year period to allow for a better understanding of the associated operating and maintenance costs for the turbines in the Cook Inlet. He expressed the need for the additional \$9.25 million in the near future. He added that ORPC was a match with the new Emerging Energy Technology Fund and expressed his belief that the commercial viability of the ORPC technology would be proven this spring with the Maine project.

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CO-CHAIR SEATON asked to clarify the use of the \$9.25 million.

MR. JOHNSON replied that the money was for the three year costs to the 600kW demonstration project.

CO-CHAIR SEATON asked to clarify whether this was only for the first phase.

MR. JOHNSON confirmed that it was necessary to prove what was needed to operate these devices in Alaska. He observed that the costs in Maine and Nova Scotia had shown that it would be expensive. He opined that after three years, ORPC would know the costs, and would make the decision whether to move forward with a pilot project for up to 5 MW of power.

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ADJOURNMENT

There being no further business before the committee, the House Resources Standing Committee meeting was adjourned at 3:00 p.m.