

ALASKA STATE LEGISLATURE  
HOUSE SPECIAL COMMITTEE ON ENERGY

April 16, 2019  
12:31 p.m.

**MEMBERS PRESENT**

Representative Grier Hopkins, Chair  
Representative Ivy Spohnholz, Vice Chair  
Representative Zack Fields  
Representative Tiffany Zulkosky  
Representative Lance Pruitt  
Representative George Rauscher

**MEMBERS ABSENT**

Representative John Lincoln

**COMMITTEE CALENDAR**

PRESENTATION: ALL ALASKA ENERGY PROJECT

- HEARD

**PREVIOUS COMMITTEE ACTION**

No previous action to record

**WITNESS REGISTER**

MEERA KOHLER, President and CEO  
Alaska Village Electric Cooperative (AVEC)  
Anchorage, Alaska

**POSITION STATEMENT:** Presented a PowerPoint, titled "More Than a Pipe Dream."

**ACTION NARRATIVE**

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**CHAIR GRIER HOPKINS** called the House Special Committee on Energy meeting to order at 12:31 a.m. Representatives Hopkins, Rauscher, Spohnholz, and Zulkosky were present at the call to order. Representatives Pruitt and Fields arrived as the meeting was in progress.

**PRESENTATION: ALL ALASKA ENERGY PROJECT**

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CHAIR HOPKINS announced that the only order of business would be a presentation titled "More Than a Pipe Dream."

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MEERA KOHLER, President and CEO, Alaska Village Electric Cooperative (AVEC), presented a PowerPoint, titled "More Than a Pipe Dream." She explained that this was a project that AVEC had "been shopping and pursuing for several years now" and that there was hope to start the project this year. She shared slide 1, "About Alaska Village Electric Cooperative," which read: "A non-profit member-owned electric cooperative Electric service to 58 villages - 32,000 population 38% of Alaska's PCE population." She noted that AVEC was headquartered in Anchorage. She moved on and paraphrased from slide 2, which read: "90 full time employees; 90+ part time employees; 11,400 services; 50 power plants; 170+ diesel generators; 500+ fuel tanks; 8.6 million gallons of diesel; 36 wind turbines serving 20 villages; Two tug and barge sets." She shared slide 3, a map of Alaska with the member communities marked.

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MS. KOHLER discussed slide 4, "The Cost of Rural Power" which read: "11,400 Services - residential and commercial; 118 million kWh sales; \$52 million revenues; \$28 million Total Fuel Cost; \$25 million non-fuel cost; 44¢ - Total revenue per kWh; 397 kWh - Average residential usage per month; 48¢ - Residential revenue per kWh × Power Cost Equalization \$10.7 million, 21% of revenue, 41% of total PCE disbursed." She pointed out that the average cost of power in Rural Alaska was very high while the consumption was very low, with an average monthly residential use of 397 kilowatt hours (kWh).

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MS. KOHLER explained slide 5, "What Alaska Spends on Heat and Power," which showed the Alaska power statistics from 2011. This slide depicted the total revenue received by electric and gas utilities for energy, and how much was spent on diesel fuel in the state. She shared that, at an average of \$4 per gallon for diesel, Alaskans spent more than \$3 billion annually on electricity and heat, with a total expenditure of more than \$60 billion in 20 years. She pointed out that most of this money

went to the outside owners of gas resources and fuel refineries. She moved on to slide 6, "Why an Alaska Grid?" She reported that Alaska lacked a transmission grid that connected the state. She paraphrased from slide 6, which read: "Large scale, high efficiency gas-fired generation; HVDC transmission to move power across Alaska; Lower emissions with large-scale renewables for distant end-users; Abundant power for North Slope operations, Fairbanks and other Railbelt communities, Remote mines, military and processors, Heat and power for rural communities." She added that the initial primary users would be the oil producers themselves although there would be more than enough electricity to ship it to major hub points using High Voltage Direct Current (HVDC) technology. She explained that most conventional electric utilities operated with alternating current (AC) transmission because the power was primarily being shipped for shorter distances and they could afford to correct the imbalances created by AC power. She added that, although DC power could go long distances with low loss, it could be a challenge to convert the power back to AC. She reported that, as technology had now made this relatively inexpensive, this was becoming the transport mechanism of choice around the world. This would create much lower emissions in Alaska as it would be using high efficiency natural gas, and it would create abundant power.

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MS. KOHLER presented slide 7, "HVDC has been in use since 1954," an overview which included the Pacific Intertie, in operation since 1985, which moved power both ways.

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MS. KOHLER displayed slide 8, "The Footprint of HVDC is Smaller than AC," which compared the footprints of AC and DC lines and revealed that the same DC footprint could ship seven to eight times the amount of power using AC. She pointed out that, as DC lines had two independently operating wires, if one AC wire malfunctioned, the entire system was down.

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MS. KOHLER presented slide 9, "In Europe," slide 10, "In North America," and slide 11, "In Canada," reporting that entire countries were being connected with DC. She declared that there was "quite a bit of utilization in Canada," reporting that Manitoba Hydro was considered a major developer of HVDC projects

and was currently feeding power into the United States. She pointed out that this area had a similar construction climate as Alaska, including permafrost and Arctic conditions.

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CHAIR HOPKINS asked whether it was possible to bury the HVDC lines.

MS. KOHLER explained that this was a development of choice, adding that the lines were also submersible with almost unlimited range. She offered an example of a 650-mile project.

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MS. KOHLER shared slide 12, "In Asia," and explained the 1250-mile Xiangjiaba - Shanghai tieline that had moved 6.5 giga watts of power since 2010. She noted that there was now another 13,000 miles of HVDC transmission moving 85 gigawatts of power. She emphasized that China had a huge demand for energy, as was reflected in their transmission system. She reported on slide 13, "Alaska Grid - Phase 1," a 2000-megawatt (MW) power plant on the North Slope and pointed out that the average load throughout Alaska was about 850 MW. As the North Slope oil producers were currently using their own power, this would allow for more power.

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CHAIR HOPKINS asked if there was interest from industry on the North Slope.

MS. KOHLER said that AVEC had spoken with the major producers and that there was interest, noting that the equipment currently used on the North Slope was very old and extremely inefficient. She pointed out that the challenge was that the producers were using free gas, so efficiency did not matter, although emissions could drive the decision. She offered her belief that an option to utilize energy from someone else would be well received. She stated that this was a situation in which the producers "don't want to get in the way of an administration that wants to develop a gas pipeline, adding that there had been some political pressures over the last several years. She offered her belief that there would be a lot of interest from the North Slope producers for this project. She returned attention to slide 13 and shared that the projected capital cost of \$2.5 billion was based on costs in the Lower 48 multiplied by 1.5

times to reflect the Alaska costs. She suggested that power could be produced for about \$0.05 per kWh.

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MS. KOHLER moved on and paraphrased slide 14, "Alaska Grid Phase 2," which read:

HVDC transmission to Fairbanks

Power for GVEA - adequate to provide space heat  
Adequate energy for Fort Knox  
Adequate energy for Livengood mining district

Capital Cost: \$1.65 Billion  
Delivered cost of power:  $\$.05 + \$.015 = \$.065/\text{kWh}$   
 $\$18/\text{mcf}$  gas at 85% efficiency =  $\$.072/\text{kWh}$

MS. KOHLER pointed out that the cost at \$.065 per kWh was 10 percent less than \$18 per mcf gas at 85 percent efficiency in the home, \$.072 per kWh, declaring this was a viable option.

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MS. KOHLER shared slide 15, "Alaska Grid Phase 3," which read:

HVDC transmission to West Coast

Adequate energy supply for Ambler mining district  
Power for Red Dog mine  
Power for Kotzebue/Nome area (electricity and heat)  
Pathway for West Coast wind power

Capital Cost: \$900 Million  
Delivered cost of power:  $\$.065 + \$.107 = \$.172$  (40% of capacity)  $\$.12$  (85% of capacity)  
 $\$4.00$  diesel with 85% efficiency for heat =  $\$.125/\text{kWh}$

MS. KOHLER said that this also opened up the ability to bring in wind power from the west coast, as it was a vast resource that was not being utilized. If there was an avenue to move that renewable power, it would become feasible to develop. She explained that the delivered cost of power from Fairbanks was \$0.65 with an additional \$0.10 if only using 40 percent of the transmission capacity, for a total of \$0.172; however, if 85 percent of the capacity was utilized, the cost of delivered power would drop to \$0.12. She compared this to the much higher

cost of diesel. She clarified that these estimated costs were predicated on the entire cost of construction being funded by investors for 30 years at 7 percent interest. She noted that, as the largest cost was this cost of money, any better rate of interest would bring down the cost to the consumer.

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CHAIR HOPKINS asked if the \$900 million line would originate at the plant on the North Slope and for how many miles, as mentioned on slide 15.

MS. KOHLER explained that this line would come from the Fairbanks area, although an option from the North Slope would also be weighed.

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MS. KOHLER moved on to paraphrase slide 16, "Alaska Grid Phase 4," which read:

HVDC transmission to Y-K area

Adequate power for Donlin Gold

Adequate power for Bethel and surrounding area

Capital Cost: \$510 million

Delivered cost of power: \$.065 + \$.058 = \$.123 (40% of capacity) \$.098 (85% of capacity)

REPRESENTATIVE FIELDS asked if this was an alternative to building a gas line to deliver power to Donlin.

MS. KOHLER replied that it could be an alternative, and that Donlin needed an option "to nail down." She added that building the transmission line in the next few years would probably persuade Donlin to go with it. She reported that an earlier analysis in 2011 had stated that Donlin needed energy at about \$0.12 per kWh in order for the project to be feasible.

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MS. KOHLER paraphrased slide 17, "Alaska Grid Phase 5," which read:

HVDC transmission to South-Central

Adequate power to supplement local generation  
Pathway to move hydropower from Susitna  
Pathway to integrate tidal/geothermal power

Capital Cost: \$1.2 Billion

Delivered cost of power: \$.065 + \$.022 = \$.087

MS. KOHLER reported that this would be the last phase and noted that although the cost of power had been less than \$0.08 kWh when she arrived in Anchorage 20 years earlier, it was now almost \$0.20 kWh, which did not support economic development.

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REPRESENTATIVE FIELDS asked if Alaska was overbuilt because of the lack of coordination among the different utilities.

MS. KOHLER opined that Alaska was not overbuilt as the gas fired generation was aging, hence many of the plants had aged out. She offered that this would replace those aged plants without adding more capacity. She stated that this was keeping a lid on demand as there was not yet the ability to serve very large potential users at an affordable cost. She said that this was an option to bring affordable power to developers that could not afford to buy the current power.

REPRESENTATIVE FIELDS asked if there would be a shift in the next generation.

MS. KOHLER replied that, in a transmission grid, as it was best to have several sources of power, it would always be good to have contributors from elsewhere in the Railbelt and not mothballing any generation but, instead, supplementing what already existed and putting the most efficient generation on-line to serve current and future customers.

REPRESENTATIVE FIELDS asked if gas generated electricity was more economical on the North Slope or in Anchorage.

MS. KOHLER posited that it was much more economical to develop on the North Slope because the cost of gas in Cook Inlet was expensive. As the demand was relatively low, the cost for the producers was high. She offered her belief that the utilities were buying gas at \$7 - \$8 per mcf, whereas the Henry Hub price was under \$3. She said that there were many iterations which

made it much more cost effective to generate on the North Slope. She stated that moving gas by wire was far more practical than moving gas by pipe.

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MS. KOHLER shared slide 18, "Combined Project Costs," and reported that the current retail sales of electricity in Alaska were about 6.3 billion kWh. She pointed out that Sacramento, California, sold more than 14 billion kWh. She noted that, as Alaska had a large potential industrial load that was not being supported, there was a need for adequate energy.

MS. KOHLER directed attention to slide 19, "What Else is Under Consideration?" She listed the Susitna-Watana Dam project, Susitna Access, the Railbelt Transmission Upgrades, the Fairbanks LNG trucking operation, and the Bullet Gas Line as ideas still being considered. She noted that she had not included the \$45 billion gas pipeline as it was something that would happen when it happened, and it would not impact Alaska as a whole.

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MS. KOHLER pointed to slide 20, "Recent Utility Projects," which read:

- GVEA - Healy Restart
- CEA/ML&P - SCPP
- CEA Beluga - Standby
- MEA - Eklutna
- HEA - Soldotna/Nikiski
- ML&P Plant 2 - Replacement
- ML&P Plant 2 - Standby

MS. KOHLER stated that these would add about 200 MW of capacity at a cost of \$1 billion because of the need to replace aging plants, a necessity every 30 - 40 years. She added that this did not create additional capacity, and that she did not believe that Alaska was overbuilt.

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MS. KOHLER shared slide 21, "Possible Unmet Energy Needs," which read:

North Slope Operations 300 MW

Gas Turbine Conversion 1000 MW  
Pipeline Operations 100 MW  
Ambler Mining District 300 MW  
Red Dog/Nome 100 MW  
Donlin Creek 180 MW  
Refining/Smelting 500 MW  
Processors 100 MW  
Value-Add 200 MW  
Server Farm 500 MW  
Electric Heat

MS. KOHLER reported that the Alyeska Pipeline Service Company would like to buy electricity from the utilities and not have to generate their own, as this cost to processors was making the cost of fish "uncompetitive." Pointing to the list, she stated that an environment that fostered development would allow these operations to exist.

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REPRESENTATIVE FIELDS asked if the processors in Naknek and King Salmon were potential energy users.

MS. KOHLER replied that this was feasible although Bristol Bay was working toward the development of a project for local service. She explained that the proposed project could not provide an HVDC line to "every nook and cranny of Alaska" as it was not cost effective. She pointed out that development of the HVDC line would benefit many communities and that power cost equalization would no longer be necessary. She spoke about value added processing in Alaska, instead of shipping fish out in the raw.

MS. KOHLER, in response to Representative Fields, stated that there were many other processors beyond Bristol Bay that would benefit, including Dutch Harbor. She pointed to the year-round jobs benefit of becoming "the fish supplier of the world."

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MS. KOHLER moved on to slide 22, "How Much Gas Would It Take?" and pointed out that a 5.0 GW project, which was more than five times what Alaska was currently using, would use 6.8 trillion cubic feet of gas in 30 years, which was a very tiny fraction of the gas on the North Slope. She declared "We can have our cake and eat it too!"

MS. KOHLER paraphrased slide 23, "The Benefits of Connecting Alaska," which read:

Reduce the number of power plants  
Consolidated loads improve economics of  
interconnection.  
Larger loads make renewables like wind or hydro  
feasible  
A grid allows large scale development of renewables to  
serve loads across the state

MS. KOHLER concluded with slide 24 and stated: "Let's ship "Made in Alaska" not "Pieces of Alaska." She declared that we treat ourselves like a colony state, a pathway that should stop.

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CHAIR HOPKINS asked how redundancy in the lines was built into the plan.

MS. KOHLER pointed out that, in a DC transmission grid, each wire could operate independently and was considered more reliable than AC transmission because there was a degree of redundancy. She declared that both DC lines would not go down at the same time, that the primary suppliers guaranteed 98.5 percent availability. She explained that the lines were built with the capacity to move a great deal more than what was being demanded. She noted that some areas would be buried to avoid avalanche and that transmission lines did not have the same vulnerability to seismic activity as with a pipeline.

CHAIR HOPKINS asked if the transmission lines would go to the regional hubs in Rural Alaska, and whether smaller lines would go to neighboring villages.

MS. KOHLER acknowledged that villages were currently being connected using AC and that there was development work for a smaller conversion system to allow for longer distance connections using single wire DC lines. She said that currently the DC would only go to a conversion station at each hub, where it would then be moved via AC to the villages. She offered her belief that there would soon be a small-scale DC conversion system which would make it more practical to send long distances. She pointed out that large transmission lines did not mean that all the communities along the way had use of that power. It was necessary to have a substation with large

transformers, which could not be justified for all the small communities.

REPRESENTATIVE FIELDS asked about any impact on the efficiency of a large plant on the North Slope with an HVDC line to Anchorage with the infrastructure in Fairbanks to convert to AC. He questioned the amount of loss.

MS. KOHLER replied that the rule of thumb for losses over distance was about 4 percent, about the same as a gas pipeline. She said that AC was a little higher because the voltage of the AC transmission had to be stepped up. However, there was not the need to correct the quality of power for DC. She reported that, as semi-conductors and computers had improved, the same technology was used in the conversion stations and that there could be DC to AC conversion at one end of the station and AC to DC conversion at the other end of the station.

REPRESENTATIVE FIELDS asked if there was a 4 percent loss from North Slope to Anchorage, regardless of any additional points of conversion.

MS. KOHLER expressed her agreement.

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REPRESENTATIVE SPOHNHOLZ commented that, after many years of associating a very high price tag with a gas pipeline, there was the possibility for a much lower cost alternative which could monetize the resource and "provide access to energy for that swath of Alaska that are highly underserved." She compared the projected cost of \$6.7 billion for this distribution to the \$45 billion for a gas pipeline that would still not distribute energy to the communities. She declared that it was exciting for this alternative. She asked for more information about the potential to convert gas into electric energy. She added that getting energy to parts of Rural Alaska created other economic development opportunities, including mining and fish processing.

MS. KOHLER pointed out that, in Naknek, two large new generators had been installed for the good quality freezing the processing industry needed to occur. She noted that the primary purpose of the gas pipeline was to export the gas, whereas the electrical distribution project did not. She shared some history of the project, reporting that ARCO had proposed a submersible cable from the North Slope to California to move 20 gigawatts of power created with gas from the North Slope. She acknowledged that

she was unsure how the State of Alaska would receive any compensation from a similar project, although the state could charge a tax on any electricity being shipped out of the state.

REPRESENTATIVE SPOHNHOLZ declared that the Alaska State Legislature was "always willing to find a way to monetize these things."

CHAIR HOPKINS asked about a role for the state in this endeavor.

MS. KOHLER offered her belief that the state needed to take a primary lead, similar to their actions with the Interior Gas Utility, by testing the feasibility of the project and serving as the lead permitting agency. She pointed out that there would be a lot of permitting required for the rights of way and to develop the lines. She noted that, as the aggregator, the state would lend the project credibility and would give the investors a "sense of credibility" as there would be a "state player that's involved at a high level." She declared that this was a huge project that needed to be managed by professionals. She shared her vision for the state taking the lead for the feasibility analysis and "working with the key players to pull together a pathway forward." She pointed out that many of the end users would shelve their self-production ideas if they knew the state was involved with the project. She reminded that the costs presented were completely independent of any state funding, pointing out that these costs would be lower if the borrowing costs were lowered, and a potential role for the state would be for bonding or bringing in large investors.

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CHAIR HOPKINS referenced a recent Legislative Research Services report which indicated about 80 different energy plans since 1983 and asked if any of these had been incorporated into the long-term energy plan.

MS. KOHLER said, "no," that the last energy plan had been an effort in 2006 by the House Special Committee on Energy which had put forth some euphemistic goals and targets, but not a step by step plan. She declared the need for a concrete plan. She referenced the 1981 Stone and Webster report, which had identified the key hydro projects for development and declared that power cost equalization was the only option for Rural Alaska, as the last energy plan.

CHAIR HOPKINS spoke about smaller energy plans.

MS. KOHLER replied that they were all local or very small regional plans.

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MS. KOHLER, in response to Chair Hopkins, spoke about the potential for appointing a committee to produce a realistic energy plan for all of Alaska with a goal for economically enhancing what already exists. She suggested that the state direct Alaska Industrial Development and Export Authority to work on a comprehensive Alaska energy plan that included large scale generation and transmission across the state. She suggested a resolution from the legislature. She declared that Alaska needs a grid.

CHAIR HOPKINS asked if it would be necessary to require utilities to purchase the gas and to utilize it when it became available.

MS. KOHLER offered her belief that it was best to offer a product to which utilities could not say no and make this product enhance what they were already doing. The utilities needed an assurance that they could collect their fixed costs through whatever process, such as non-fuel charges. It had to be cost effective for all Alaskans.

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#### **ADJOURNMENT**

There being no further business before the committee, the House Special Committee on Energy meeting was adjourned at 1:18 p.m.