ALASKA STATE LEGISLATURE
SENATE COMMUNITY AND REGIONAL AFFAIRS STANDING COMMITTEE
January 30, 2020
3:32 p.m.

MEMBERS PRESENT

Senator Click Bishop, Chair
Senator Peter Micciche, Vice Chair
Senator Elvi Gray-Jackson

MEMBERS ABSENT

Senator Lyman Hoffman
Senator Mike Shower

COMMITTEE CALENDAR

PRESENTATION: HYDROELECTRIC PROJECTS IN ALASKA BY ALASKA ENERGY AUTHORITY

- HEARD

PREVIOUS COMMITTEE ACTION

No previous action to record

WITNESS REGISTER

CURTIS THAYER, Executive Director
Alaska Energy Authority
Anchorage, Alaska
POSITION STATEMENT: Provided an overview of hydroelectric projects in Alaska.

BRYAN CAREY, Hydro Power Manager
Alaska Energy Authority
Anchorage, Alaska
POSITION STATEMENT: Answered questions regarding hydroelectric projects in Alaska.

ACTION NARRATIVE

3:32:12 PM
CHAIR CLICK BISHOP called the Senate Community and Regional Affairs Standing Committee meeting to order at 3:32 p.m. Present at the call to order were Senators Gray-Jackson, Micciche, and Chair Bishop.

Presentation: Hydroelectric Projects in Alaska by Alaska Energy Authority

3:33:05 PM
CHAIR BISHOP announced that the only order of business would be a presentation by the Alaska Energy Authority (AEA) on hydroelectric projects in Alaska.

3:33:52 PM
CURTIS THAYER, Executive Director, Alaska Energy Authority, Anchorage, Alaska, commenced on slide 2 of his presentation, Who We Are, paraphrasing the following:

- Created in 1976 by the Alaska Legislature, the Alaska Energy Authority (AEA) is a public corporation of the State of Alaska governed by a board of directors with the mission to "reduce the cost of energy in Alaska." AEA is the state's energy office and lead agency for statewide energy policy and program development.

CHAIR BISHOP explained that the Senate Community and Regional Affairs Committee will be more energy centric. He said the Senate Resources Committee is the final gatekeeper on energy related things, noting that Senator Micciche is the chairman of that committee.

3:35:17 PM
MR. THAYER summarized slide 3, What We Do, that read as follows:

- Energy Planning – In collaboration with local and regional partners, AEA provides critical economic and engineering analysis to plan the development of cost-effective energy infrastructure.
- Grants and Loans – AEA provides loans to local utilities, local governments, and independent power producers for the construction or upgrade of power generation and other energy facilities.
- Railbelt Energy – AEA owns the Bradley Lake Hydroelectric Project and the Alaska Intertie (both valued over $600 million). These assets benefit Railbelt consumers by reducing the cost of power.

- Renewable Energy – AEA provides renewable energy and energy efficiency grants, analysis, and expertise to benefit Alaskans. These include hydro, biomass, wind, solar, and others.
- Power Cost Equalization – The Power Cost Equalization Program reduces the cost of electricity in rural Alaska for residential customers and community facilities.
- Rural Energy – AEA constructs bulk fuel tank farms, diesel powerhouses, and electrical distribution grids in rural villages. AEA supports the operation of these facilities through circuit rider and emergency response programs.

3:35:41 PM
MR. THAYER turned to slide 4, Our Projects, and explained that the statewide map illustrates AEA projects over the past 10 years. AEA has been involved in over 300 projects that include geothermal, hydroelectric, solar, wind, and biomass. AEA currently has over 80 active projects in Alaska.

MR. THAYER reviewed the following projects and programs listed on slide 5:

- Bradley Lake Hydroelectric Project,
- Alaska Intertie,
- Bulk Fuel Upgrades,
- Rural Power System Upgrades,
- Rural Utility Assistance,
- Power Cost Equalization,
- Renewable Energy Fund Grants,
- Power Project Fund Loans,
- Alaska C-PACE,
- Alternative Energy,
- Energy Efficiency,
- Energy Project Development.

MR. THAYER displayed the state map on slide 6 that illustrates the hydropower projects in Alaska that AEA is aware of. There are three projects in construction, six in the design stage, and 51 projects in operation. He explained that AEA only knows about hydropower projects when the project has reached out to AEA for technical advice, funding, or input.

SENATOR GRAY-JACKSON asked if there are any projects in Akutan.

MR. THAYER replied he will check and follow up with the information. He noted that King Cove currently has a maintenance project that AEA is possibly funding.

SENATOR GRAY-JACKSON disclosed that she used to work for the City of Akutan.

CHAIR BISHOP asked what percentage of power generation in Alaska comes from hydropower.

3:37:53 PM
MR. THAYER answered approximately 28 percent. The graph on slide 7 illustrates that in 2008 Alaska generated 18 percent of its electric energy from hydropower. That grew to 27 percent in 2017. The graph also shows that energy generation from wind is increasing, oil is staying the same, natural gas and coal are both decreasing slightly.

SENATOR MICCICHE commented that it would have been interesting to see the slide on a kilowatt load. He noted that since 2008 there has not been a lot of variation in the hydrocarbons, but there was a significant increase in renewables. He asked if the kilowatt demand increased and if renewables account for the increase.

MR. THAYER answered yes. He explained that over the last 10 years there has been an increase in hydroelectric and natural gas output.

SENATOR MICCICHE asked him to provide additional information on how energy generation has changed.

MR. THAYER agreed to provide the information.

3:39:25 PM
MR. THAYER explained that the two types of hydropower projects are traditional storage and run of river.

- Traditional Storage projects tend to be more expensive, require terrain chokepoints, and require more time for permitting and construction. These projects include:
    - Bradley Lake,
    - Snettisham,
    - Susitna-Watana,
    - Swan Lake,
    - Sweetheart Lake,
    - Terror Lake.

- Run of River projects are lower cost and tend to be permitted and constructed quicker. These projects include:
    - Delta Creek,
    - Five Mile Creek,
    - Gartina Falls,
    - Humpback Creek,
    - Knutson Creek,
    - Nuyakuk River,
    - Thayer Creek.

MR. THAYER detailed that a river continues in run-of-river projects. They tend to flow more in the summertime when peak demands are greater but flow less in the wintertime, whereas traditional dams store water up in the wintertime.

MR. THAYER reviewed the following relevant terms on slide 11:

- Capacity of a generator is measured in megawatts (MW) or kilowatts (kW) at a single point in time.
- Project Energy is power over time. Commonly measured as Megawatt-hours (MWh) or kilowatt-hours (kWh).
- A house on the Alaska Railbelt may use 500-600 kWh per month energy.
- 1 watt equals a single LED.
- 1 kilowatt (1,000 watts) equals a toaster.
- 1 megawatt (MW) (1,000,000 watts) equals 1,000 houses.
- 1 gigawatt (1,000,000,000 watts) equals 1,000,000 houses.

3:41:12 PM
MR. THAYER displayed slide 13, Alaska Hydropower Projects in Operation:

- 51 operational hydropower projects in Alaska.
- Three projects under construction to increase statewide capacity by 5.5 MW to be completed in 2020.
- Projects in design and funding to increase capacity by nearly 491 MW.

MR. THAYER detailed that the Susitna-Watana Project is in design, which explains the 491 MW increased capacity.

He explained that the three projects under construction include the $47 million Battle Creek Project that will divert Battle Creek into Bradley Lake to increase lake capacity. It is an AEA project that has the support of the Railbelt utilities. The nearly completed Hidden Basin Project will also increase

capacity. The Hiilangaay Project on Prince of Wales Island will come online the summer of 2020 and have a 5 MW capacity.

3:42:31 PM
MR. THAYER paraphrased the following information on slide 14, State Involvement in Hydropower Projects:

- State of Alaska owns over 40 percent of statewide hydropower capacity:
  - Bradley Lake (AEA),
  - Snettisham (AIDEA).
- State of Alaska through AEA/AIDEA has supported the development of more than two-thirds of statewide hydropower capacity.

He noted that the photo shows Snettisham on Long Lake. The Alaska Industrial Development and Export Authority (AIDEA) owns Snettisham, AEA manages it, and Alaska Electric Light and Power (AEL&P) in Juneau operates it. Mr. Carey with AEA is the program manager.

He explained that Bradley Lake and Snettisham are state-owned assets that account for 42 percent of the hydroelectric production in the State of Alaska.

MR. THAYER reviewed the following information about Bradley Lake:

- Located 25 miles northeast of Homer and serves Railbelt.
- Capacity of 120 MW.
- Completed in 1991.
- Funding by State of Alaska and Railbelt utilities.
- Owned by AEA and managed to the maximum extent by Railbelt utilities.

He said the management committee for Bradley Lake is the governing body that meets regularly. The Bradley Lake photo on slide 15 (taken the fall of 2019 during the Swan Lake Fire) shows the lake at near capacity and spilling over, which is never desirable. Bradley Lake lost about $1 million worth of energy when it was at capacity.

3:44:04 PM
CHAIR BISHOP asked if Alaska is reaping 100 percent benefit from Bradley Lake.

MR. THAYER answered no, primarily because of constrained power due to line loss going north into the Anchorage and Fairbanks

areas. The power lines do not necessarily have the built-in deliverable power capacity that Bradley Lake can deliver. At certain times, the line loss to Fairbanks is close to 40 percent. Conversations with the Railbelt utilities on the needed line upgrades, specifically the fire-damaged S&Q line are ongoing. Needed upgrades would be from Bradley Lake to Quartz Creek, which is the Hope Substation.

CHAIR BISHOP asked if an upgraded line from Bradley Lake to the Hope Substation would allow the state to reap maximum yields.

MR. THAYER replied that expensive venture would require upgrades in phases. He said a study done 10 years ago, which AEA would like to update, looks at $1 billion worth of power line infrastructure. The state owns a higher capacity line from Willow to Healy, so the structures are there. To maximize the benefits, a parallel line pole configuration is needed in the Kenai Peninsula.

3:46:12 PM
SENATOR MICCICHE asked if a subsea line from Kenai to Tyonek has been evaluated, as opposed to a parallel line. He noted that if there had been parallel lines in 2019, it is likely that both would have been lost in the fire.

MR. THAYER answered that the conversation is ongoing, but not all the utilities are in support. The utilities are not pushing the conversation in any direction.

MR. THAYER reviewed the following information about Snettisham:

- Located 30 miles southeast of Juneau and serves Juneau.
- Capacity of 78 MW.
- Initial completion in 1973.
- Funded by the federal government.
- Owned by AIDEA, managed by AEA, and operated by Alaska Electric Light & Power (AEL&P).

CHAIR BISHOP asked how much lifespan has Snettisham left.

MR. THAYER replied the bond payoff for Snettisham occurs in 20 years.

3:47:54 PM
BRYAN CAREY, Hydro Power Manager, Alaska Energy Authority, Anchorage, Alaska, added that AEL&P has hydroelectric plants

that have been in operation for more than 100 years, so Snettisham should be able to operate another 100 years.

MR. THAYER reviewed the following points on slide 17, Four Dam Pool Power Authority:

- AEA sold to local utilities in 2002:
  - Solomon Gulch,
  - Swan Lake,
  - Terror Lake,
  - Tyee Lake.
- Proceeds helped establish the Power Cost Equalization Program Endowment.

He said knowing where the endowment for the Power Cost Equalization (PCE) Program started is important. The $28 million PCE program helps rural Alaska with high energy costs. He added that building the intertie between Willow and Healy helped Fairbanks save $40 million. The investment by the state was a large sum of money, but it provided a $40 million benefit to Fairbanks and established the PCE endowment.

3:49:36 PM

MR. THAYER reviewed the following information from slide 19, Alaska Hydropower Projects in Construction:

- Four projects under construction to increase statewide energy by 5.5 MW to be completed in 2020:
  - Gunnuk Creek,
  - Hidden Basin,
  - Hiilangaay,
  - West Fork Upper Battle Creek.

CHAIR BISHOP asked if the West Fork Upper Battle Creek will only add water to the reservoir.

MR. THAYER answered correct; it adds capacity but not energy.

He explained that Gunnuk Creek is located in Kake, Alaska, has 0.5 MW capacity, will be completed in 2020, was funded by an AEA grant and Inside Passage Electric Cooperative financing, and is owned by the Inside Passage Electric Cooperative.

Hidden Basin is located 22 miles southeast of Kodiak and serves the City of Kodiak and surrounding communities. It adds water to the existing dam but zero capacity. It was completed in December 2019 and is financed and owned by the Kodiak Electric Association.

Hiilangaay is located 8 miles east of Hydaburg and serves Prince of Wales Island. It has 5 MW capacity, will be completed in late summer or early winter of 2020, and was funded primarily by AEA through grants, loans, and Alaska Power & Telephone. Hiilangaay is owned by Haida Energy.

MR. THAYER explained that the legislature, through AEA, gave the Hiilangaay Project a $6 million grant. The legislature also approved an additional $20 million loan through the AEA Power Project Fund to finance the bulk of the project. The State of Alaska has $26 million in the Hiilangaay Project and Alaska Power & Telephone has money in it as well.

3:51:29 PM
CHAIR BISHOP noted that he met Mr. Thayer on a plane last summer and they talked about hydropower. He asked Mr. Thayer if he was going to the Hiilangaay Project at that time.

MR. THAYER answered yes and noted that he took the photo shown on slide 22 during his visit. He pointed out that Vigor Shipyard welders were working on the penstock shown in the photo.

MR. THAYER returned to the presentation and explained that West Fork Upper Battle Creek is located 2 miles [southwest] of Bradley Lake dam. It adds water to the lake but has zero capacity, will be completed in summer 2020, is funded by an AEA grant and Railbelt utilities, and is owned by AEA.

MR. THAYER explained that the photo on slide 23 shows a 62-inch, high-density polyurethane pipe that will divert water into Bradley Lake.

CHAIR BISHOP asked if the pipe used for West Fork Battle Creek is plastic.

MR. THAYER answered yes. He noted that the Hiilangaay Project is using fiberglass.

SENATOR MICCICHE questioned how capacity is evaluated because a project would not be built if the capacity were zero.

MR. THAYER answered correct, it is the energy behind it. He deferred further explanation to Mr. Carey.

3:53:27 PM
MR. CAREY explained that the two important terms are capacity and energy. The capacity is like the size of the engine in a

truck that has either four, six, or eight cylinders. The energy tells utilities how long a certain capacity can be sustained. In the case of Battle Creek or Hidden Basin, water is added to an existing lake and it increases the energy available for the entire year. By comparison, new hydroelectric projects must have a new generator so that is why they have a capacity number attached.

CHAIR BISHOP analogized that the cubic inches on an engine has not changed, but improved fuel usage has occurred.

MR. CAREY answered correct.

SENATOR MICCICHE asked if a hydro turbine runs at the same speed if there is adequate water for turbine rotation.

MR. CAREY answered that the turbines he is familiar with run at the same speed.

SENATOR MICCICHE suggested that he think of a better way to explain capacity. He said Mr. Carey is saying that capacity is essentially your horsepower, whereas Senator Bishop described capacity as having more fuel available for the times when there is not adequate fuel due to water supply.

3:55:40 PM
MR. CAREY answered correct. He explained that an eight-cylinder truck will go through fuel from a fixed gas tank more quickly than a four-cylinder truck. He said for the most part, the lakes have a greater capacity than the hydroelectric projects really need. Generators will run at lower power than the actual capacity. Bradley Lake, which has 120 MW capacity, operates at 42 MW or 43 MW on a year-round average to avoid using all the water. Monitoring water capacity in a lake occurs to match demand where the generator drops down to a lower amount.

CHAIR BISHOP asked what MW capacity Bradley Lake will have when it is fully operational. He noted that Bradley Lake currently operates at 42 MW.

MR. THAYER answered there will a 10 percent increase.

CHAIR BISHOP calculated that Bradley Lake will ultimately operate at 52 percent.

MR. THAYER reviewed the Alaska hydropower projects that are in design listed on slide 25. The slide read as follows:

- Projects in design/funding to increase statewide energy by greater than 491 MW hours
    - Nuyakuk River
    - Susitna-Watana
    - Sweetheart Lake
    - Thayer Creek

MR. THAYER detailed that Susitna-Watana is projected to increase capacity by 459 MW on the average pool; Nuyakuk River is about 12 MW; Sweetheart Lake is 19.9 MW; and Thayer Creek is 0.85 MW.

MR. THAYER explained that the Nuyakuk River project is located 50 miles north of Dillingham and would serve regional communities, the capacity is approximately 12 MW, the completion date and funding are yet to be determined, and it is owned by Nushagak Electric & Telephone Cooperative. Senate Bill 91, that passed in 2019, allows for the development and operation of a hydro facility in the state park.

MR. THAYER said the map on slide 26 shows that six communities will benefit if transmission lines are built to connect to this hydro project rather than using diesel generation.

3:58:56 PM
MR. THAYER displayed slide 27 and detailed that Susitna-Watana is located approximately 125 miles northeast of Anchorage and would serve the Railbelt, the average capacity was designed for 459 MW, and the average annual energy was projected to be 2,800,000 MWh. The completion date, funding, and ownership are yet to be determined.

He reminded the committee that Governor Walker shelved the Susitna-Watana project in 2015. No money has been spent on it to date, but AEA has completed about two-thirds of the licensing and engineering. He emphasized that this is a valid project as far as construction. AEA's view is that a stage-gate approach is appropriate to determine what permits are still valid and how much it will cost for the additional licenses. The state has already spent $200 million and estimates for a FERC license range from $50 million to $100 million.

SENATOR GRAY-JACKSON asked him to comment on the organizations that oppose the Susitna-Watana project.

MR. THAYER communicated that a hearing on the Susitna-Watana project is scheduled for February 11. He clarified that the project is not using state money; the information in the

presentation is based on existing information and the work to date. He reiterated that completion is hypothetical and explained that when the project was put into abeyance in 2015, FERC licensing looked to be a year or two away. He said construction time for this size of dam is close to 10 years. Project financing for the $4.5 billion to $5 billion project was available in 2000. Updated studies have not occurred since the project was suspended.

4:01:28 PM
SENATOR GRAY-JACKSON pointed out that opposition to Susitna-Watana is not about the funding, but about the environment. She asked his opinion of the opposition.

MR. THAYER replied that any project, but particularly one of this magnitude, needs renewed stakeholder engagement because a lot has changed with hydro-dam technology. The project will have to go through every step of the permitting process again. He clarified that AEA is not restarting the project, but if it were completed it would take the Railbelt to almost 60 percent renewable. That would meet the governor's goal as well as a 10-year-old state goal of being more than 50 percent renewable by 2025. He conceded that the dam will not be built by 2025.

SENATOR MICCICHE remarked that he struggles between the balance of reduced carbon production of renewables versus impacts on anadromous streams and downstream water flow. He said aside from the cost, Bradley Lake is producing at about $0.0450 per kilowatt and the rest of the Railbelt, which is hydrocarbon fueled, is probably $0.1300 per kilowatt.

MR. THAYER concurred.

SENATOR MICCICHE said he does not know where the balance lies, but ongoing public discussions are worth having.

MR. THAYER noted that when the project was first proposed in 2014, the cost per kilowatt appeared to be $0.0600 to $0.065. The cost discrepancy into the Railbelt is clear with Bradley Lake at $0.045 per kilowatt, Susitna-Watana at $0.0650, and hydrocarbons at $0.0800 to $0.1000 per kilowatt.

4:04:05 PM
CHAIR BISHOP asked if hydropower is classified as renewable energy today or it is under discussion.

MR. THAYER answered that the discussion is ongoing. Some classify it as renewable and some do not.

MR. THAYER communicated that Sweetheart Lake is located 33 miles southeast of Juneau, the capacity will be 19.9 MW, the completion date and funding are to be determined, and it is owned by Juneau Hydropower Inc.

He detailed that Sweetheart Lake has a Federal Energy Regulatory Commission (FERC) license. AEA is working through an interconnection agreement with Snettisham to move the power that the Regulatory Commission of Alaska (RCA) must approve. Funding and a business model are still needed, but the project is feasible. AEA is helping through the first step of connecting with Snettisham, but Juneau Hydropower Inc. must build their own transmission line south of the Snettisham line.

4:05:48 PM
MR. THAYER said Thayer Creek is located 6 miles north of Angoon, the capacity is 0.85 MW, the completion date is to be determined, funding is by AEA, Kootznoowoo Inc. and Inside Passage Electric Cooperative, and the dam is owned by Kootznoowoo Inc.

He explained that AEA delayed the project for seven years. An advisory committee put conditions on the grant money and for six years the Alaska Department of Law argued that the community in Kootznoowoo did not meet the grant requirements. AEA reexamined the Capital Project Submission and Information System (CAPSIS) and discovered that there were no requirements when the legislature appropriated the money. Therefore, AEA and the Alaska Department of Law did not have a right to put conditions on the money. The funding is not all lined up but Thayer Creek will hopefully be constructed.

CHAIR BISHOP asked if Angoon would get 100 percent of its energy from hydro once the project is completed.

MR. THAYER answered that he is not sure and will get back to the committee with the information.

4:07:40 PM
MR. THAYER concluded the presentation reading the following from slide 30:

- AEA provides energy solutions to meet the unique needs and opportunities of Alaska's rural and urban communities.

MR. THAYER said AEA knows of about 90 projects in the state and is involved in about half. He offered to share the spreadsheet of all the projects with the committee. He noted that one project was built in 1904 and is still in operation and tracked. AEA usually lists projects for larger communities and does not necessarily list small-demand projects.

CHAIR BISHOP commented that there are hydropower projects built pre-statehood that are off the grid and unknown.

MR. THAYER agreed and explained that AEA primarily keeps tabs on projects that involve state money or technical advice provided by AEA.

CHAIR BISHOP asked if AEA has maintained an archive on all the Susitna-Watana studies dating back to the 1980s.

MR. CAREY answered that AEA has a large library on microfiche or portable document format (PDF) for the project.

4:09:43 PM
CHAIR BISHOP asked if there are alternative rivers and potential outputs in the Healy and Cantwell area.

MR. CAREY answered that there are alternative rivers, such as the Nenana River, but they all have less energy and less wintertime storage than the Susitna River. The alternative rivers have a variety of permitting and fisheries issues as well.

CHAIR BISHOP thanked Mr. Thayer and Mr. Carey for their presentation. He said the committee might request additional data on Susitna-Watana.

SENATOR MICCICHE remarked that the state has gone through high revenue years since the creation of AEA in 1976. One of the greatest challenges in Alaska is the high cost of energy and so much of the state has the diesel reset that is cumbersome at best.

SENATOR MICCICHE asked if consideration has been given to having a longer-term statewide energy plan that captures the best of the best regionally for future potential between diesel, gas, hydropower, hydrokinetic, geothermal, wind, solar, or tidal. He said even a long-term plan will help in evaluating what a goal may look like. He also discounted the statement that some do not consider hydro as renewable.

SENATOR MICCICHE stressed that his question is not a reflection on AEA because the legislature has not made an energy plan a priority. He pointed out that Alaskans are having the same struggles they have had for 50 years and it seems like there has been very little forward motion.

4:12:17 PM
MR. THAYER said AEA completed a statewide energy plan in 2010 and it is time for an update because a lot of things have changed since then.

He observed that the legislature made renewable energy a priority when prices were high. He pointed out that $268 million flowed through AEA into various projects that displaced about $75 million in diesel per year. That investment has clearly paid for itself, but as money has dwindled, so have the projects. He remarked that the state has a lot of projects that are on the cusp of being economic.

MR. THAYER suggested that it is time to reevaluate and look at a statewide energy plan. Technology has changed dramatically for solar and wind, and AEA still has experts in those fields. Even though there have not been the resources or prioritization, AEA does have a plan, but it is sorely outdated.

CHAIR BISHOP said he was part of Governor Palin's cabinet amid the implementation of the previous energy plan. He noted that Senator Coghill's staff showed him a territorial energy plan from the 1950s and remarked that there is nothing new under the sun. He observed that the same 1950s project discussions occurred in 2010. He concurred with Senator Micciche that AEA should receive direction to do more. He also questioned the 10-year construction timeline on Susitna-Watana when the 2,000 MW Hoover Dam took less than five years to construct.

4:15:21 PM
There being no further business to come before the committee, Chair Bishop adjourned the Senate Community and Regional Affairs Standing Committee meeting at 4:15 p.m.