

ALASKA STATE LEGISLATURE
HOUSE SPECIAL COMMITTEE ON ENERGY

March 15, 2022
10:20 a.m.

MEMBERS PRESENT

Representative Calvin Schrage, Chair
Representative Chris Tuck
Representative Matt Claman
Representative Tiffany Zulkosky
Representative Zack Fields
Representative George Rauscher
Representative James Kaufman

MEMBERS ABSENT

All members present

COMMITTEE CALENDAR

HOUSE BILL NO. 301

"An Act relating to the establishment of a renewable portfolio standard for regulated electric utilities; and providing for an effective date."

- HEARD & HELD

PREVIOUS COMMITTEE ACTION

BILL: HB 301

SHORT TITLE: UTILITIES: RENEWABLE PORTFOLIO STANDARD

SPONSOR(S): RULES BY REQUEST OF THE GOVERNOR

02/04/22	(H)	READ THE FIRST TIME - REFERRALS
02/04/22	(H)	ENE, L&C, FIN
03/08/22	(H)	ENE AT 10:15 AM BARNES 124
03/08/22	(H)	Heard & Held
03/08/22	(H)	MINUTE (ENE)
03/10/22	(H)	ENE AT 10:15 AM BARNES 124
03/10/22	(H)	Heard & Held
03/10/22	(H)	MINUTE (ENE)
03/15/22	(H)	ENE AT 10:15 AM BARNES 124

WITNESS REGISTER

SHERRY STOUT, Arctic Strategic Program Manager

Cold Climate Housing Research Center
National Renewable Energy Laboratory
U.S. Department of Energy
Denver, Colorado

POSITION STATEMENT: Co-provided a PowerPoint presentation and testified in support of HB 301.

PAUL DENHOLME, Principal Energy Analyst
Grid Planning and Analysis Center
National Renewable Energy Laboratory
U.S. Department of Energy
Golden, Colorado

POSITION STATEMENT: Co-provided a PowerPoint presentation and testified in support of HB 301.

ACTION NARRATIVE

[10:20:30 AM](#)

CHAIR CALVIN SCHRAGE called the House Special Committee on Energy meeting to order at 10:20 a.m. Representatives Tuck, Rauscher, Kaufman, and Schrage were present at the call to order. Representatives Fields, Zulkosky, and Claman arrived as the meeting was in progress.

HB 301-UTILITIES: RENEWABLE PORTFOLIO STANDARD

[10:21:07 AM](#)

CHAIR SCHRAGE announced that the only order of business would be HOUSE BILL NO. 301, "An Act relating to the establishment of a renewable portfolio standard for regulated electric utilities; and providing for an effective date."

[10:23:00 AM](#)

SHERRY STOUT, Arctic Strategic Program Manager, Cold Climate Housing Research Center, National Renewable Energy Laboratory (NREL), U.S. Department of Energy (DoE), introduced NREL's PowerPoint presentation on Renewable Portfolio Standards (RPS) [hard copy included in the committee packet]. She introduced herself, her colleague, and the core team, as seen on slide 2. She gave an overview of NREL, as seen on slide 3 and slide 4. She stated that NREL is the only laboratory in DoE with the single mission of energy efficiency and renewable energy. She noted that NREL also has the Cold Climate Housing Research Center (CCHRC) in Fairbanks. She stated that NREL focuses on

the following renewable technologies: solar, wind, water, geothermal, sustainable transportation, and energy efficiency. She informed the committee that the presentation will focus on energy systems integration. She defined energy systems integration as how renewable energy systems are brought into the U.S. electric grid. The process uses complex hybrid systems to ensure energy resilience and security. The process also involves economic planning, economic policy, and market maturity. She reiterated that this is all under energy systems integration.

MS. STOUT, moving to slide 5, stated that NREL has been involved with RPS design and development since well before 1999. She stated the Renewable Electricity Futures Study is now 10 years old. The study reviews the process of obtaining 80 percent renewable energy for the entire U.S. grid. She said the laboratory has been working in this field for a very long time, and current studies are looking at bringing grids to 100 percent.

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REPRESENTATIVE RAUSCHER questioned the amount of time and the timeframe NREL has been doing research in Alaska.

MS. STOUT responded that her knowledge depends on digital records, not paper files. She stated that digital records indicate research goes back as early as 1995, but there had been research before this point. She mentioned a wind-diesel hybrid microgrid project in Wales, Alaska. She stated that NREL has worked across the state for over 20 years but very little in the Railbelt. She indicated that the research has been concentrated on energy planning, energy resilience, and cost reductions in microgrids. She added that CCHRC has worked on energy efficiency in Alaska since 1999, before it became a part of NREL. She stated that NREL has a history of work in the state and is very familiar with the Alaska markets.

[10:29:31 AM](#)

MS. STOUT, in response to Representative Kaufman, explained that NREL's funding primarily comes from DoE in the form of congressional earmarks and competitive funding within different offices in DoE. She added that NREL does not receive nuclear funds, but rather it is funded from the Office of Energy Efficiency and Renewable Energy. She said that NREL also works with the Office of Electricity and the Office of Science. In

terms of Alaska, she mentioned the Arctic Energy Office and the Office of Indian Energy, which are both part of DoE. She added that funding also comes from agencies not connected with DoE, such as military bases in Alaska and the Department of Interior. She stated that the funding is mostly from a mix of federal offices, but it is not exclusively federal. Private sector funding includes large partnerships with Exxon Mobile and Shell.

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MS. STOUT, turning to slide 6, addressed the study's goals of providing insight into the economic feasibility of 80 percent RPS and identifying likely elements of the portfolio. She said that giving every utility "a voice" was really important in the study. The utilities and energy developers were involved with the data clarification and information gathering. She stated that the Alaska Energy Authority (AEA) provided a large amount of data, along with other sources in Alaska, and this resulted in a collaborative process. She indicated that the data used in the analysis came mostly from Alaska.

[10:33:13 AM](#)

PAUL DENHOLME, Principal Energy Analyst, Grid Planning and Analysis Center, National Renewable Energy Laboratory, U.S. Department of Energy, reviewed NREL's analysis. He provided an overview of the integrated resource planning process, as seen on slide 7. To achieve desired costs and reliability, he said, utilities would go through this process to develop their power systems. He indicated that the proceeding slides go into detail about this process. Given the short timeframe of the study, he related that [the scope of the study is limited]. He pointed out that the following [two] slides provide an overview of the planning process [to achieve 80 percent RPS]. Slide 8 outlines an approach which concentrates on costs and reliability. Slide 9 outlines the 4 steps of the process.

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MR. DENHOLME, referencing the 4 steps in developing the system model, stated that during step 1 an electrical model of the Railbelt system had been designed. To achieve 80 percent RPS by 2040, step 2 had used various combinations of renewables to develop 5 scenarios. He continued that [during step 3] each scenario had been modeled, addressing issues until the reliability standard was met. The final step confirmed that

fuel savings were evaluated [in each scenario] and 80 percent RPS was achieved.

MR. DENHOLME, [in providing more detail on step 1], explained that to create the electrical model, each of the five Railbelt utilities were divided into three electrical zones, [as listed on slide 10], and connected by two transmission systems, or interties. He stated that the three zones were considered to be a single balancing area, but each could also operate independently. A critical element of this was testing each for independent robustness and reliability if disconnected from the [intertie].

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REPRESENTATIVE RAUSCHER, in reference to the evaluation of fuel savings, questioned whether the study took into consideration a capital-cost evaluation.

MR. DENHOLME responded that there had not been sufficient time to evaluate the capital-cost savings. The primary focus of the study was the savings from the avoided [use of] fuel. He continued that a more comprehensive study could be performed at a later time to compare the avoided-fuel savings with the increase of capital costs associated with [implementing renewables].

MR. DENHOLME, in response to a follow-up question, stated that the timeframe for a future study of capital costs would be relevant to the study's details, and he would follow up once this is determined.

[10:38:29 AM](#)

REPRESENTATIVE FIELDS, for clarification, expressed his understanding that capital costs of generation and transmission were not quantified [in the study].

MR. DENHOLME responded in the affirmative. He moved to slide 11, [which details the base conditions considered while developing the system model in step 2]. He addressed the differences between [2020] and 2040. Based on data from AEA, and other sources, he pointed out that an anticipated 12 percent load growth had been used to increase the peak demand for the system. He said the 2040 system had been modeled on the current way electricity is used, but with an increased usage of electric vehicles. Other adaptations in the model had been upgrades to

existing systems and age-related retirement of fossil-fire energy, adding the replacement of new types of gas-fired generation.

MR. DENHOLME, moving to slide 12, [addressed the scenarios created in step 2 of the modeling process]. He stated that scenario 1 was created using no new added renewables, while the other scenarios were created using different mixes of renewables. He stated that these scenarios are not considered optimum, as the optimum would be determined in the future. In developing the scenarios, he noted that an 80 percent standard was applied to the entire Railbelt, not individual utilities. The eligible renewables used are listed in the slide, with wind, solar, and hydro being the primary sources. In slide 13 he pointed out the 2020 base case depicting the existing mix of the Railbelt's energy, and its growth to 2040 using fuel, but no new renewables.

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MR. DENHOLME directed attention to scenario 1 on slide 14. He stated that this scenario uses the largest amount of hydropower and is based on the capacity of the Susitna-Watana project, but any hydropower resource could have been used. The remainder of the energy contribution in this scenario is mostly wind. On slide 15, he pointed out scenario 3 with 60 percent of the Railbelt electricity mostly coming from wind and solar. Slide 16 depicts the technologies that have not been significantly deployed in Alaska. He pointed out that in this slide wind and solar were replaced with tidal power and new geothermal. He moved to slide 17 which shows the range of the scenarios and their energy mixes. He stated this helps to understand the full range of the evaluation.

MR. DENHOLME moved to slide 18, which displays step 3 in the modeling process. He said that this is the most important step, as the primary objective is to test systems for reliability, "making sure we can keep the lights on." He explained that the systems not meeting the reliability criteria were not reported. When a system is not reliable, problems would be identified in an interim step and fixes are attempted by adjusting mixes of capacity. He pointed out the three tests for reliability on slide 19, as listed: have sufficient generation resources to meet the demand for electricity, have operating reserves, and have sufficient generation for quick outage response. He stated that power plants can rapidly fail and be out for extended periods of time, either from unforeseen events or for needed

maintenance. He stated that these outages were simulated to check the largest generator in each region for interconnection and regional robustness. He pointed out slide 20 shows the locations considered in the analysis for extended outages. He added that while these interties reduce costs to ratepayers, they would be vulnerable to outages like all elements in the power grid. In these cases, he said, no two single large elements were allowed to cause power outages. He added that this is an example of things "we basically broke to test the system." He said, "A big part of my job is to break things and see if the lights stay on."

[10:47:28 AM](#)

MR. DENHOLME stated that slide 21 provides an overview of electrical reliability with 80 percent depending on wind and solar for energy. He stated that the system depicted does not rely on wind and solar for capacity, as Alaska's energy demand would peak in the winter when there is insufficient sun and wind. He pointed out that the slide identifies the periods in each of the scenarios when the grid would need to rely on fossil fuel generators to meet the demand. He said that during these periods hydropower and energy storage would also be used.

[10:49:57 AM](#)

REPRESENTATIVE FIELDS clarified his understanding that with the use of gas resources, 80 percent renewables [could achieve reliability] during the winter months. He questioned the economics concerning the use of large amounts of natural gas during the winter months while adding renewable generation, which would have to be built.

MR. DENHOLME responded, "So that is a huge part of what I want to talk about." He relayed that he would address this question after the discussion of the current slide, [as this would help detail the answer]. He stated that variability needs to be addressed to confirm 80 percent renewable energy was obtained. He indicated variability relates to any time "you are getting a lot more than 80 percent or, in many cases, a lot less than 80 percent." He pointed to the line on the graph [on slide 21] which depicts this and confirms 80 percent renewables was achieved. He explained that once 80 percent is obtained, fuel savings can be evaluated. He expressed the importance of the role of an upgraded intertie, as seen on slide 23. He noted that he passed over slide 22.

[10:52:56 AM](#)

REPRESENTATIVE KAUFMAN questioned whether Mr. Denholme has ever provided an analysis of the most cost-effective and reliable energy mix, as opposed to the analyses for a certain percentage of renewables. He questioned whether a study of this has been conducted in Alaska.

MR. DENHOLME responded that NREL has not done this study for Alaska. He explained that NREL has done many studies on the cost-optimization mix of resources, either under RPS or in cases with no policy constraints. Directing attention [to slide 23], he emphasized the role of the Alaska intertie and its use. He commented that he has never seen a study when transmission did not pay for itself, regardless of renewable energy. He stated that not only would transmission reduce overall cost and increase reliability, but it would also increase the integration of renewable energy. He explained the details on the graph, which depicts the Alaska Intertie ability to share resources.

[10:56:30 AM](#)

MR. DENHOLME, [addressing Representative Fields' previous question on fuel savings], moved to slide 24. He stated that [deploying renewables] would save the cost of fuel but increase capital costs of renewable energy. Describing whether [building renewable energy] would make economic sense, he cautioned that the full analysis is not available, but some of the pieces available will help to understand the potential fuel-cost savings along with some insights into capital costs. In example, he pointed out the avoided-cost calculation for the Eklutna Power Plant on the chart. He stated this example is used because of its flexibility and efficiency as a key source of reliable energy for the Railbelt. He detailed the estimated fuel-cost usage at 7 cents per kilowatt hour. He stated that if a power purchase agreement (PPA) could be signed below this price, the avoided-fuel cost alone would pay for the renewable energy investments. Because of the variability of fuel costs, he explained that any PPA at or below the estimated value would produce net savings. He speculated that if fuel costs go down, this should still be considered in the future. He reiterated that any PPA for any renewable resource at or below this value would produce net savings in cost, regardless of ongoing costs associated with maintaining this resource for reliability.

[10:59:39 AM](#)

REPRESENTATIVE RAUSCHER expressed his understanding concerning the fuel cost and ratepayers, but he pointed out that the capital and maintenance costs would need to be paid. Because ratepayers would be paying capital costs, he questioned the benefit compared to what the ratepayers are paying today.

MR. DENHOLME responded that if a power plant is built, the capital and fixed maintenance costs would be incurred regardless of whether renewables were built. If the cost of building renewables is less than the variable fuel cost, this would be a fuel-cost savings. He pointed out that there would be some bonuses. If renewables were built, power plants would be used less; thus, the life of these plants would be extended. He reasoned that the savings would not be much, but it would add to the plus side of the balance sheet, with the primary benefit being avoided-fuel cost. He added that maintenance and investment in resources could also be deferred.

REPRESENTATIVE RAUSCHER stated that his question had concerned "if the ratepayers win or lose."

CHAIR SCHRAGE suggested that Representative Fields' upcoming question may provide an answer.

[11:01:37 AM](#)

REPRESENTATIVE FIELDS asked how long an optimized-cost analysis would take, and if the necessary information to conduct the analysis is available to NREL.

MR. DENHOLME responded that NREL is "really good at this." He said that NREL has most of the information, but some of the Alaska specific information has not been obtained. He offered to follow up after the meeting with a timeline.

REPRESENTATIVE FIELDS said, "I think we are only looking at 25 percent of the picture." He expressed certainty that renewables would save money, but he argued the right mix has not yet been determined, and this cannot be understood until the costs are known. He said, "It makes very little sense to advance this when we don't have most of the information we need."

[11:03:00 AM](#)

MR. DENHOLME continued with the presentation, noting that the effect [of deploying renewables] would be accumulative, with benefits from multidecade investments taking a long time to

accrue. He pointed out the graph on slide 25, which depicts the accumulation of fuel savings as renewables move to 80 percent. He said that fuel savings would begin when renewable energy is deployed, but savings in the beginning would be very little. In conjunction with the slide, he provided the details of the projected fuel savings. Speaking about avoided-fuel cost, he said that every time a wind and solar plant is built, savings would be locked in, and the electricity prices of ratepayers would be fixed for 20-plus years. He explained that the portion of [electricity] being served by wind and solar would not be exposed to price volatility. He remarked that volatility goes both ways, and if the price of fossil fuel decreases in the coming decades, the negative-price rate would need to be studied. To insulate against short-term price shocks, he suggested deploying renewables would decrease the impact. He said, "That is just math, and I'm not really trying to sound like an advocate here." He added that [renewables] would be in long-term contracts with a guaranteed price. He said, per the committee's requested fuel-cost analysis, a study on the accumulative fuel savings compared to capital costs would need to be done, and then decisions would need to be made in terms of benefits associated with avoided costs and the value of avoided-price volatility.

[11:05:46 AM](#)

MR. DENHOLME explained that slide 26 summarizes the results of the implementation of an 80 percent renewable standard. There would be an increase in the capital costs of the renewable infrastructure and a decrease in the costs of the fossil infrastructure. Less fossil capacity would be built, which would offset some of the renewable capital costs; however, the capital costs would still increase. He explained that this is really a comparison between the net increase of capital costs and the net decrease in variable costs associated with the fossil infrastructure. He advised that some of the questions can be answered now, but because only variable costs are known and capital costs are unknown, there is not a complete picture. He pointed to the conclusion on slide 27, which conveys multiple pathways for reliable electricity. He said further analysis would be needed to determine an optimum portfolio minimizing overall costs while maintaining reliability standards.

[11:07:17 AM](#)

REPRESENTATIVE FIELDS expressed the opinion that the state should be aggressively deploying renewable energy; however, the

best way to do this needs to be understood. He continued that the Railbelt would need to maintain gas capacity and more storage for periods of low wind and sun. He questioned the optimum mix for those low renewable periods, referencing using fuel or building a large amount of pumped-hydro storage. He suggested that this analysis should be done. He stated that AEA's shovel-ready costs for capital projects represent \$7 billion, or \$1000 per person. He stated that he pays over \$200 for gas to heat his home. In conclusion, he said, the math may work out, but still, he would like to see the analysis.

[11:08:47 AM](#)

REPRESENTATIVE KAUFMAN referenced a prior presentation to the committee that discussed other states' implementation of RPS. He remarked that some states have "lofty" goals and commented on the differences in Alaska's opportunities. He said, "We have tremendous hydrocarbon reserves, and ... we don't want to walk away from them too soon, or at all, if that is the best mix for us." He said the state can be very dark and cold, and fuel is a solid energy source. He expressed the opinion that this resource is dependable and produces jobs in the state. He referenced that deploying renewables would require equipment imports for infrastructure. He questioned whether a "prosperity factor" concerning job creation and productivity in Alaska should be considered in the mix.

MS. STOUT responded that Alaska has some of the best hydrocarbon resources in the country but exports most of it. She stated that the refined product primarily comes from Washington, versus Alaska, so there is a reliance on a supply chain. She pointed out the weaknesses in the supply chain should be considered. In response to the jobs question, she referenced NREL's Jobs Economic Development Impact Index. She said this tool looks at jobs created in the various stages of renewable energy deployment. She stated that initially there would be construction jobs, and then operations jobs would be created. She added that the index also considers ancillary jobs like hotels, restaurants, and gas stations, which would support the labor force. She stated that the short answer is the impact on jobs would not be known until an analysis is done. She said if Alaska pursues renewables, this could be a decision point for job optimization and building a job market.

[11:13:10 AM](#)

REPRESENTATIVE KAUFMAN, with a follow-up comment, expressed the belief that every state is endowed with a resource mix. He reiterated the hope that Alaska would not ignore its resources to pursue a "lofty" goal that may fit better elsewhere, or at a different point in time. He said, "The adoption curve can be the bleeding edge as opposed to the leading edge, if you deploy technology that may be soon displaced by something even better." He explained that the state should not lock into something which would not be the optimal solution over the long term, especially with resources in the state that could be developed.

[11:14:22 AM](#)

REPRESENTATIVE FIELDS questioned the process for NREL to be able to start on the optimized-cost analysis as soon as possible.

MS. STOUT responded that, like state government, this would take funding. All the funding streams are directly tied to certain outcomes, research projects, and analyses. She said the expense in these studies would be in the use of high-performance computers, which take time. She stated that staff would need to be reserved, and it would also take additional time to work with entities within Alaska to obtain the needed data. She concluded that, in terms of the request, NREL works with state governments at any level.

[HB 301 was held over.]

[11:16:45 AM](#)

ADJOURNMENT

There being no further business before the committee, the House Special Committee on Energy meeting was adjourned at [11:17] a.m.