

**ALASKA STATE LEGISLATURE
HOUSE TRANSPORTATION STANDING COMMITTEE**

March 21, 2023

1:03 p.m.

MEMBERS PRESENT

Representative Kevin McCabe, Chair
Representative Sarah Vance, Vice Chair
Representative Tom McKay
Representative Jesse Sumner
Representative Louise Stutes
Representative Genevieve Mina

MEMBERS ABSENT

Representative Craig Johnson

COMMITTEE CALENDAR

PRESENTATION(S) : GREEN HYDROGEN BY LAUNCH ALASKA

- HEARD

PREVIOUS COMMITTEE ACTION

No previous action to record

WITNESS REGISTER

ISAAC VANDERBURG, CEO
Launch Alaska
Anchorage, Alaska

POSITION STATEMENT: Provided a PowerPoint presentation, titled, "Launch Alaska Clean Hydrogen Hub in Upper Cook Inlet, Alaska."

ERIN WHITNEY, PhD, Director
Arctic Energy Office
U.S. Department of Energy
Anchorage, Alaska

POSITION STATEMENT: Provided a PowerPoint presentation, titled "Hydrogen in the Arctic" and answered questions.

ACTION NARRATIVE

[1:03:29 PM](#)

CHAIR KEVIN MCCABE called the House Transportation Standing Committee meeting to order at 1:03 p.m. Representatives McKay, Vance, Mina, Sumner, and McCabe were present at the call to order. Representative Stutes arrived as the meeting was in progress.

PRESENTATION(S): Green Hydrogen by Launch Alaska

[1:04:07 PM](#)

CHAIR MCCABE announced that the only order of business would be the presentations on green hydrogen.

[1:05:04 PM](#)

ISAAC VANDERBURG, CEO, Launch Alaska, provided a PowerPoint presentation, titled "Launch Alaska Clean Hydrogen Hub in Upper Cook Inlet, Alaska," [hard copy included in the committee packet]. On slide 2, he stated that Launch Alaska is a nonprofit organization founded in 2016. Its mission is to accelerate the energy transition and decarbonize the globe, starting in Alaska. He noted that the transportation, energy, and industry sectors are all connected. He stated that Launch Alaska is a "deployment accelerator," helping new climate technology companies connect to asset owners in the state. He moved to slide 3 through slide 5, which showed launch Alaska's board of directors, team, and partners. He noted that many of the team members have a background in the oil and gas sector. He discussed the funding partners, which includes the U.S. Office of Naval Research and the U.S. Office of Technology Transitions.

MR. VANDERBURG moved to slide 6 and stated that Launch Alaska's objective is to facilitate \$1 billion of projects in Alaska by 2030. He expressed confidence that the goal is attainable. He continued to slide 7 and addressed Launch Alaska's current portfolio of companies, which is broken down into the energy, transportation, and industry sectors. He stated that the companies listed are all high-growth startups. He expressed the belief in small businesses, as they are the "pillars of our local economies."

[1:14:15 PM](#)

MR. VANDERBURG, in response to a committee question, stated that several of these companies listed are engaging with the oil and gas sector. He noted that Kartorium works with microgrids for

rural utilities, with its key sector being the oil and gas industry. He discussed Water Pigeon in relation to the Alyeska pipeline. In response to a follow-up question, he stated that out of the 24 portfolio companies, 3 are from Alaska. He explained that all the companies are involved in cutting-edge technologies funded by the federal government. He gave a brief explanation of his understanding for why there are not more local startups in Alaska. He noted that these other companies are high growth and come to Alaska to engage Alaska's economy.

MR. VANDERBURG, in response to a committee question, stated that he will follow-up with an explanation of the companies highlighted on slide 7. He briefly went through some of the companies. He further discussed why startups have chosen Alaska as a place to deploy new technology, and how Launch Alaska has helped these entities make progress in the state.

[1:24:48 PM](#)

MR. VANDERBURG continued onto slide 8, titled "Economic Headwinds for Alaska." The slide featured three bullet points: the long-term declines in oil and gas production, increases in the price for natural gas, and the once-in-a-generation opportunity with the federal Infrastructure Investment and Jobs Act (IIJA) funding. He moved to the next slide and discussed the downturn in the oil and gas industry.

[1:27:21 PM](#)

MR. VANDERBURG, in response to a committee comment that disputed the decline of the oil and gas sector in the state, expressed the understanding that a transition away from the oil and gas sector is underway. He used global numbers to support this perspective. He stated that "this is not an antagonistic thing," rather he advised that Alaska should take a leadership role. He argued that this is not a government policy issue, rather the economics are driving this. In response to a committee comment, he expressed agreement that in Alaska solar energy cannot be relied upon for the entire year. He continued that developing long-term seasonal storage for solar energy would be a worthy challenge.

MR. VANDERBURG moved to slide 10, titled "Global EV fleet sizes by segment and market." He noted the increase of electric vehicles in use. In response to a committee comment, he expressed agreement that hydrogen would be a better option for larger transportation involved with ports and airports. He

added that lighter duty transportation is not a good candidate for hydrogen, and this would likely stay electric. He discussed the possibility for different battery chemistry, as this would address resource issues.

1:38:09 PM

MR. VANDERBURG, in response to a committee question, stated that he does not have the rate of adoption of electric vehicles in the state, but he would report this back to the committee.

MR. VANDERBURG moved to slide 12 and pointed out a report addressing the decline in Alaska's economy. He suggested that the current approach is not working, and a new approach needs to be developed. He moved to slide 13 and discussed the renewable resources available in Alaska. He pointed out that there is not a market for the renewable energy in the state, and this has hindered the development of these available resources. He described the extent of the renewable energy in the state, as seen on the slide. He moved to slide 14, stating that Alaska's renewable energy assets have been stranded because of the costs and the markets. He expressed the opinion that this is changing, as the cost barrier is being solved by natural gas in the state. However, he pointed out the rising cost of natural gas.

MR. VANDERBURG showed slide 15, titled "Enter Clean Hydrogen," and he summarized the country's clean hydrogen market. He suggested that hydrogen could create a market for the huge amount of renewable energy in the state, as there is a global demand. He stated that clean hydrogen is taking renewables and converting this to electricity through electrolysis. He noted the tax credits and incentives that IIJA gives for clean hydrogen. He pointed out the potential customers for this, such as the airlines and shipping sectors, as these sectors have set stringent emission reduction targets. He reiterated that hydrogen has the potential to help these two sectors. He noted that this hydrogen is now referred to as "clean hydrogen," as opposed to "green hydrogen." He moved to slide 16 and pointed out that the transportation sector has the largest percentage of use in the clean hydrogen market.

1:45:30 PM

MR. VANDERBURG, in response to a committee question on slide 16, stated that the "other" category on the chart includes industrial heat and chemical manufacturing.

1:46:37 PM

MR. VANDERBURG moved to slide 17 and explained the graph of the expected use of renewable hydrogen from 2020 to 2030. He moved to slide 18 and reiterated that international shipping and aviation are two of the best uses for hydrogen. He continued to the next slide and discussed the untapped renewable energy resources centered in Anchorage and Upper Cook Inlet.

1:49:08 PM

MR. VANDERBURG, in response to a committee question, stated that clean hydrogen is created by the direct conversion of renewable energy into electricity, by electrolysis, and then into hydrogen. He expressed the understanding that for hydrogen storage and distribution, issues need to be worked out. He continued that this is not an unknown technology, as it is known how to store and distribute hydrogen. He added that a hydrogen hub would need individuals who know how to move and store volatile fuel.

1:53:08 PM

ERIN WHITNEY, PhD, Director, Arctic Energy Office, U.S. Department of Energy, responding to a committee question, stated that in a large grid using electricity directly would make sense; however, if there are not grid connections, hydrogen would be a way to store and transport the electricity as a commodity to be used somewhere else. She added that this is in opposed to using transmission lines, which are very expensive to build. She continued to explain that if there is a wind resource not connected to a grid, this energy could be converted to hydrogen and a hydrogen carrier, such as ammonia or methanol. In response to a follow-up question, she stated that hydrogen, as a compressed gas, would be much more difficult to transport than a liquid, and this is why there is a discussion on carriers of hydrogen.

MR. VANDERBURG, in response to a committee question on the cost benefit, explained that the Willow solar project was built with private debt and tax-equity dollars, for example. He expressed the opinion that the private sector would invest in these types of projects. He explained that private investors would do the research on the viability of a project and whether local grids could accept the electricity. He expressed the opinion that there is almost an unlimited amount of money in the private

sector for this. He discussed the government initiative supporting this development, as well.

MS. WHITNEY, in response to a committee question, stated that the BTU [British thermal unit] yield of a kilogram of hydrogen is 33-kilowatt hours per kilogram. She stated that she would report back to the committee with a complete answer.

[2:01:36 PM](#)

MR. VANDERBURG, on slide 20, listed the economic benefits of clean hydrogen, which include job creation, reduced energy costs, and increased revenue for the region. He noted that there are major incentives and investments available from IIJA. He explained the topic of "additionality." He continued that renewable projects would "lock in" the cost of energy over a long period of time, providing a stable price, and he expressed the understanding that investors like this. He stated that the state is not being asked for investments, just an alignment of vision. He listed other benefits, which include establishing a presence in emerging industries, attracting startups and innovators, and supporting local companies and jobs through the energy transition. He added that these benefits would enhance the work environment in the state, as young people are often motivated to work in these fields. He further discussed the benefits of clean energy.

[2:07:52 PM](#)

MR. VANDERBURG, in response to a committee question on the cost benefit of clean hydrogen projects, discussed that there was a 2022 conference held on how to precede with projects and create a roadmap. He listed some of the people and entities present. He expressed the opinion that currently it is very early in the process, adding that the opportunity is unique. He suggested that now some of the producers, storage and distribution centers, in-use customers, and policy makers should come together, look at the roadmap, and create an actual project. He noted that Ravn Alaska recently purchased 30 hydrogen aircrafts, and this hydrogen needs to be developed. He stated that the Port of Alaska is looking at developing a hydrogen system. He pointed out that these are small projects that are starting to happen. In response to a follow-up question on whether these projects are being developed to replace the oil and gas sector, he expressed the opinion that this should not be an antagonistic situation. He explained that this position is based on the decline in the production and demand for oil and gas.

[2:13:13 PM](#)

MR. VANDERBURG discussed the Port of Alaska's power plan with a microgrid. He expressed the opinion that this would be an economic opportunity, with little downside. He urged that the infrastructure for renewable energy in Alaska should be built, as this would put the state on a path to abundant electricity. In conclusion, he stated that this would produce gigawatt scale renewables, but the renewables need to be built. He suggested that entities could come together in the state to create an energy transition plan. He expressed support for passing a renewable portfolio standard in the state.

[2:16:41 PM](#)

The committee took an at-ease from 2:16 p.m. to 2:18 p.m.

[2:18:45 PM](#)

MS. WHITNEY continued with the next presentation titled "Hydrogen in the Arctic," [hard copy included in the committee packet]. She pointed out that the Arctic Energy Office (AEO) is the U.S. Department of Energy's (DoE's) only regional office. She shared her professional history. She moved to slide 2 and stated that the mission of the Arctic Energy Office is to bring DoE to the Arctic and Alaska, and vice versa. She emphasized that the AEO is a portal between the state and DoE, as any questions on DoE can be directed through AEO.

MS. WHITNEY moved to slide 3, titled "AEO's Role in Advancing Green Hydrogen." She stated that DoE has a national green hydrogen strategy under review and an overall Arctic strategy. To implement these strategies, AEO participates in the activities and with groups, such as the Alaska State Hydrogen Energy Working Group. She discussed this further. She continued to slide 4 to explain the chemistry of hydrogen versus other molecular structures. She explained the chemical structures of common fuels, as seen on the slide. She pointed out methanol, as it can be a hydrogen carrier.

MS. WHITNEY moved to slide 5 which explained how hydrogen relates to other energy carriers. She pointed out that this addresses some of the challenges of working with gaseous and liquified hydrogen. She discussed the volumetric energy density of different fuel options, as seen on the graph on slide 5. She pointed out that carbon-based fuels are dense with energy, as

opposed to gaseous hydrogen. However, when hydrogen is converted to carriers, she said, there is a higher energy density.

[2:27:19 PM](#)

MS. WHITNEY, in response to a committee question on the advantages of using methanol, she pointed out that methanol does have carbon in it. She stated that the method being investigated would pull carbon dioxide from the air or fossil fuel feed stocks and turn this into a carrier. She stated that the methanol would be burned, emitting carbon, but it would not be making any new carbon emissions.

[2:28:25 PM](#)

MS. WHITNEY continued to discuss slide 5, stating that "where hydrogen becomes exciting" is when the specific energy per unit mass is investigated. She pointed to the small graph on the slide and discussed the advantages of hydrogen energy density. She suggested that if hydrogen can be put into an efficient carrier form, the result would be a very energy-dense fuel.

MS. WHITNEY moved to slide 6, which shows a breakdown of green hydrogen relative to other types of hydrogen. She reiterated that the use of color to describe hydrogen is not being used as much, but she stated that the term "green hydrogen" is still used somewhat. She defined "green hydrogen" as hydrogen made from renewable resources, and she further described the other types of hydrogen in relation to color.

[2:32:41 PM](#)

MS. WHITNEY, in response to a committee question on when too much oxygen is not good for the environment, expressed the understanding that this is not a concern. She discussed the theoretical idea of there being too much oxygen in the atmosphere.

MS. WHITNEY continued to slide 7, which addressed current hydrogen production. She stated that this is mostly made from natural gas fuel stock.

MS. WHITNEY, in response to a committee question, confirmed that hydrogen made from natural gas is "blue hydrogen." She expressed uncertainty what hydrogen made from coal would be called. She added that hydrogen made without carbon capture

would be brown hydrogen. She reiterated that coding hydrogen with colors is "going out of vogue" because the complexity of the colors now. She pointed out that the vocabulary is moving toward "clean" and "nonclean."

MS. WHITNEY moved to slide 8 and addressed the "big picture" for the advancement of hydrogen technologies. She stated that one of the drivers is the amount of carbon dioxide in the atmosphere, which is leading to global warming. She expressed the opinion that using hydrogen would be away to decarbonize the atmosphere. She continued to slide 9, titled "The Drivers," which featured a pie chart of global greenhouse gas emissions by economic sector. She argued that other than environmental concerns, another driver for having hydrogen would be energy security.

MS. WHITNEY moved to slide 10, which showed a bar chart on existing and emerging demands for hydrogen. She pointed out how versatile hydrogen can be, as it can be used for transportation, chemical and industrial applications, power generation, and hybrid energy systems.

[2:43:19 PM](#)

MS. WHITNEY, in response to a committee question on examples of the use of hydrogen in the state, pointed out that the Ravn Alaska is an example of a committed project. Another potential use, she said, would be seeding the natural gas supply with hydrogen for power and heat, as this would not require any retrofitting and it would extend the natural gas supplies. She stated that there has been a discussion of making ships that run on methanol.

MR. VANDERBURG stated that currently there are two different companies in the world that are testing hydrogen ferries. He also pointed out that there is the possibility of long-duration energy storage.

MS. WHITNEY added that there is not just an in-state demand, but there are also demands outside of the state driving the conversation. She gave the example of Asian countries that have mandates for hydrogen fuels. She suggested that these external demands are driving the conversations on Alaska's potential development to be a supplier. This is not just because of the state's location, she explained, but it is also because of the resources available in Alaska, such as stranded renewables. She

suggested that the external demand would create the economy of scale that would make this economical in the state.

[2:48:36 PM](#)

MS. WHITNEY moved to slide 11 and discussed the hydrogen possibilities in Alaska. She pointed out that from delivery or storage, hydrogen could be converted to fuel cells, combusted, or mixed with other fuels. She further discussed the applications and opportunities for hydrogen. The opportunities include powering remote communities with microgrids, powering the Railbelt, and exportation.

MS. WHITNEY moved to slide 12, titled "Points of Reference," which featured energy consumption estimates. She stated that this shows the scale of usage of energy. She discussed the reliance on natural gas, pointing out that the use of jet fuel almost equals the Railbelt's heat and power consumption. Concerning the use of jet fuel, she stated that these numbers are growing. She stated that the slide highlights the intensity of consumption of the different sectors. She gave some examples of hydrogen usage and compared this with global estimates, as seen on slide 13. She reiterated that hydrogen production would create an "incredible" opportunity globally.

MS. WHITNEY moved to slide 14, showing hydrogen programs and tools. She stated that DoE is working on all of these, and AEO is "keeping its finger on the pulse," making sure Alaska and the Arctic can benefit. She moved to slide 15 which showed contact information and resources.

[2:55:45 PM](#)

MS. WHITNEY, in response to a committee question, stated that the Alaska Gas Line Development Corporation led the Alaska application discussion, but this application was not encouraged. She stated that this had allowed stakeholders to talk about how fossil and non-fossil fuel energy suppliers could create a hydrogen economy in the state.

MS. WHITNEY, in response to a committee comment that China is currently the largest producer of hydrogen, expressed the opinion that one of the advantages for Alaska would be to export hydrogen.

[2:57:47 PM](#)

CHAIR MCCABE thanked the presenters, and he made closing comments.

ADJOURNMENT

There being no further business before the committee, the House Transportation Standing Committee meeting was adjourned at 2:57 p.m.