ALASKA STATE LEGISLATURE
SENATE RESOURCES STANDING COMMITTEE
February 26, 2025
3:30 p.m.

MEMBERS PRESENT

Senator Cathy Giessel, Chair
Senator Bill Wielechowski, Vice Chair
Senator Matt Claman
Senator Forrest Dunbar
Senator Scott Kawasaki
Senator Shelley Hughes
Senator Robert Myers

MEMBERS ABSENT

All members present

COMMITTEE CALENDAR

PRESENTATION(S): LAUNCH ALASKA UPDATE

- HEARD

SENATE BILL NO. 47
"An Act relating to Chugach State Park; and providing for an effective date."

- MOVED CSSB 47(RES) OUT OF COMMITTEE

PREVIOUS COMMITTEE ACTION

BILL: SB 47
SHORT TITLE: CHUGACH STATE PARK EASEMENTS
SPONSOR(s): SENATOR(s) GIESSEL

01/17/25	(S)	PREFILE RELEASED 1/17/25
01/22/25	(S)	READ THE FIRST TIME - REFERRALS
01/22/25	(S)	TRA, RES
02/04/25	(S)	TRA AT 1:30 PM BUTROVICH 205
02/04/25	(S)	Heard & Held
02/04/25	(S)	MINUTE(TRA)
02/11/25	(S)	TRA AT 1:30 PM BUTROVICH 205
02/11/25	(S)	Moved SB 47 Out of Committee
02/11/25	(S)	MINUTE(TRA)
02/14/25	(S)	TRA RPT 2DP 1DNP 1NR
02/14/25	(S)	DP: BJORKMAN, KIEHL

02/14/25	(S)	DNP: SHOWER
02/14/25	(S)	NR: TOBIN
02/17/25	(S)	RES AT 3:30 PM BUTROVICH 205
02/17/25	(S)	Heard & Held
02/17/25	(S)	MINUTE(RES)
02/26/25	(S)	RES AT 3:30 PM BUTROVICH 205

WITNESS REGISTER

ISAAC VANDERBURG, Chief Executive Officer (CEO)
Launch Alaska
Anchorage, Alaska
POSITION STATEMENT: Introduced the presentation Launch Alaska Update.

PENNY GAGE, Chief Policy and Partnerships Officer
Launch Alaska
Anchorage, Alaska
POSITION STATEMENT: Co-presented Launch Alaska Update.

ARPIT DWIVEDI, Founder
Cache Energy
Chicago Illinois
POSITION STATEMENT: Co-presented Launch Alaska Update.

MIKE EROS, Chief Geoscientist
Sage Geosystems
Houston, Texas
POSITION STATEMENT: Co-presented Launch Alaska Update.

PAIGE BROWN, Staff
Senator Cathy Giessel
Alaska State Legislature
Juneau, Alaska
POSITION STATEMENT: Provided the explanation of changes for and answered questions on CSSB 47, work order 34-LS0179\G.

CHRISTOPHER ORMAN, Natural Resources Attorney
Department of Law (DOL)
Juneau, Alaska
POSITION STATEMENT: Answered questions on CSSB 47, work order 34-LS0179\G.

RICKY GEASE, Director
Division of Parks and Outdoor Recreation
Department of Natural Resources
Anchorage, Alaska.

POSITION STATEMENT: Answered questions on CSSB 47, work order 34-LS0179\G.

CHRIS BECK, Coordinator
Alaska Trails Initiative
Anchorage, Alaska
POSITION STATEMENT: Testified with concerns on SB 47.

DIANA RHOADES Director of Programs
Anchorage Park Foundation
Anchorage, Alaska
POSITION STATEMENT: Testified with concerns on SB 47.

ACTION NARRATIVE

3:30:27 PM
CHAIR GIESSEL called the Senate Resources Standing Committee meeting to order at 3:30 p.m. Present at the call to order were Senators Dunbar, Kawasaki, Myers, Hughes, Wielechowski, and Chair Giessel. Senator Claman arrived shortly thereafter.

PRESENTATION(S): LAUNCH ALASKA UPDATE

3:31:17 PM
CHAIR GIESSEL announced the presentation, Launch Alaska Update.

3:31:36 PM
ISAAC VANDERBURG, Chief Executive Officer (CEO), Launch Alaska, Anchorage, Alaska, introduced himself and the presentation Launch Alaska Update. He said the stars of the presentation would be the companies presenting their technologies to the committee.

3:31:51 PM
SENATOR CLAMAN arrived.

3:32:10 PM
MR. VANDERBURG moved to slide 2 and said Launch Alaska, founded in 2016, was Alaska's first accelerator program for high-growth start-up companies. Launch Alaska, a non-profit organization, supported companies focused on energy, transportation and industrial sectors; in particular, companies that can help reduce emissions across those three sectors. He said Launch Alaska worked with global start-up companies and Alaska start-ups to deploy technologies developed by companies with Alaska communities, infrastructure owners, ports, airports and municipalities. He said Launch Alaska saw innovation as a key

ingredient to unlocking vast economic opportunities and addressing some of Alaska's most pressing challenges:

[Original punctuation provided.]

> **ABOUT** LAUNCH ALASKA
>
> Founded in 2016 in Anchorage, Alaska, Launch Alaska is a nonprofit on a mission to catalyze rapid innovation that strengthens **energy**, **transportation**, and **industrial** systems.
>
> We envision prosperous and resilient communities rich in economic opportunities and sustainable systems.
>
> LaunchAlaska.com

3:32:56 PM
MR. VANDERBURG moved to slide 3, Partners, depicting over 80 company logos and said Launch Alaska was based in Anchorage and staffed by eleven people with expertise across technology sectors. He encouraged the committee to visit the LaunchAlaska.com website to learn more. He said Launch Alaska received major funding support from the U.S. Department of Naval Research and the U.S. Department of Energy, Office of Tech Transitions and by dozens of Alaska organizations as illustrated on slide 3. He noted this included large and small organizations, Alaska native corporations and resource development companies, utilities, research institutions, community groups and more. He said folks from these organizations participated as advisors for the companies in Launch Alaska's accelerator program and participated in project deployment.

3:33:44 PM
MR. VANDERBURG moved to and narrated slide 4:

[Original punctuation provided.]

> **Launch Alaska has a powerful engine with a proven track record**
>
> **People:** Industry expertise, Alaska roots, personal connections
>
> **Projects:** Deploying leading-edge technologies across the state’s energy, transportation, and industrial sectors

Partnerships: Tech startups, Alaska corporate leaders, community groups & government agencies

Policy: Nonpartisan education and advocacy to advance deployment and innovation in Alaska

3:34:26 PM
PENNY GAGE, Tlingit name X'waséeya, Chief Policy and Partnerships Officer, Launch Alaska, Anchorage, Alaska, introduced herself and moved to slide 5:

[Original punctuation provided.]

TECH AREAS

Energy

- Clean Energy Generation Solutions: solar, nuclear, wind, thermal, ocean and hydro, waste-to-energy
- Grid Management and Resiliency
- Microgrid Technologies
- Long Duration Energy Storage
- Geothermal
- Hydrogen
- Demand-Side Management and Energy Efficiency
- Battery/Solar Panel Recycling
- Biofuels

Transportation

- Autonomous Vehicles
- Unmanned Aerial Vehicles
- Electric Transportation
- Last Mile Transport
- Shipping and Logistics
- Mobility
- Aviation
- Maritime
- Alternative Fuels

Industry

- Industrial Internet of Things
- Robotics and Automation
- Carbon Tech
- Hydrogen

- Low-Footprint Industrial Processes
- Alternative Fuels
- 3D Modeling
- Augmented and Virtual Reality
- Predictive Maintenance
- Permafrost Management and Ice Engineering

MS. GAGE said Launch Alaska ran an eight-month accelerator program called the tech deployment track, during which Launch Alaska recruited tech companies globally in the three major focus areas: energy, transportation and industrial systems. She said Launch Alaska was looking for technologies that reduce emissions and electrify these three sectors. She emphasized that these were fast-growing fields introducing exciting new innovations every year. She noted [Alaska's] high energy costs, extreme environments and changing climate and said technologies Launch Alaska sees could help solve Alaska's challenges while creating jobs and economic opportunity.

3:35:58 PM
MS. GAGE introduced two companies:

- Cache, presenting their long duration energy system
- Sage Geosystems, presenting their long duration energy system and geothermal system

3:36:23 PM
MS. GAGE moved to slide 7, depicting 41 Launch Alaska Portfolio Companies that went through the Launch Alaska program and from whom Launch Alaska anticipated substantial traction toward deployment in Alaska.

3:36:48 PM
MS. GAGE moved to slide 8 and thanked the committee for the opportunity to introduce [representatives of] their portfolio companies and their projects.

3:36:59 PM
CHAIR GIESSEL said she invited Launch Alaska to present to the committee in part because she wanted to clarify that they were not a missile launch facility.

MS. GAGE affirmed that Launch Alaska's intent was to launch Alaska's economy.

3:37:28 PM

ARPIT DWIVEDI, Founder, Cache Energy, Chicago Illinois, introduced himself and said Cache Energy was building long duration energy storage systems.

3:38:03 PM
MR. DWIVEDI moved to slide 2 and said Alaska faced two primary challenges: a natural gas shortage and high heating costs. Even if solutions for affordable heating are found, the intermittent nature of renewable energy sources like hydro, solar, and wind poses a significant problem. To achieve reliable energy independence and affordability, Alaska must develop robust energy storage systems capable of handling long-term storage under harsh weather conditions:

[Original punctuation provided.]

2 Major Energy Challenges in Alaska

Long term, inter-seasonal energy storage

[A graphic depiction of seasonal variation in energy generation and use by the Cordova Energy Cooperative (CEC)]

Natural Gas Shortage

[A map illustrating the cost of heating fuel prices in Alaska - July 2022.]

3:38:46 PM
MR. DWIVEDI moved to slide 3 and further discussed the challenges of renewable energy storage in Alaska. He said the intermittent availability of hydro, solar, and wind led to over-sizing and underutilization of the systems. He said Lithium-ion batteries, commonly used for energy storage, were problematic due to their limited energy retention and poor performance in cold climates. He emphasized the need for a cost-effective solution to store large quantities of energy under harsh conditions:

[Original punctuation provided.]

X THE PROBLEM: "LONG-TERM" STORAGE of Energy

Hydro/Solar/Wind are not always present Leads to overbuilding & under utilization

Alaska needs unique features in batteries - unlike others. U.S. Department of ENERGY

EXISTING STORAGE SOLUTIONS

X CANNOT SCALE to long durations

X LOSE CAPACITY with time

3:39:36 PM
MR. DWIVEDI moved to slide 4:

[Original punctuation provided.]

Cache
energy

Long-term Energy Storage
in a **Solid Fuel**

MR. DWIVEDI said Cache Energy's solution was inspired by the attributes of fossil fuels like coal, oil and gas.

- low-cost
- solid or liquid at room temperature
- store energy in chemical bonds

easy to ship

3:40:01 PM
MR. DWIVEDI moved to and narrated slide 5:

[Original punctuation provided.]

Cache
energy

Like **Coal,**
without the
Consequences.

Clean/Safe **Low Cost** **Uses Existing Infrastructure**

MR. DWIVEDI said this technology was a low cost solid just like coal and could produce heat just like coal. He acknowledged that it stored less energy per unit weight compared to coal, but unlike coal, could be charged and discharged like a battery. It can be shipped around and even when it is charged, it is still at room temperature. He said it was very easy to contain in simple barrels.

3:40:35 PM
MR. DWIVEDI moved to and narrated slide 6, explaining that limestone was the raw material for Cache Energy's innovative energy storage system. He said lime was readily available, costing around $100 a ton, and was heated using various renewable energy sources like solar, wind, and hydropower:

[Original punctuation provided.]

Technology

Energy Storage By Removing Water

Calcium Hydroxide	+	Heat or Electricity	**Charge** =>	Calcium Oxide	+	Steam

Energy Discharge By Adding Water

Calcium Oxide	+	Steam	**Discharge** =>	Calcium hydroxide	+	Heat

Our innovation: Make a well-known chemical cyclable a
t < $ 0.20/kWh

DOE Announces Energy Storage Innovations Prize Winners
February 27, 2023

Introducing the Winners of the EPIC DC Pitch Competition
May 15, 2024

MR. DWIVEDI said Cache Energy's innovation was to make pellets from the limestone, making it durable, and then simply repeating the cycle of heating to charge the pellets and then discharging the energy, producing heat up to 1,000 degrees Fahrenheit by exposing the pellets to water. He said the cycle could be repeated indefinitely.

3:42:42 PM
MR. DWIVEDI moved to and narrated slide 7:

[Original punctuation provided.]

Providing Low-Cost Heat in Anchorage

Hosted > 200 Alaska Energy leaders on site

Hired, trained local non-engineer operators in Alaska

>12 months of operation under cold climate

[Slide 7 includes an inset photo of AlaskaBusiness Magazine's cover from the August 2024 issue featuring Cache Energy.]

3:43:40 PM
MR. DWIVEDI shared a video of the May 2024 open-house demonstration of the Cache Energy Heat Storage Pilot Project Launch in Anchorage.

3:44:55 PM
MR. DWIVEDI moved to slide 8, a graph comparing the cost of operation and the duration of continuous energy supply for Cache Energy's system compared to alternative systems. He said their technology was able to store energy during summer and release it during winter, which no other current technology can match at their price point. He explained that standard stainless steel was suitable to store and ship the charged material safely, contributing to the containment of costs.

3:46:23 PM
MR. DWIVEDI moved to slide 9, two photos from a winter trial of the Cache Energy system in Prudhoe Bay, designed to test and demonstrate the system's cold climate performance. He emphasized the value of being able to store solar, wind and hydro energy available in the summer to be released when it is needed in the winter.

3:47:06 PM
MR. DWIVEDI moved to slide 10, Alaska Projects in Pipeline summarizing the energy challenges in Alaska that Cache Energy intends to address, as well as a diagram illustrating the Cache Energy system inserted in an existing district heating loop. He said Kotzebue Electric Association, Chugach Electric, and Municipality of Anchorage were potential partners.

MR. DWIVEDI said Cache Energy would prioritize serving Alaska, as evidenced by his frequent travel and investment of time and effort to the state. He envisioned establishing plants to manufacture the lime pellets in Alaska to further enhance the economics of the system.

3:49:42 PM
MR. DWIVEDI moved to slide 11, TRACTION, listing entities working with Cache Energy by providing funding:

- U.S. Department of Energy
- U.S. Department of Defense
- American Made

and by partnering:

- Haliburton
- EDP Renewables
- Berkshire Hathaway Energy
- Chugach Electric Cooperative
- Duke Energy
- Kotzebue Electric Association

MR. DWIVEDI said Cache Energy had the capacity to produce about one ton of the [limestone pellets] in their own facility in Illinois. He reiterated his hope to manufacture pellets in Alaska near installations.

3:50:08 PM
MR. DWIVEDI moved to slide 12, concluding that the big energy moonshot projects like the pipeline should be pursued and he urged that smaller, simpler, low risk projects like the Cache Energy system could begin to make an impact much sooner. He said Cache Energy was ready now:

[Original punctuation provided.]

There are low cost/low risk steps that leverages existing resources/labor-force and can start moving the Alaska Energy needle NOW

Cache is ready to deploy NOW

Contact: arpit@cache-energy.com

3:50:57 PM
SENATOR CLAMAN asked, in the short term, where the limestone would come from and where the pellets would be manufactured before shipping to Alaska.

3:51:14 PM
MR. DWIVEDI said Halliburton, an investor in Cache Energy, used lime for the cement to line oil wells and created a direct supply line for Cache Energy. Raw lime powder is sourced from Mississippi Lime Company and Austin Lime. He said that would continue to be their source when pellet processing in Alaska begins.

3:51:58 PM

SENATOR MYERS observed how time Mr. Dwivedi spent in Alaska and suggested he would be wise to move to the state. He asked how much energy was wasted in the charge-discharge cycle.

3:52:17 PM
MR. DWIVEDI said 100 units of electricity to charge would yield about 95 or 96 units of heat. He said the losses were about two percent for blowers used in the charging process and about three percent straight heat loss.

3:53:06 PM
MIKE EROS, Chief Geoscientist, Sage Geosystems, Houston, Texas, moved to slide 1 and introduced himself. He said he was a professional geologist from Texas and West Virginia with personal ties to Alaska. He said his intent was to initiate a conversation about Sage Geosystems in Alaska and to answer questions to the best of his ability:

[Original punctuation provided.]

Alaska State Senate
Resources Committee

Alaska's Multi-GW
Opportunity

Sage
Geosystems

February 26, 2025

3:54:24 PM
MR. EROS moved to and narrated slide 2. He said the Sage Geosystems team was composed of former oil and gas executives, including himself. The opportunity to deliver the lowest cost electricity and energy storage on the market in Texas was the inspiration for their formation:

[Original punctuation provided.]

Experienced Team of Industry Leaders

Cindy Taff Founder & Chief Executive Officer
Previously global VP of Unconventional Wells at Shell.

Dr. Lev Ring Founder & President
Previously Director of Technology Development at Weatherford and Technology Development Manager at

Enventure (a joint venture between Shell and Halliburton).

Lance Cook Founder & Chief Technology Officer
Previously Chief Scientist and global VP Technology for Wells at Shell.

Doug Simpkins Modeling Director
Jason Peart GM Strategy & Development
Shannon Bolton Project Manager
Mike Eros Chief Geoscientist

3:55:36 PM
MR. EROS moved to and narrated slide 3:

[Original punctuation provided.]

Sage Geosystems Corporate Timeline

2020	Incorporated
2021	Seed round (Virya and Nabors)
2022	HeatRoot™ patent granted
2023	TRL-7 Completed energy storage commercial pilot
2024	Series A First Close
2025	TRL-8 3MW energy storage commercial facility, followed by scale to 50MW TRL-8 Geothermal power generation demonstration with U.S. Air Force
2026	
2027	Meta Phase I Commission

In less than 4 years, Sage has:

- Reached TRL-7
- One cornerstone patent granted (gravity fracturing methodology)
- One cornerstone patent with all claims allowed (using the earth's pressure energy)
- Designed, built, and load-tested a full-scale 3MW sCO2 turbine in partnership with SwRI

Over the next year, Sage will:

- Commission its first EarthStore 3MW commercial energy storage facility

- Buy/sell electricity to the ERCOT grid to enable moving from equity to project financing
- Demonstrate its geothermal technology and generate electricity in a joint effort with the U.S. Air Force

MR. EROS added that Sage Geothermal (Sage) raised more than $55 million from private equity and oil and gas companies to test their ideas, modeling results and field drilling. He said Sage was working with Meta, Facebook's parent company, to deliver energy in the form of geothermal power. Sage also had U.S. Air Force funding to test geothermal pilot projects in Texas, which he said had direct applicability to Alaska, because the workforce is [in Alaska] and because the rocks are [in Alaska].

3:56:50 PM
MR. EROS moved to slide 4:

[Original punctuation provided.]

Alaska's Abundant Geothermal and Subsurface Energy Storage Potential

High Potential:
- Subsurface heat >90 mW/m2
- Proximity to Railbelt grid
- De-risked subsurface (lithology, heat)

Geothermal Developments:
- <500kW Chena Plant (2007)
- ~15 MW Makushin / Unalaska Plant (planned)

[Slide 4 includes a detailed map illustrating existing geothermal energy development and potential geothermal opportunity.]

MR. EROS commended Alaska's potential for low-cost geothermal power and noted Sage's partnership with GeoAlaska to drill on Augustine Island. He said the project targets both hydrothermal and hot dry rock geothermal energy, with the latter making up 90 percent of the subsurface. He highlighted other areas with high heat transfer potential, particularly in the Cook Inlet and near Juneau. He advocated for oil and gas drilling technologies for quick and cost-effective access and energy storage. He said the Chena plant near Fairbanks, the coldest geothermal power plant globally and noted for its 500-kilowatt scale, had potential for expansion to megawatts.

3:59:10 PM
MR. EROS moved to and narrated slide 5:

[Original punctuation provided.]

New Subsurface Energy Solutions:
Two Products Built on Same Technology

Energy storage (EarthStoreTM)

Uses only pressure (mechanical) energy
70-75 percent round-trip efficiency (RTE):
< 2 percent water losses and 3MW-5MW per well
Can be designed for **short-duration** (3-4 hours) **or long-duration** (24+ hours)
Demonstrated in Texas (2022-2025)

[Diagram illustrating the Energy storage system]

Geothermal (Geothermal Geopressured System)

Uses pressure and heat energy
80 percent of the tech is the same (using pressure energy), with the remaining 20 percent being a **heat exchanger** and **binary cycle turbine**
Sage's GGS geothermal technology will be demonstrated in 2025 with the **U.S. Air Force**

[Diagram illustrating the Geothermal system]

MR. EROS explained that the new technology would drill vertical wells to 7,000-10,000 feet, using third generation fracking to create a large permeable area. High-pressure water is injected and released, generating power through turbines, like pump-storage hydro. Tests in Texas have shown continuous operation for up to 72 hours with minimal water loss. He said the technology could be applied geothermally in Alaska as shallow as 5000 feet on Augustine Island or in many places near Fairbanks, potentially 10,000 - 15,000 feet. He emphasized that Sage was aiming to produce energy that would be price competitive with natural gas in Texas today, under seven cents per kilowatt hour for energy storage, and approaching nine cents for geothermal. He reiterated that the technologies and experience of oil and gas drilling entities were essential to geothermal development. He noted Sage would be conducting a geothermal demonstration in 2025 in South Texas. The demonstration well will have similar properties to [future] wells in the Nenana basin near Fairbanks or in the Cook Inlet.

4:03:22 PM
MR. EROS moved to and narrated slide 6:

[Original punctuation provided.]

US Department of Defense Projects

[Aerial photo of Fort Bliss and profile photo of an armored vehicle]
Feasibility Study for U.S. Army & DIU at Fort Bliss |Ongoing|

[overhead photo of Naval air base and turbine prop airplanes on tarmac]
Feasibility Study for U.S. Navy & DIU at Naval Air Station CC |Ongoing|

Commercial 3-5MW Installation for U.S. Air Force at Ellington Field in Houston, TX |PPA to follow geothermal demonstration in Starr County|
[Overhead photo of Ellington Field, Houston and runway photo]

Geothermal Demonstration for U.S. Air Force in Starr County, TX |Funded - Targeted for 2025|
[photos of drilling equipment and a well in arid environment]

MR. EROS emphasized worldwide security concerns around reliable, grid-independent power. He said the military was especially interested in obtaining this power economically.

4:03:59 PM
MR. EROS moved to and narrated slide 7:

[Original punctuation provided.]

First Commercial 3MW Subsurface Storage Facility (2025)

COD in January 2025 in partnership with San Miguel Electric Cooperative Inc. (SMECI)

[conceptual illustration]

3MW Pelton turbine / generator

[photo of turbine/generator]

MR. EROS enthusiastically presented the successful installation of a three-megawatt Pelton turbine generator, connected to a well drilled to 10,000 feet and contributing power to the grid for the San Miguel Electrical Cooperative, Inc. (SMECI) in Texas. He said the project was generating excitement and interest because of it's potential for scaling further. He noted that the project received funding from the oil and gas industry by [formerly] Chesapeake, now Expand Energy, which invested over $10 million.

4:04:44 PM
MR. EROS moved to slide 8:

[Original punctuation provided.]

Use Case: Solar + Storage = Scalable 24/7 Power

Solar

- Solar = 200MW to sell directly to off taker
- Overbuild (2.7x) = 540MW to pump and store water in well

+

Energy Storage

- Energy storage = 200MW to sell when the sun is down

=

24/7 Power
200MW to sell 24/7

[Graphic depictions of solar panels, energy storage system and power transmission lines.]

- Scalable to GW
- 10 wells at 3-5MW/well
- Footprint = 15-20 acres

MR. EROS said Sage was working to test and demonstrate that their technologies for energy storage and geothermal power would make a significant difference. He said slide 8 summarized Sage's work with a Texas utility looking to diversify their portfolio beyond their lignite coal production, by building a 200-megawatt solar plant. He reiterated the limitations of lithium-ion batteries and said Sage was granted a lease on the Texas utility's land to demonstrate. He said a 15 to 20 acre well pad was required to approach the 30-to-50-megawatt scale, but Sage

would be starting at half a megawatt. He explained that this [would demonstrate] the potential for 100 percent renewable baseload power generation. He emphasized that Sage does not intend to rely on tax credits or handouts. He said Sage intends to compete and win in the marketplace, especially [over] natural gas in Texas.

4:05:57 PM
MR. EROS mentioned that [Sage's energy storage approach] would allow for over-building solar [capacity] to perhaps a three to one use of solar. He said [the utility] could run their operation for eight hours during the day and store enough energy to power energy storage recovery for 16 hours at night, [providing for] a 24-hour cycle. He said that cycle could be longer as well.

4:06:25 PM
MR. EROS moved to and narrated slide 9:

[Original punctuation provided.]

Energy Storage + Solar: Coal Power Plant Repurposing

Texas Example:

San Miguel Electric Cooperative Inc. (SMECI)
With Sage Geosystems: Lignite Coal Plant Staged Plan

- Convert 410MW coal plant to clean, renewable power
- 1GW by 2030 = solar with storage + geothermal power
- Repurpose 400 SMECI jobs
- Fill economic void left from coal plant closure

Synchronous generator Batteries Solar Geothermal Storage

4:06:55 PM
MR. EROS moved to and narrated slide 10:

[Original punctuation provided.]

Geothermal is < 1 percent of Utility Power

Current: Conventional Geothermal

- Permeable rocks naturally flowing steam/water
- Geographically limited to areas near volcanoes

- Production rates often unpredictable

[Conventional Geothermal illustration]

< 2 percent
of geothermal resources

Future: Hot Dry Rock

- Rocks that do not naturally flow steam or water
- Drilling for temperature not water production

[Hot Dry Rock illustration]

Hot Dry Rock technology can provide nearly unlimited geothermal power

4:08:02 PM
MR. EROS moved to and narrated slide 11:

[Original punctuation provided.]

Hot Dry Rock Geothermal
Competitive Edge

Sage has figured out how to make hot dry rock geothermal commercially viable:

- **Net power output is significantly higher (25-65%), as uses pressure and heat energy**
- **Less Capex**
- **Even fluid dispersion and lower friction pressure in fracture:** Only company to operate above frac opening pressure
- **Proprietary Geopressured Geothermal System (GGS) design**
- **Lower risk of induced seismicity**
- Enabling **commercial geothermal 'anywhere'**

[Illustration comparing three Hot Dry Rock Geothermal Systems]

Geopressured Geothermal System (e.g., Sage)

Enhanced Geothermal System (e.g., DOE/Fervo)
+ Conventional tech developed by the U.S. DOE

- Lower net power output due to high friction in fractures
- Added complexities of connecting multiple wells with fractures

Closed Loop System (e.g., Eavor)
+ Does not require fracturing
- Complex directional drilling = high Capex
- Requires tens of kms of well length for sufficient surface area = high Capex

MR. EROS highlighted ongoing research and government funding in support of developing energy efficiency with projects in Utah and Nevada. He asserted Sage's capability to offer the most cost-effective and efficient energy solutions using oil and gas technologies. He emphasized the urgency of this moment for implementing such technologies at a low cost.

4:08:54 PM
MR. EROS moved to slide 12. He said Sage entered a partnership with Meta (Facebook's parent company) to provide 150 megawatts of power to their data centers by 2030, with an initial demonstration of 5-8 megawatts by 2027. He also said the U.S. Air Force would fund testing for this scale of power provision. He emphasized the U.S. Air Force's concern over future energy reliability and delivery, citing long wait times for utility grid connections and permits. He said the Air Force was seeking independent power solutions, which Sage planned to offer through virtual power purchasing agreements:

[Original punctuation provided.]

Use Case: 150MW Term Sheet with Meta Platforms

- Sage Geosystems & Meta terms:
  - Phase I = 8MW | COD 2027
  - Phase II = 150MW | COD 2030
  - Option for additional 200MW
- Location TBD (L48 east of the Rocky Mountains)
- Term sheet signed with VPPA to follow

4:09:41 PM
MR. EROS moved to slide 13, a closing slide displaying the names and logos of Sage Geosystem's investors and partners.

4:10:03 PM

SENATOR DUNBAR noted that Cordova Electric faced challenges with seasonal hydro power availability, as they have abundant, cheap hydro during the summer but insufficient power during the winter due to frozen rivers. He asked whether Sage's energy storage system would apply economically to small rural communities like Cordova.

4:10:46 PM
MR. EROS said the feasibility of energy storage projects depends on local infrastructure, particularly existing oil and gas wells, which can reduce capital expenditures. He said studies indicated that under a megawatt, a single plant with a single well is feasible, and there are confirmed studies up to 500 kilowatts. The goal was to achieve a levelized cost of storage or electricity that competes with alternatives like lithium-ion batteries or pumped hydro storage, which comprises 90 percent of energy storage, ensuring similar efficiencies and costs.

4:11:34 PM
SENATOR DUNBAR asked what that [storage system] would look like.

4:11:44 PM
MR. EROS returned to slide 7 and explained that a system [suitable for Cordova] would look very similar to the [San Miguel Electric Cooperative Inc. (SMECI)] system in Texas.

SENATOR DUNBAR asked how many households would be served [by a system similar to the SMECI system].

MR. EROS said a megawatt generally served 2,000 people.

4:12:09 PM
SENATOR DUNBAR asserted that [the SMECI 3 MW system] would serve about 6,000 people.

MR. EROS affirmed that it would serve up to [6,000 people]. He said a smaller well could serve a smaller [community].

4:12:21 PM
SENATOR MYERS asked whether there had been experiments using fluids other than water in the closed loop system [depicted on slide 10].

4:12:34 PM
MR. EROS returned to slide 11 and said Sage did modeling using supercritical CO2 as a carrier and other gasses. He said water was frankly the easiest to permit right now in the United States and in many parts of the world. He noted that supercritical CO2

was wonderful in many ways, but did not assume it would be cost effective, because that hadn't been demonstrated.

4:13:22 PM
SENATOR MYERS noted that ammonia was used to keep the ground cold. He suggested that it was the same concept in that Sage's objective was to bring heat out of the ground.

MR. EROS affirmed that Sage's president had researched [ammonia] and he said he would have a better answer in the future.

4:13:55 PM
SENATOR DUNBAR asked how long energy could efficiently be stored using Sage's system.

4:14:16 PM
MR. EROS explained that the testing process involved a settling period where a fracture finds its limits, resulting in minimal water loss to the formation. He highlighted the ability to maintain pressure for extended periods in tight rock, with longer durations possible under lower permeability. He noted the importance of scaling the technology to subsurface conditions, managing costs, and avoiding faults and leaks, which he said are evident during drilling. He said the goal was to keep pressure with minimal fluid loss and without causing far-field pressure effects.

4:15:33 PM
SENATOR CLAMAN asked whether there was certainty about constructing the 150 MW platform for Meta, noting that Sage was still looking for a location in the Lower 48.

4:15:53 PM
MR. EROS noted that the Meta project was a pilot, and the location was still undetermined. He suggested there may be opportunity for Alaska.

4:16:26 PM
CHAIR GIESSEL thanked the presenters.

4:16:36 PM
At ease.

SB 47-CHUGACH STATE PARK EASEMENTS

4:17:47 PM

CHAIR GIESSEL reconvened the meeting and announced the consideration of SENATE BILL NO. 47 "An Act relating to Chugach State Park; and providing for an effective date."

4:18:40 PM
CHAIR GIESSEL solicited a motion.

4:18:46 PM
SENATOR WIELECHOWSKI moved to adopt the committee substitute (CS) for SB 47, work order 34-LS0179\G, as the working document.

4:18:57 PM
CHAIR GIESSEL objected for the purpose of discussion.

4:19:10 PM
PAIGE BROWN, Staff, Senator Cathy Giessel, Alaska State Legislature, Juneau, Alaska, provided the explanation of changes for and answered questions on CSSB 47, work order 34-LS0179\G:

[Original punctuation provided.]

Explanation of Changes
Senate Resources CS for Senate Bill 47
Version A to Version G

"An Act relating to Chugach State Park; and providing for an effective date."

The committee substitute adopts the following changes:

Section 1, page 1, lines 6-7
Deletes "and control of highway access and".

Section 2, page 2, lines 8-10
Adds language confining the purpose of an easement or right-of-way within Chugach State Park to repairing, maintaining, and constructing roads and related facilities.

Section 2, page 2, lines 11-17
Adds 4 additional requirements for a municipality to obtain an easement or right-of-way if:

1. The easement or right-of-way is requested by the municipality.
2. The municipality pays for all costs DNR may require obtaining an easement or right-of-way.

3. The municipality assumes the duty of maintaining the easement or right-of-way, and any constructed facilities.
4. The duration of the easement or right-of-way is set in the easement.

4:20:05 PM
MS. BROWN said SB 47, version G, was the result of collaboration with the Municipality of Anchorage, the Anchorage Department of Parks, the [Alaska] Department of Natural Resources (DNR), Division of Parks and the DNR Division of Mining, Land and Water, the Department of Transportation and Public Facilities (DOTPF), and the Department of Law (DOL).

4:20:24 PM
CHAIR GIESSEL noted representatives of the Department of Natural Resources (DNR) and the Department of Law (DOL) were available to answer questions.

4:21:07 PM
SENATOR WIELECHOWSKI asked whether the state would be giving the municipality the right to pursue a mining or timber harvest easement under the provisions of SB 47.

4:21:54 PM
CHRISTOPHER ORMAN, Natural Resources Attorney, Department of Law (DOL), Juneau, Alaska, clarified the intent of SB 47. He said Section 2(b) would authorize the Department of Natural Resources (DNR) to create an easement or right of way within Chugach State Park for road repair, maintenance, and construction. He noted that while there might be secondary implications, such as soil or gravel removal, the primary focus was on easements for road-related activities.

4:23:01 PM
SENATOR WIELECHOWSKI quoted from SB 47, Section 1, page 1, lines four - six: "**Except as provided by (b) and (c) of this section, control, development, and maintenance of** [THE] state land and water described in AS 41.21.121 as the Chugach State Park **and control of roadside structures** within the park is assigned to the department". He noted that [lines] four and five seemed broad. He asked whether it was Mr. Orman's opinion that the easements for right of way would be limited to roads and related facilities within the park.

4:23:49 PM
MR. ORMAN concurred with this interpretation. He noted that Section 1 page 1, lines four and five led to Section 1(b) and

Section 1(b) provided the exception limiting [the right of way] for purposes of repairing, maintaining and constructing roads.

4:24:11 PM
CHAIR GIESSEL invited Mr. Gease to comment on the questions.

4:24:22 PM
RICKY GEASE, Director, Division of Parks and Outdoor Recreation, Department of Natural Resources, Anchorage, Alaska concurred with Mr. Orman and said DNR endorsed SB 47, version G.

4:24:48 PM
CHAIR GIESSEL opened public testimony on SB 47.

4:25:10 PM
CHRIS BECK, Coordinator, Alaska Trails Initiative, Anchorage, Alaska, testified with concerns on SB 47. He said he supported SB 47 which was intended to improve access to Alaska's Chugach State Park. He emphasized the need for a broad definition of "access" in the bill to include roads, parking areas, and facilities, and explained that this would align better with Anchorage municipality voters' intent. He highlighted the economic impact of extending visitors' stays, noting that an extra day could generate $250 million annually. He urged the passage of SB 47 to facilitate the comprehensive use of funds for access improvements, thereby enhancing the park's appeal and Alaska's economy.

4:28:47 PM
DIANA RHOADES Director of Programs, Anchorage Park Foundation, Anchorage, Alaska, expressed her support for SB 47 with concern that broader language would allow for voter expectations of the anticipated improvements to the Chugach access service area.

4:29:30 PM
CHAIR GIESSEL closed public testimony on SB 47.

CHAIR GIESSEL directed Ms. Brown to respond to concerns expressed by stating the intent of SB 47.

4:29:42 PM
MS. BROWN said the intent of SB 47 was to allow the municipality of Anchorage to bond for improvements, specifically to Canyon Road, but also where the Anchorage municipality and Chugach State Park met. She said the committee substitute included language that would allow repair, maintenance, and construction of roads and related facilities. She concluded that [the

language] should cover the potential improvements intended by the Anchorage Bond.

4:30:29 PM
CHAIR GIESSEL said the original goal of SB 47 was to repair and maintain a section of Canyon Road that is in poor condition. She noted that the municipality sought to install a small gravel pad for equipment parking, with potential future use for public parking. She asserted that the limited right of way would require Commissioner approval, as stated in SB 47 and she emphasized the public interest in improved park access. She said SB 47 would not allow for the establishment of amusement facilities by the municipality.

4:32:11 PM
SENATOR CLAMAN said the language of SB 47 was broad enough to cover parking lots and potentially paved trails from the parking area up to the trailhead, etc. He appreciated that SB 47 allowed flexibility to address the Canyon Road issue as well as future issues. He opined that the drafting of [SB 47, version G] also addressed the concerns raised by the public testimony. He also affirmed the provision in SB 47 allowing the future renewal of the easement and flexibility among the different government entities involved.

4:33:39 PM
SENATOR HUGHES commended the cooperation and collaboration evident in the development and refinement of SB 47.

[CHAIR GIESSEL removed her objection. She found no further objection and CSSB 47 was adopted.]

4:34:00 PM
CHAIR GIESSEL solicited the will of the committee.

4:34:05 PM
SENATOR WIELECHOWSKI moved to report CSSB 47, work order 34-LS0179\G, from committee with individual recommendations and attached fiscal note(s).

4:34:23 PM
CHAIR GIESSEL found no objection and CSSB 47 was reported from the Senate Resources Standing Committee.

4:34:53 PM
There being no further business to come before the committee, Chair Giessel adjourned the Senate Resources Standing Committee meeting at 4:34 p.m.