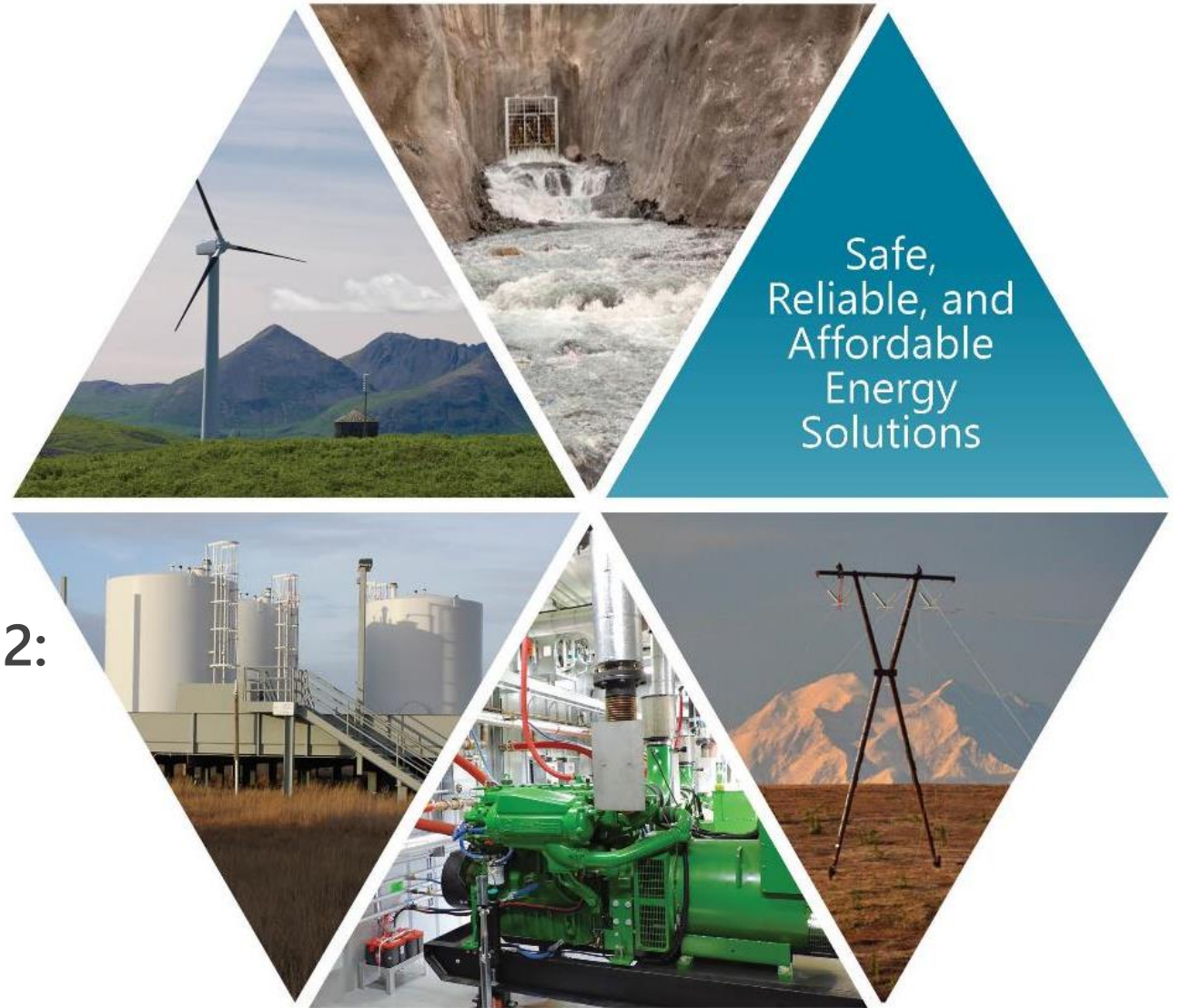


ALASKA ENERGY AUTHORITY

# MODERNIZING THE RAILBELT GRID

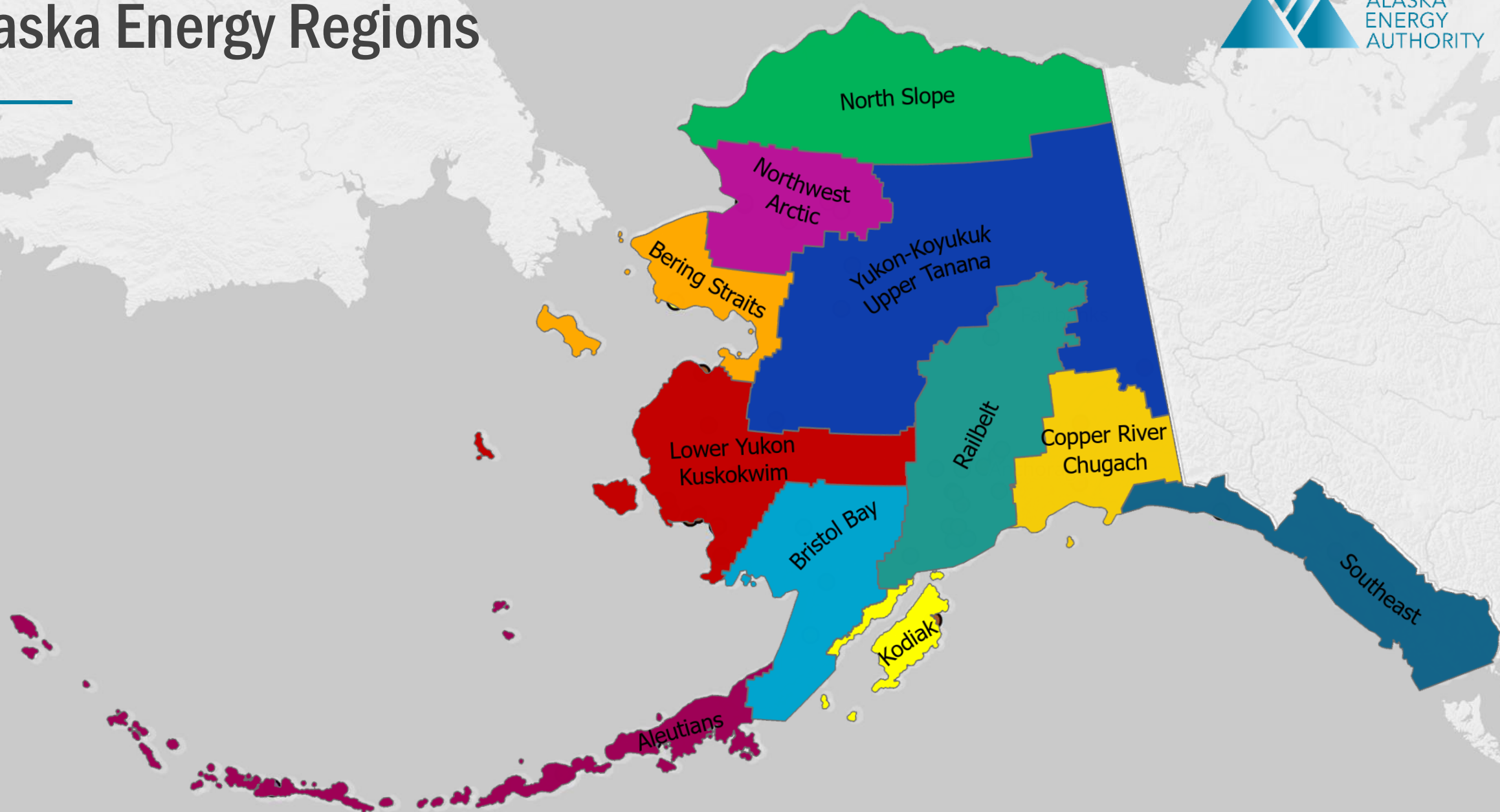
Jim Mendenhall, PE  
Program/Project Manager

2024 ASEC Pre-Conference Workshop 2:  
Transmission and Distribution  
April 3, 2024



Safe,  
Reliable, and  
Affordable  
Energy  
Solutions

# Alaska Energy Regions



# Grid Resilience and Innovation Partnerships



- **On October 18, 2023, the U.S. Department of Energy (DOE) announced up to \$3.5 billion in Grid Resilience and Innovation Partnerships (GRIP) Program investments for 58 projects across 44 states to strengthen electric grid resilience and reliability across America. In the fall of 2023, AEA was awarded \$206.5 million by DOE to advance the Railbelt Innovation Resiliency (RIR) project, which aims to enhance the resiliency and transfer capability along Alaska’s Railbelt.**
  - To utilize the funds, **there must be a commitment to match 100 percent** — or \$206.5 million — bringing the project’s total cost to \$413 million.
  - These **federal funds were the result of a successful collaboration** between AEA and Railbelt utilities:
    - Chugach Electric Association
    - Golden Valley Electric Association
    - Homer Electric Association
    - Matanuska Electric Association, and
    - Seward Electric.
  - With this DOE funding, **Alaska can leverage dollar-for-dollar matching federal investment** to expand on transmission upgrades already underway and modernize the transmission system for the benefit of all of the Railbelt communities, while at the same time improve resilience and energy security, diversify its energy portfolio, and accelerate the effective future integration of renewable and clean power.

# Why are Transmission Upgrades Needed?

Many of the transmission lines and associated equipment serving Alaska were constructed more than 40 years ago. Transmission upgrades are needed to improve Alaska's resilience and energy security, diversify its energy portfolio, and accelerate the effective future integration of renewable and clean power.



## Energy Security

Reliable transmission infrastructure ensures that those projects will be able to connect to the grid and provide energy anywhere it is needed along the Railbelt.



## Energy Diversity

As Cook Inlet natural gas supplies decline, new energy projects, including renewable energy, will become increasingly important to our energy security.



## Redundant Energy

A second transmission line from the Southern region (Kenai Peninsula) of the Railbelt to the Central region (Anchorage) will ensure power in the event of an emergency shutdown along existing lines.

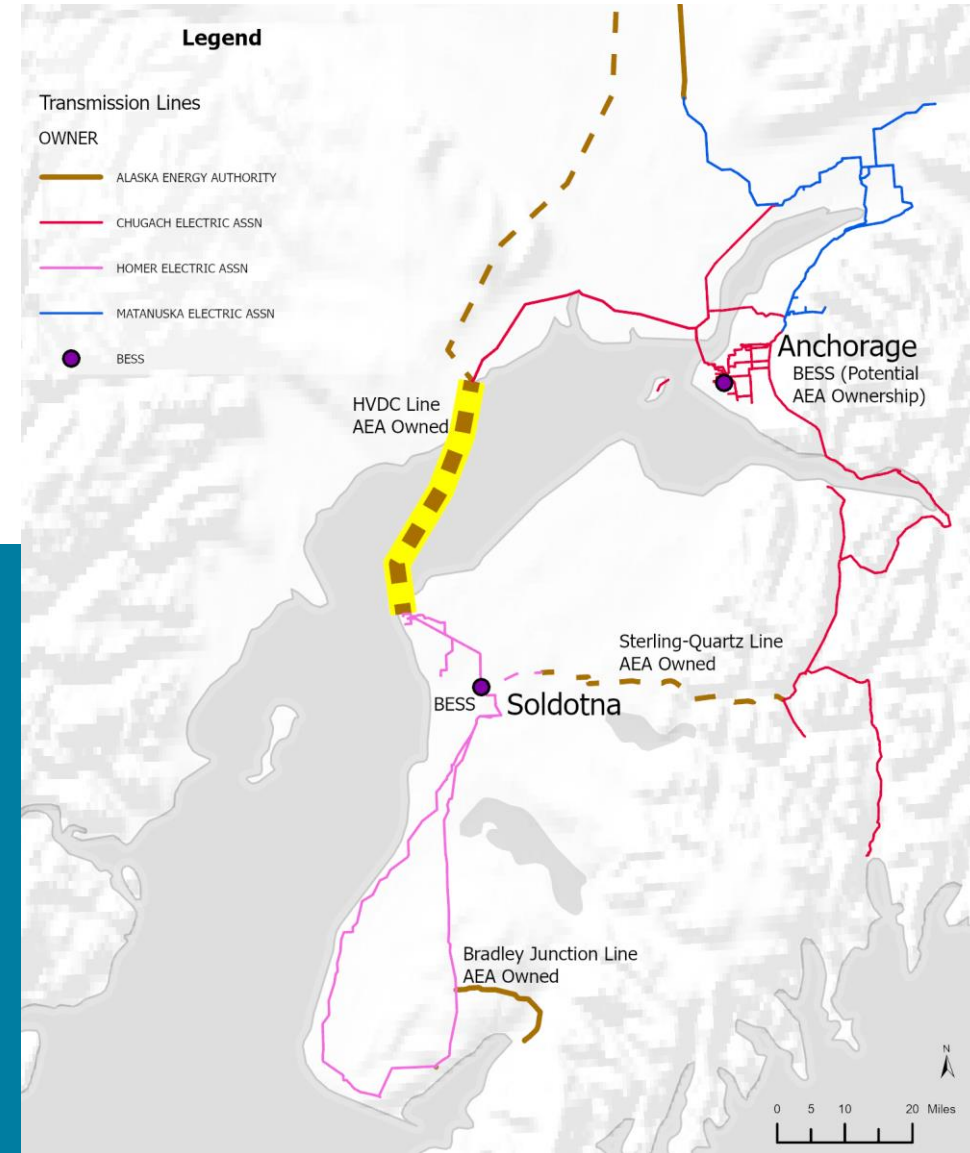
\$413 Million (206.5 Million Federal and \$206.5 Million Alaska Match)

# GRIP 3, Round 1 - Railbelt Innovation Resiliency Project: HVDC Subsea Cable

- The Railbelt Innovation Resiliency (RIR) project will construct a high-voltage direct current (HVDC) subsea cable to serve as a parallel transmission route from the Kenai Peninsula to Anchorage, creating a much-needed redundant system in case of disruptive events.

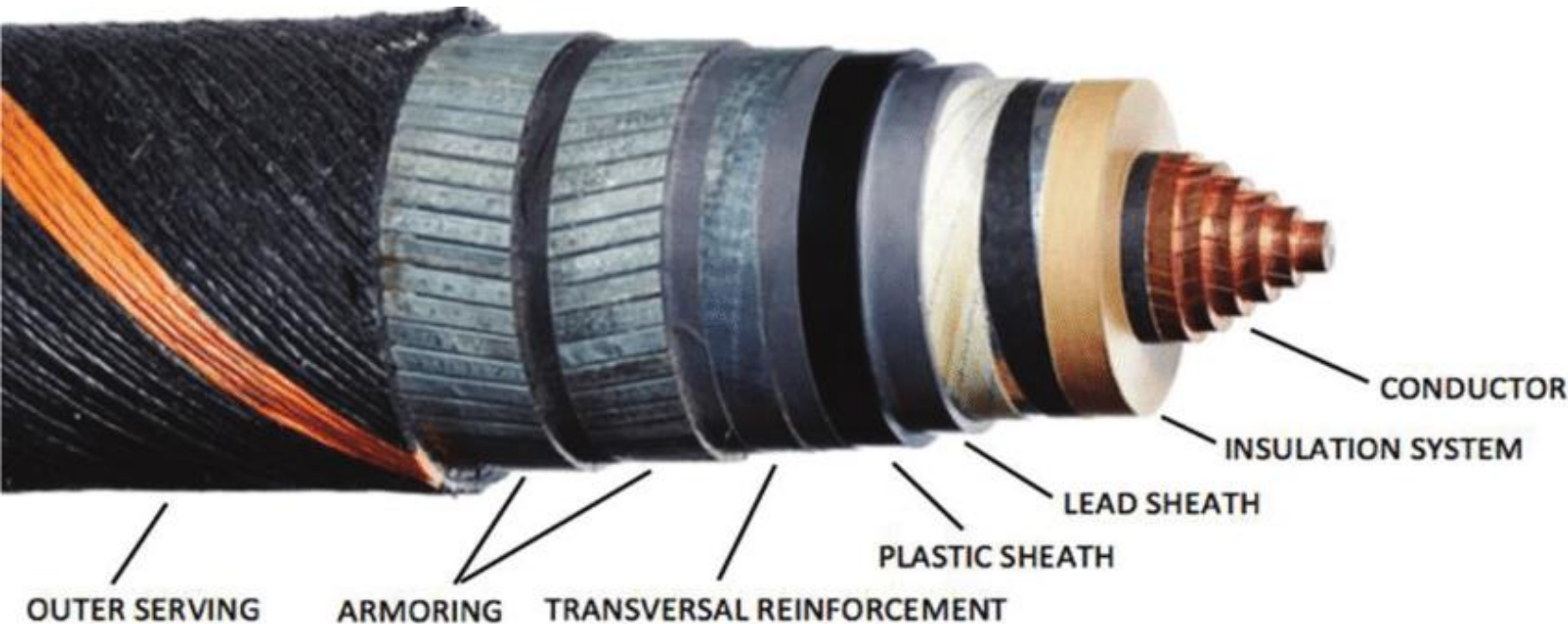
## Anticipated outcomes and benefits include:

- Increases transfer capacity between regions that enables higher renewable energy integration into the electricity system.
- Improves resilience and reliability for tribal and disadvantaged communities in the Railbelt region, and a reduction in reliance on fossil fuel generation and associated emissions.
- Supports the retention of high-quality jobs in the region, including 650 highly paid jobs with competitive employer-sponsored benefits.
- Creates apprenticeship and internship programs to train a new generation of lineworkers and wireworkers to reinvigorate Alaska's energy workforce.



# HVDC Subsea Cable from Kenai to Beluga

- The RIR project encompasses several projects — one of them being the installation of a **new subsea high-voltage direct current (HVDC)** transmission line from the Kenai Peninsula across Cook Inlet to the existing Beluga Power Plant — and, if feasible, **one or two battery energy storage systems (BESS)** in the Central (Anchorage) and Northern (Fairbanks) regions.



## Project highlights:

- **Location:** The project involves connecting the Railbelt's Southern region (Kenai Peninsula) to the Central region (Anchorage, Matanuska-Susitna Valley) via Beluga with an HVDC submarine circuit.
- **Cable length:** Approximately 65 miles total length, 37.5 mile subsea cable/2.5 miles from the landing to Beluga, and 25 miles from the Southern landing to Soldotna.
- **Cable size:** The cable is approximately 8" in diameter with roughly 250 megawatt transfer capability.
- **Cable depth to be buried in the seabed:** About 4-6 feet deep. Landings may be installed using horizontal directional drilling.

# BESS in Central (Anchorage) and Northern (Fairbanks) Regions



**At its most basic level** a BESS consists of one or more batteries that store electrical energy for use at a later time. This stored energy can then be drawn upon when needed to meet various demands for power across different applications.



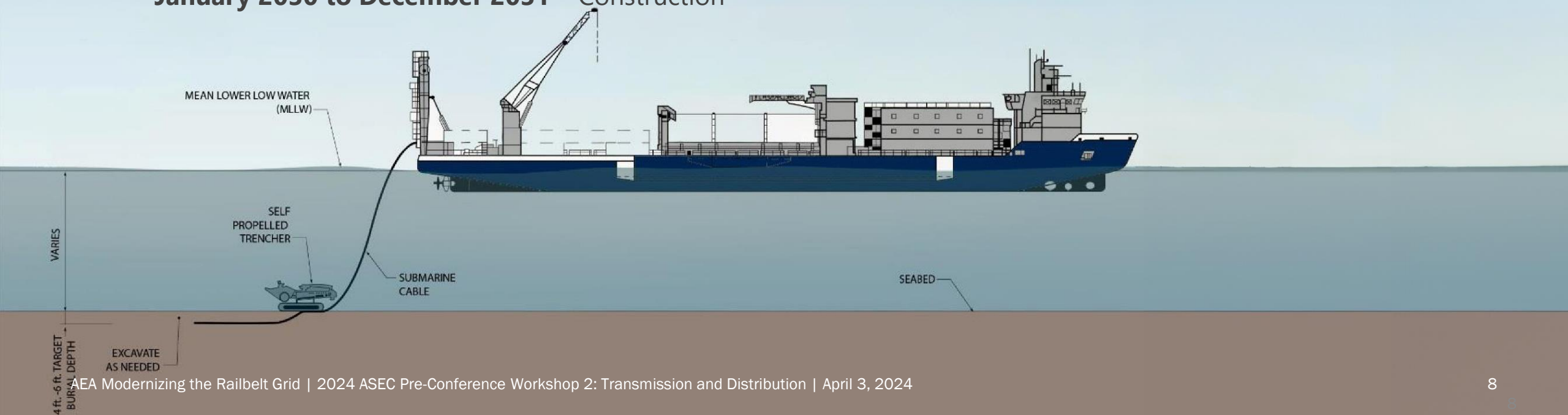
**BESS can also provide advantages over other energy storage systems** including greater efficiency and flexibility, faster response times when powering equipment or devices, and lower costs overall.



**Coordinated interregional control and operations** of the BESSs and HVDC line will tie all the individual systems together to maximize stability and limit congestion.

# Schedule

- The statutory period for the project is eight (8) years and the construction schedule below is based on a design-bid-build process — a traditional project delivery method that consists of three distinct phases in sequence:
  - **Second Quarter 2024** – Award
  - **Summer 2024** – Preliminary Engineering
  - **December 2024** – Complete Preliminary Design
  - **July 2027** – Complete National Environmental Policy Act (NEPA) Process
  - **December 2027** – Contractor Selection
  - **January 2028 to December 2029** – Long Lead Items
  - **January 2030 to December 2031** – Construction



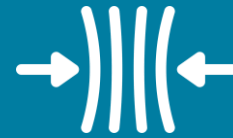


# Jetting Sled for Subsea Power Cable Laying

---

# Benefits and Opportunities

- Alaska has a once-in-a-generation opportunity to expand on upgrades underway by leveraging federal funding to modernize the transmission system for all Railbelt communities. Transmission line upgrades and BESS acquisition will provide consumers with multiple benefits, including:



**Decreased line loss:** Upgraded line will substantially reduce energy losses from resistance, contributing to lower energy prices.

**Grid redundancy and stability:** Adds redundancy and stability on the Railbelt by creating an alternate path for generation to flow north and south.

**Better cost alignment:** Align the allocation of resources with traditional utility methodology, i.e. cost causer/cost payer.

**Rural benefits:** Upgrades will benefit rural communities; when energy costs decrease on the Railbelt, residential rates are reduced for communities that receive Power Cost Equalization.

**Increased resilience and reliability:** BESS increases grid resilience and reduces outage risk by supporting load for several hours.

**New renewable energy:** Allows for development of new renewable energy projects on the Kenai Peninsula for consumers.

**Increased stability:** Regardless of fuel supply diversity and decarbonization solutions, these improvements are needed for increased stability.



\$730 Million

# GRIP 3, Round 2 - Beluga to Healy Overhead High-Voltage Direct Current

- The Railbelt Innovative Resiliency (RIR) Project, Phase 2 is a crucial initiative to build a clean, smart, and affordable grid in Alaska. This project consists of constructing a 240-mile high-voltage direct current (HVDC) overhead transmission line from Beluga (west of Cook Inlet) to Healy. Coupled with the RIR Phase 1 project (Subsea cable from the Kenai Peninsula to Beluga), which includes two battery energy storage systems (BESS), this will provide a redundant connection between Bradley Lake Dam and Fairbanks.

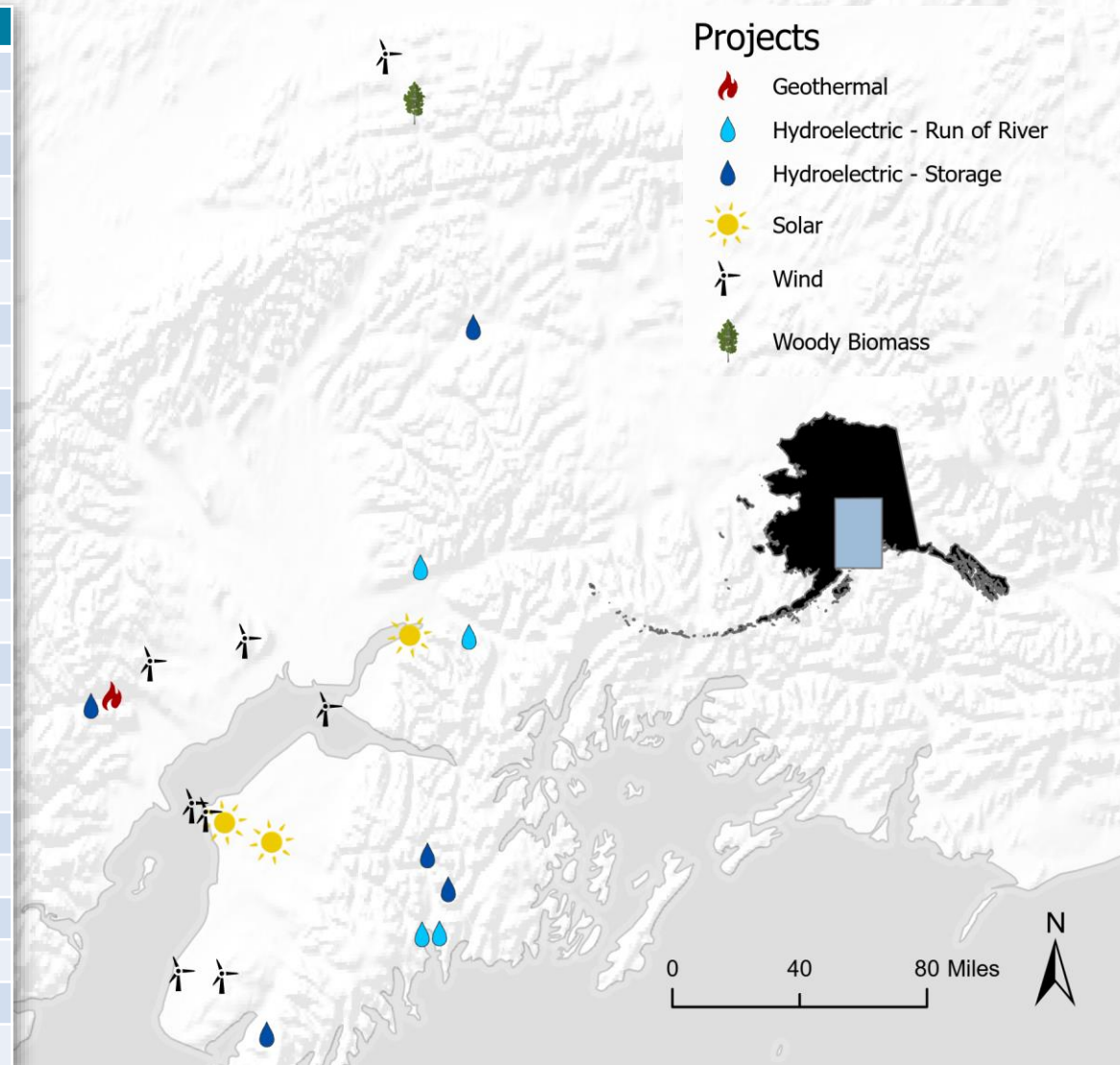
## Project Status:

- In January 2024, AEA and the Railbelt Utilities submitted a concept paper to the Department of Energy (DOE) for the project. In late February, we were notified that our concept paper had been reviewed and we were encouraged to submit a full application.
- For this type of project, 50 percent of the concept papers were advanced to the full application phase. The full application is due on April 17, 2024, and we expect notification in early third quarter of this year. If successful the DOE will provide 50 percent of the project funding.



# Major Projects Being Considered

Project Name	Project Developer	Technology
Augustine Island	Homer Electric Association, Inc.	Geothermal
Mount Spurr	Homer Electric Association, Inc.	Geothermal
Hunter Creek	Matanuska Electric Association, Inc.	Hydroelectric - Run of River
Godwin Creek	Chugach Electric Association, Inc.	Hydroelectric - Run of River
Fishhook	Fishhook Renewable Energy, LLC	Hydroelectric - Run of River
Lowell Creek	Your Clean Energy LLC / City of Seward	Hydroelectric - Run of River
Dixon Diversion	AEA	Hydroelectric - Storage
Susitna Watana	AEA	Hydroelectric - Storage
Snow River	Chugach Electric Association, Inc.	Hydroelectric - Storage
Grant Lake	Homer Electric Association, Inc.	Hydroelectric - Storage
Chakachamna	Tanadgusix Corporation (TDX)	Hydroelectric - Storage
Eklutna Solar Project	Native Village of Eklutna	Solar
Kenai Peninsula Solar Project	Solstice Energy LLC	Solar
Sterling Solar Project	Utopian Power LLC	Solar
Fire Island Phase 2	Cook Inlet Region, Inc.	Wind
Little Mount Susitna	Alaska Renewables LLC	Wind
Shovel Creek	Alaska Renewables LLC	Wind
Belgua Area Wind Farm	Cook Inlet Region, Inc.	Wind
Healy Area Wind Farm	Cook Inlet Region, Inc.	Wind
Cook Inlet Offshore Oil Platform	Homer Electric Association, Inc.	Wind
Ninilchik Wind Farm	Homer Electric Association, Inc.	Wind
East Foreland (Nikiski) Wind Farm	Homer Electric Association, Inc.	Wind
Caribou Hills Wind Farm	Homer Electric Association, Inc.	Wind
Healy 2 Biomass	Golden Valley Electric Association, Inc.	Woody Biomass





# Thank You

Alaska Energy Authority  
813 W Northern Lights Blvd.  
Anchorage, AK 99503  
Phone: (907) 771-3000  
Fax: (907) 771-3044  
[akenergyauthority.org](http://akenergyauthority.org)