ALASKA ENERGY AUTHORITY

MODERNIZING THE RAILBELT GRID

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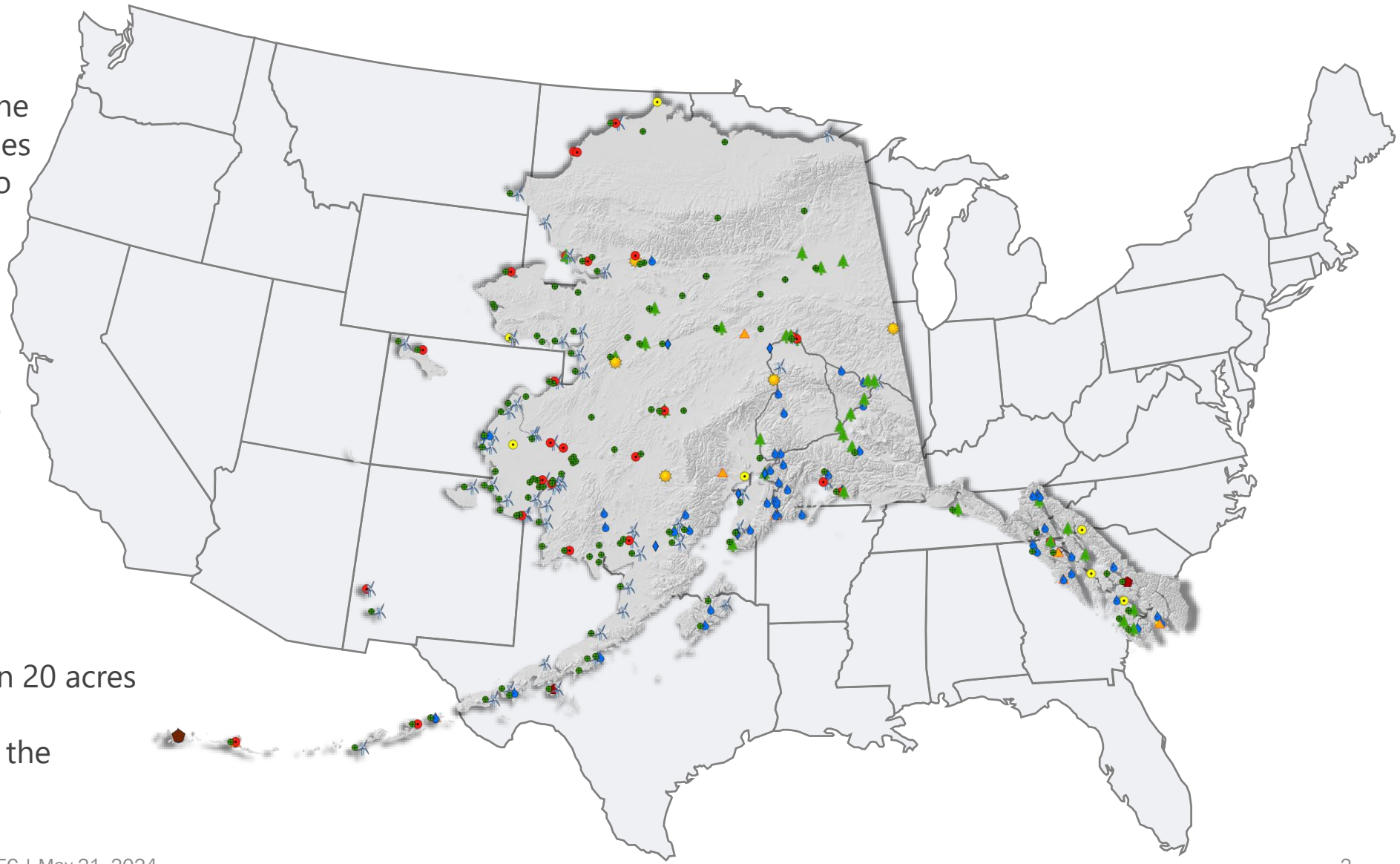
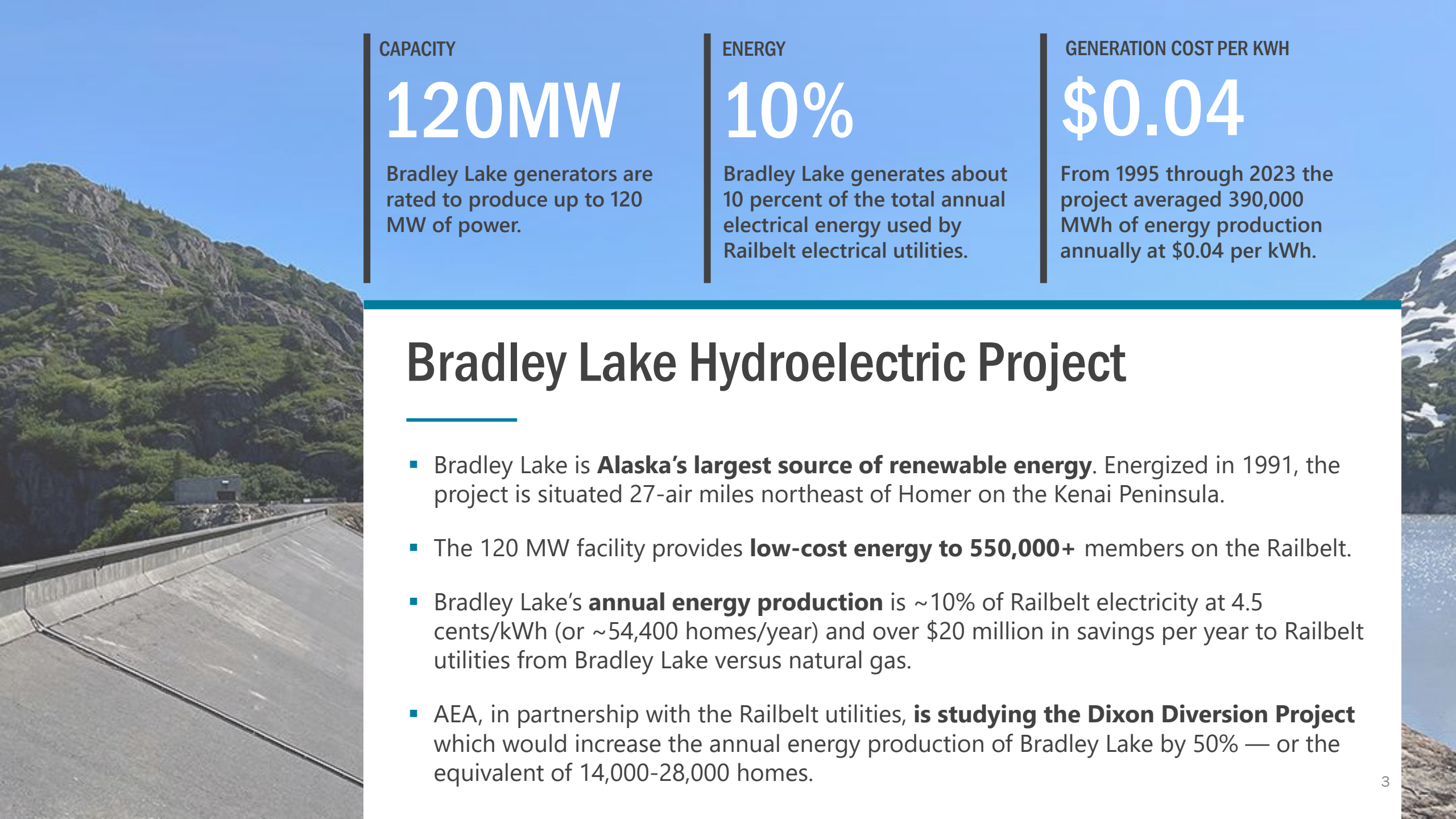
Just how big is Alaska?

Alaska has 586,000 square miles of land. It is one-fifth the size of the Lower 48, 488 times larger than Rhode Island, two and a half times larger than Texas, and bigger than the next three largest states in the U.S. combined.

- 33,904 miles of shoreline
- 6,640 miles of coastline
- 19 mountain peaks over 14,000 feet
- 3 million lakes larger than 20 acres
- Has more than half of all the world's glaciers





CAPACITY

120MW

Bradley Lake generators are rated to produce up to 120 MW of power.

ENERGY

10%

Bradley Lake generates about 10 percent of the total annual electrical energy used by Railbelt electrical utilities.

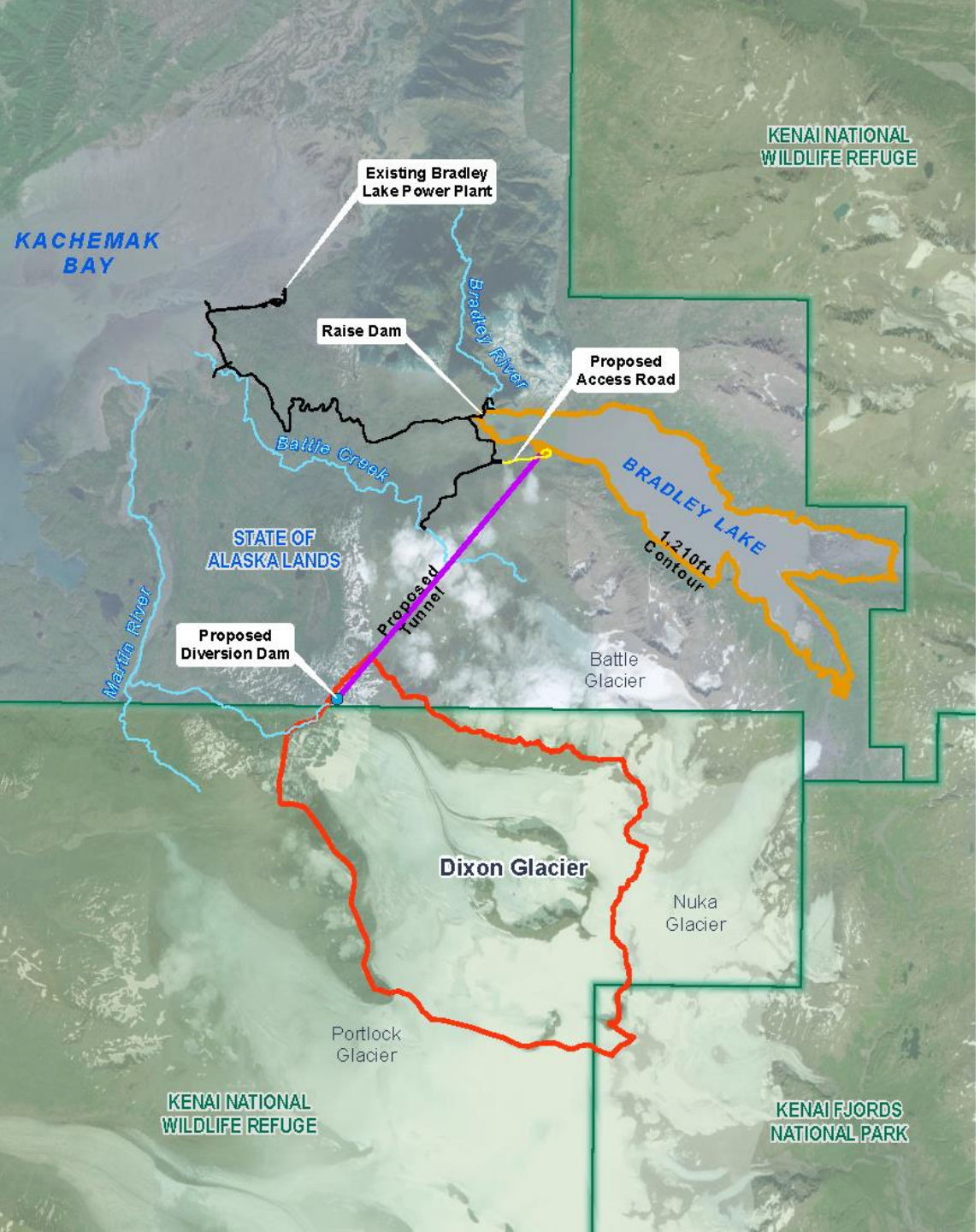
GENERATION COST PER KWH

$0.04

From 1995 through 2023 the project averaged 390,000 MWh of energy production annually at $0.04 per kWh.

Bradley Lake Hydroelectric Project

- Bradley Lake is **Alaska's largest source of renewable energy**. Energized in 1991, the project is situated 27-air miles northeast of Homer on the Kenai Peninsula.
- The 120 MW facility provides **low-cost energy to 550,000+** members on the Railbelt.
- Bradley Lake's **annual energy production** is ~10% of Railbelt electricity at 4.5 cents/kWh (or ~54,400 homes/year) and over $20 million in savings per year to Railbelt utilities from Bradley Lake versus natural gas.
- AEA, in partnership with the Railbelt utilities, **is studying the Dixon Diversion Project** which would increase the annual energy production of Bradley Lake by 50% — or the equivalent of 14,000-28,000 homes.



$342 Million

Dixon Diversion Project

AEA is studying the Dixon Diversion Project to optimize the energy potential of the AEA-owned Bradley Lake Hydroelectric Project. Like the West Fork Upper Battle Creek Diversion Project, the Dixon Diversion Project would divert water from Dixon Glacier in order to increase Bradley Lake's annual energy production by 50 percent.

- Located five miles from Bradley Lake and would utilize existing powerhouse at Bradley Lake
- Estimated annual energy 100,000-200,000 MWh (~24,000-30,000 homes)
- Estimated to offset 1.5-1.6 billion cubic feet of natural gas per year in Railbelt power generation (equal to 7.5% of Alaska's unmet natural gas demand projected for 2030)
- Estimated completion is 2030

*Funding will be used for engineering studies (feasibility, hydrological, geological) and environmental studies (fisheries, water quality, geomorphology).

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.

Reliable 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.

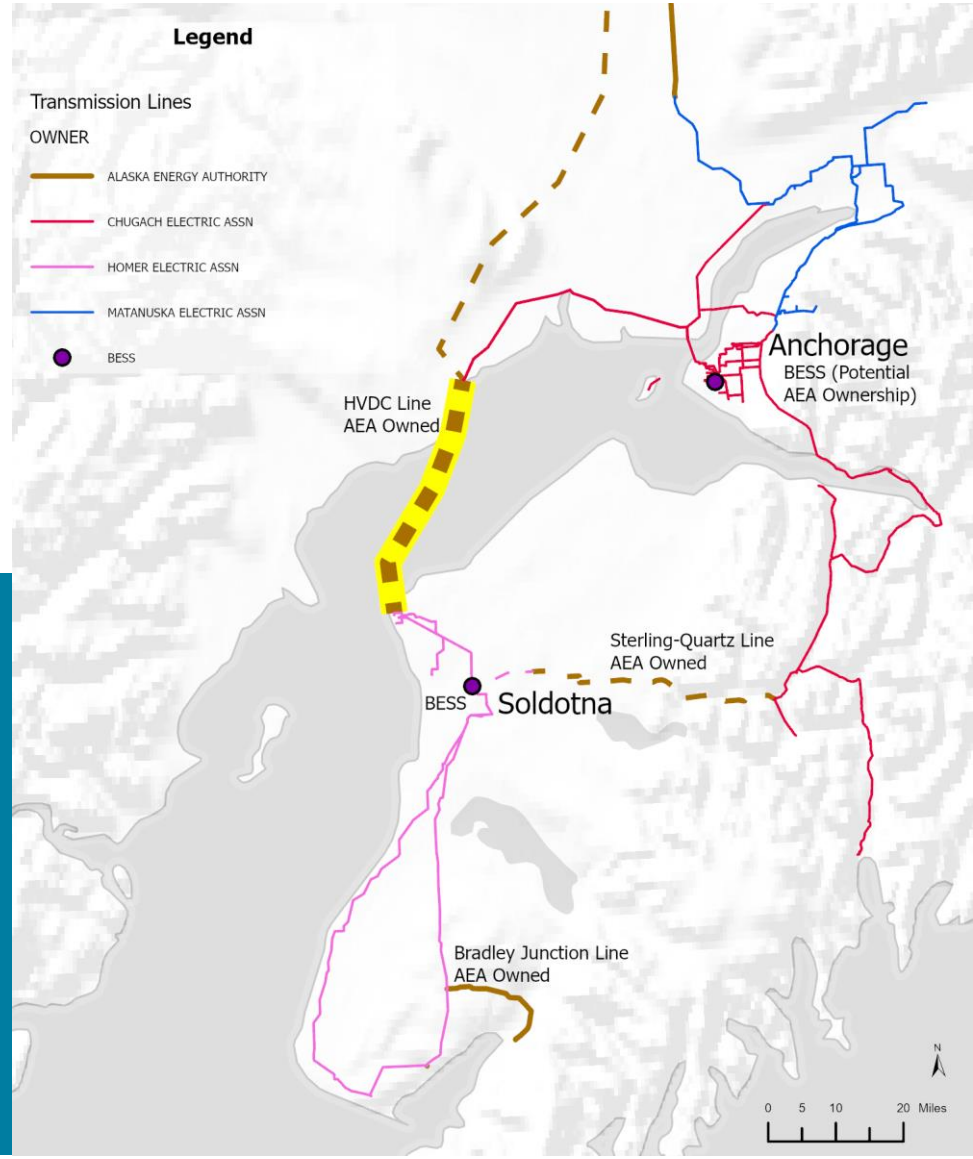
$413 Million (206.5 Million Federal and $206.5 Million Alaska Match)

Grid Resilience and Innovation Partnerships (GRIP): HVDC Line

AEA secured $206.5 million for GRIP Topic Area 3: Grid Innovation through the United States Department of Energy's Grid Deployment Office. A cost share of 100 percent, or $206.5 million, is required for a total project amount of $413 million. The Railbelt Innovation Resiliency project will construct a high-voltage direct current (HVDC) submarine 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:

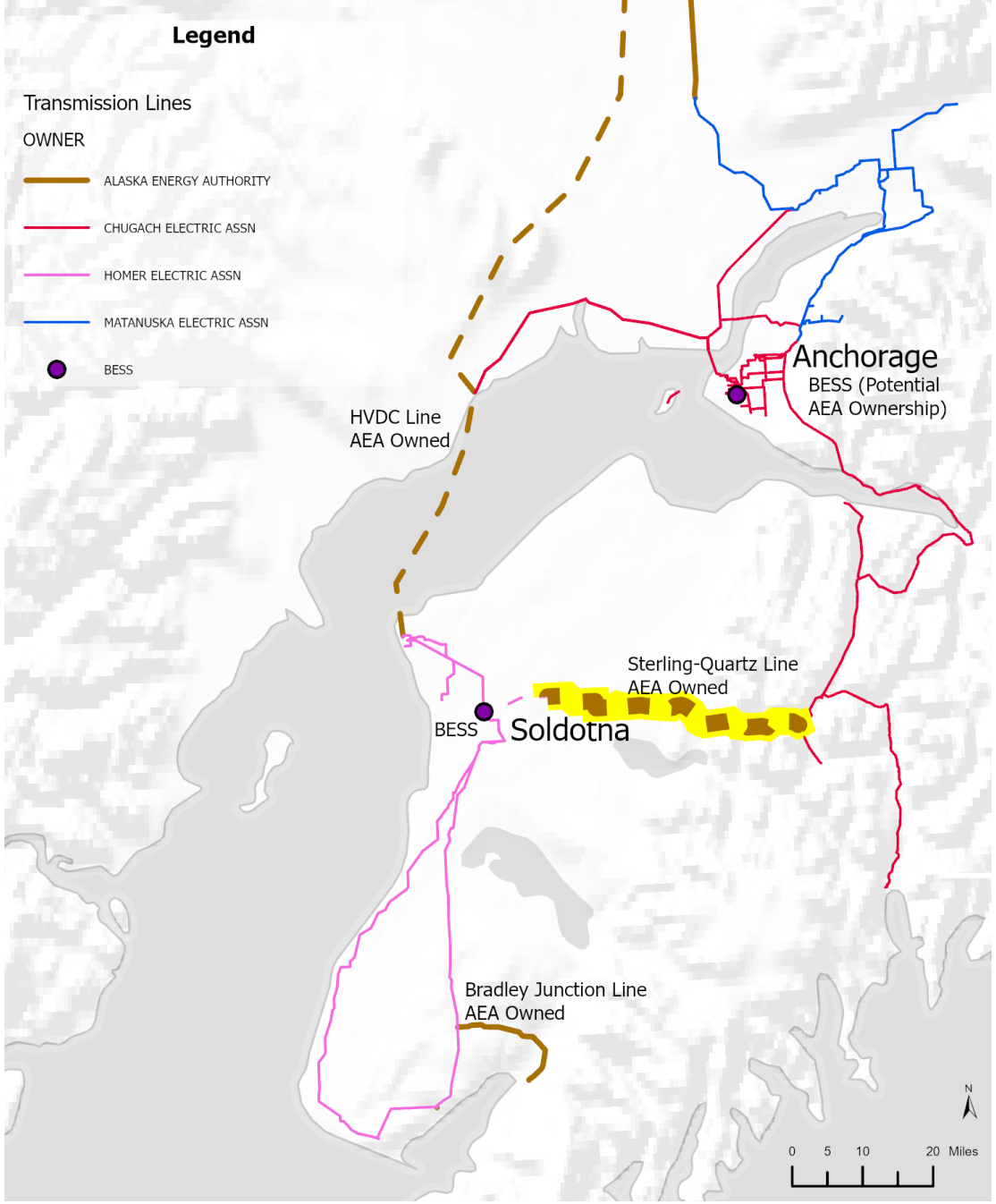
- Increases transfer capacity between regions that enables higher renewable energy integration into the electricity system.
- Improves resilience and reliability for tribal and disadvantaged communities in the Railbelt region, and a reduction in reliance on fossil fuel generation and associated emissions.
- 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.



$730 Million Total Cost ($365 Million Federal and $365 Million Match)

GRIP 3, Round 2: Beluga to Healy Overhead HVDC

- **Scope –** The Railbelt Innovative Resiliency Project, Round 2 is a crucial initiative to build a clean, smart, and affordable grid in Alaska. This project involves building a 250-mile high-voltage direct current (HVDC) overhead transmission line from Beluga (west of Cook Inlet) to Healy.
- **Benefits** – Increased resilience and redundancy of the Alaska Intertie, an additional conduit for power to transmit between regions, reduced line losses, and allows for more energy to be delivered to consumers.
- **Status and Schedule –** In January 2024, AEA and Railbelt Utilities submitted a concept paper to the Department of Energy. In March, we were encouraged to apply fully. Application deadline is April 17, 2024, and we expect notification in early third quarter.
  - 2025-2026 – Initial design, permitting
  - 2026-2027 – Engineering, NEPA process
  - 2027-2031 – Construction
- **Budget –** Estimated total cost is up to $730 million



$90 Million (Under Construction; AEA Bonds Existing)

Sterling to Quartz (SSQ) and Soldotna to Sterling Transmission Lines

In 2020, AEA acquired the SSQ Transmission Line, a critical component of the interconnected Railbelt transmission system on the Kenai Peninsula, as part of the Bradley Lake Hydroelectric Project.

- **Location –** 39.4 miles of 115 kilovolt (kV) transmission and out of use 69 kV transmission from Sterling to Quartz substation (Kenai Lake)
- **Benefits –** AEA ownership ensures better cost alignment, increase reliability, and more timely repairs and upgrades
- **Status –** 69 kV line decommissioned and removed. Engineers are designing and are procuring equipment for the upgrade of the existing 115 kV line to 230 kV. Upgrade will reduce line losses, increase line reliability and system resiliency
- **Cost –** Estimated cost to upgrade line to 230 kV standards is $90 million for the transmission line between Sterling Substation and the Quartz Creek Substation on Kenai Lake

$168 Million Total Cost ($58 Million Current Available Funds)

Battery Energy Storage Systems for Grid Stabilization

- **Scope –** The BESS projects consist of an upgrade to the existing BESS system in the North, and also new BESS systems in the Southern, and Central regions of the grid. The Northern BESS is located at Fairbanks, the Southern BESS is located in Kenai, the Central Region BESS will be located at Anchorage. BESS will be needed to fully realize the benefits of a 230 kV bulk power supply system, regulate energy from various generation, and increase resilience.

- **Benefits** – Increase system resilience, transfer capability, more efficient use of system, and lowers impediments to additional renewable generation development

- **Schedule –** Estimated completion date is 2026:
  - Southern (Kenai) – In service
  - Central (Anchorage) – October 2024
  - Northern (Fairbanks) – To be determined

- **Budget –** Estimated total cost is up to $168 million (depending on technology choices and capacity)

Thank You

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