ALASKA ENERGY AUTHORITY

MODERNIZING THE RAILBELT GRID

Curtis W. Thayer
Executive Director

Senate Resources Committee
March 13, 2024

ALASKA ENERGY AUTHORITY

About AEA

AEA's mission is to reduce the cost of energy in Alaska. To achieve this mission, AEA strives to diversify Alaska's energy portfolio — increasing resiliency, reliability, and redundancy.

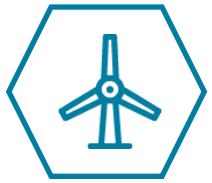
Railbelt Energy – AEA owns the Bradley Lake Hydroelectric Project, the Alaska Intertie, and the Sterling to Quartz Creek Transmission Line — all of which benefit Railbelt consumers by reducing the cost of power.

Power Cost Equalization (PCE) – PCE reduces the cost of electricity in rural Alaska for residential customers and community facilities, which helps ensure the sustainability of centralized power.

Rural Energy – AEA constructs bulk fuel tank farms, diesel powerhouses, and electrical distribution grids in rural villages. AEA supports the operation of these facilities through circuit rider and emergency response programs.

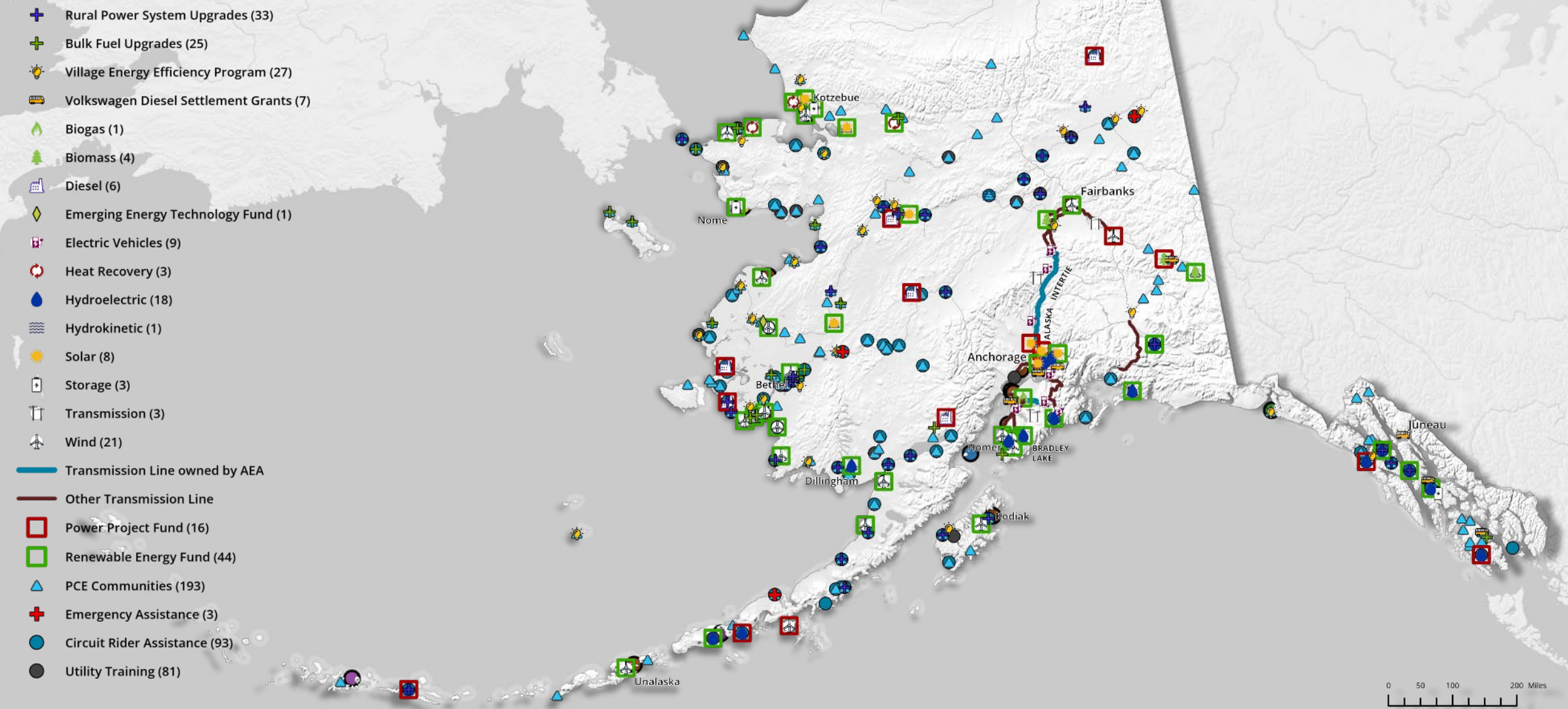
Renewable Energy and Energy Efficiency – AEA provides funding, technical assistance, and analysis on alternative energy technologies to benefit Alaskans. These include biomass, hydro, solar, wind, and others.

Grants and Loans – AEA provides loans to local utilities, local governments, and independent power producers for the construction or upgrade of power generation and other energy facilities.



Energy Planning – In collaboration with local and regional partners, AEA provides economic and engineering analysis to plan the development of cost- effective energy infrastructure.

AEA Active Projects and Services



Alaska Energy Security Task Force

60+
Subcommittee Meetings

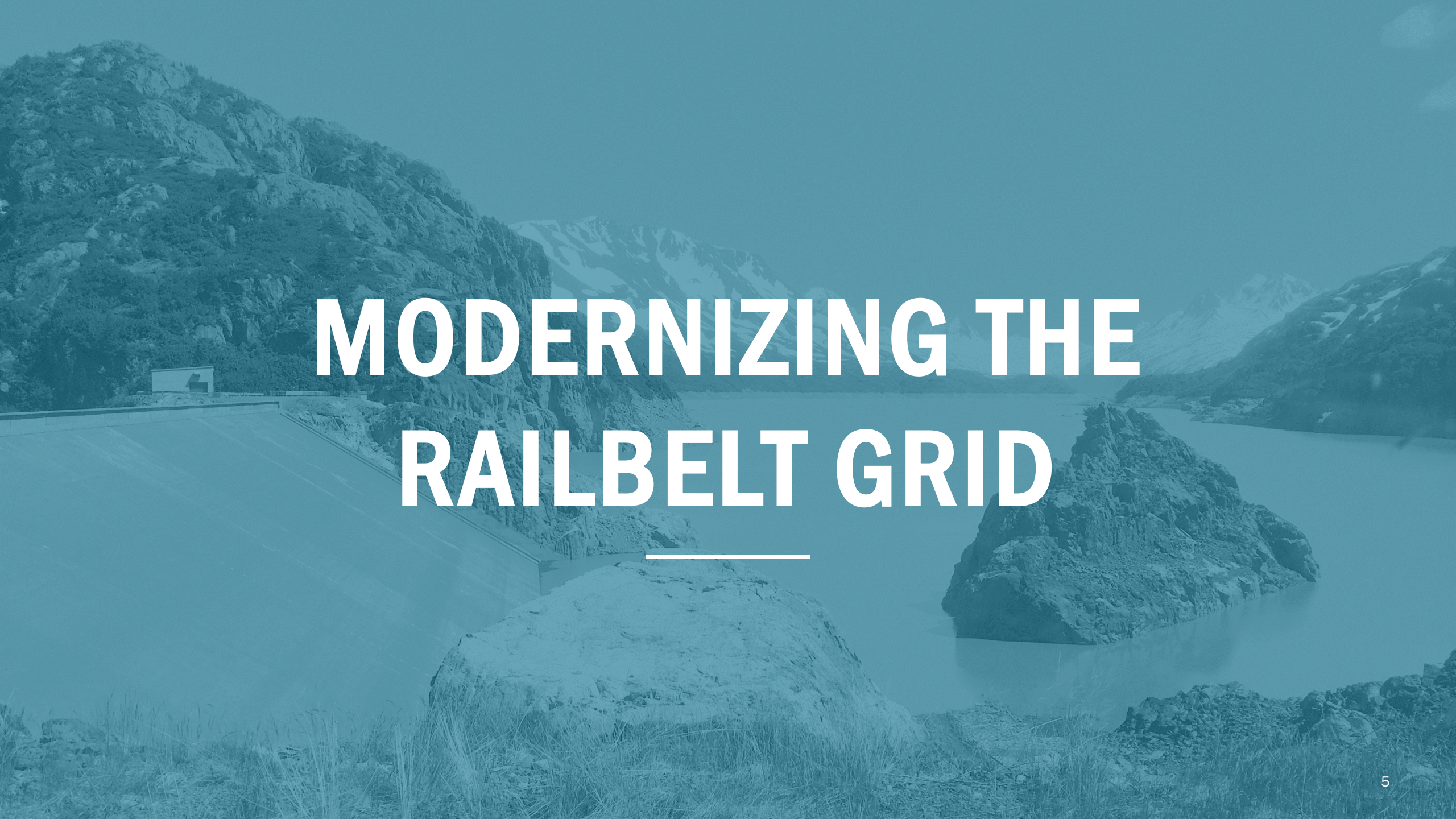
11
Task Force Meetings

150+
Hours of Public Meetings

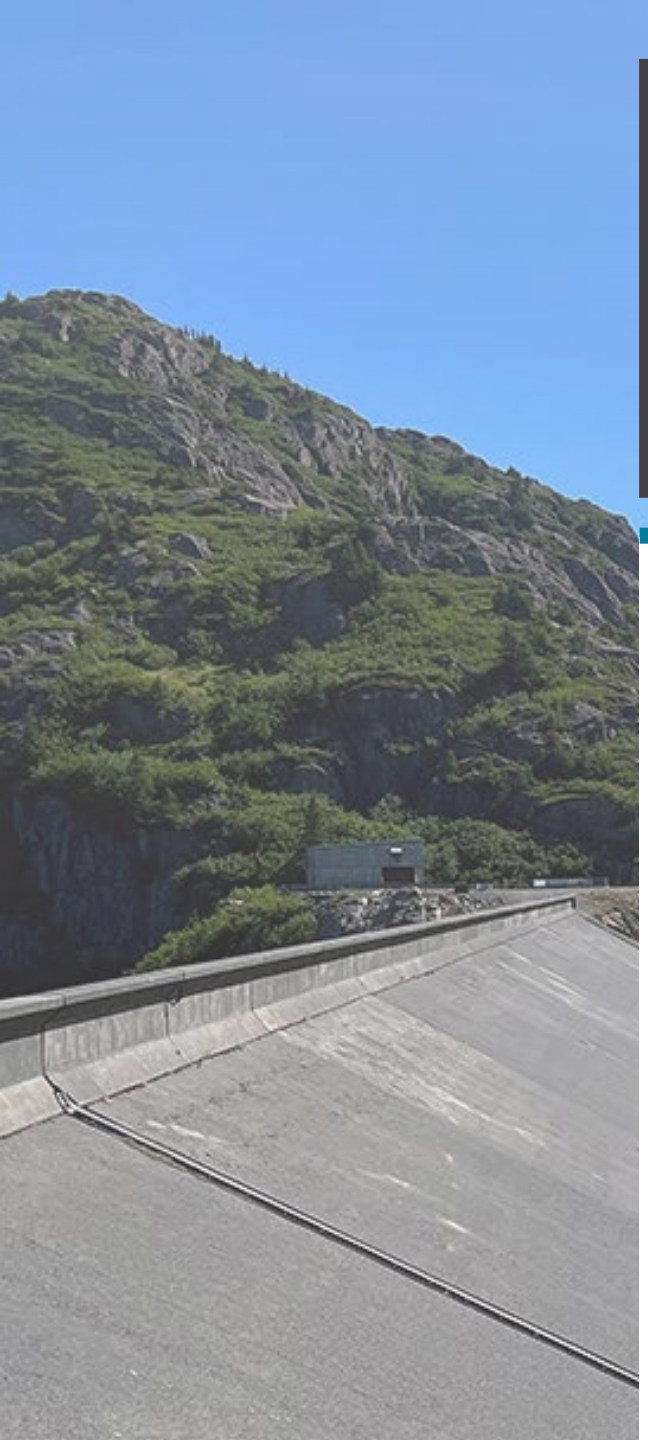
8
Energy Symposiums with 16 hours of OnDemand learning

6
Subcommittees have created over 60 preliminary actions for considerations:

- Railbelt Transmission, Generation, and Storage
- Coastal Generation, Distribution, and Storage
- Rural Generation, Distribution, and Storage
- State Energy Data
- Incentives and Subsidies
- Statutes and Regulations



MODERNIZING THE RAILBELT GRID



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 sued 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.

Alaska Intertie

Constructed in the mid-1980s with $124 million in State of Alaska appropriations, there is no debt associated with the Alaska Intertie.

- AEA owns the **170-mile Alaska Intertie transmission line that runs between Willow and Healy**. The line operates at 138 kV (it was designed to operate at 345 kV) and includes 850 structures.
- A **vital section of the Railbelt transmission system**, the Intertie is the only link for transferring power between northern and southern utilities.
- The Intertie transmits power north into the Golden Valley Electric Association (GVEA) system and provides Interior customers with low-cost, reliable power — between 2006 and 2023, the Intertie **saved GVEA customers an average of $36 million annually**.
- The Intertie provides benefits to Southcentral customers as well through **cost savings and resilience to unexpected events**.

Railbelt Transmission System Urgently Needs Modernization

The majority of the Railbelt transmission system was constructed over 40 years ago. A resilient, reliable, and redundant Railbelt transmission system is not only achievable but also necessary to create the needed capacity to integrate additional renewable energy in the future.

Grid Forming
A grid with alternate paths will increase reliability, resiliency, and fuel diversification.

Fuel Savings
Upgrades and alternate paths will reduce line losses.

Energy Security
Natural or other events can isolate cities or regions from energy.

Generation Changes
New renewable energy projects are not located in existing cities. New transmission to connect new renewable projects to existing transmission paid for by projects. However, existing transmission must be upgraded to transmit energy to and between the Railbelt regions.

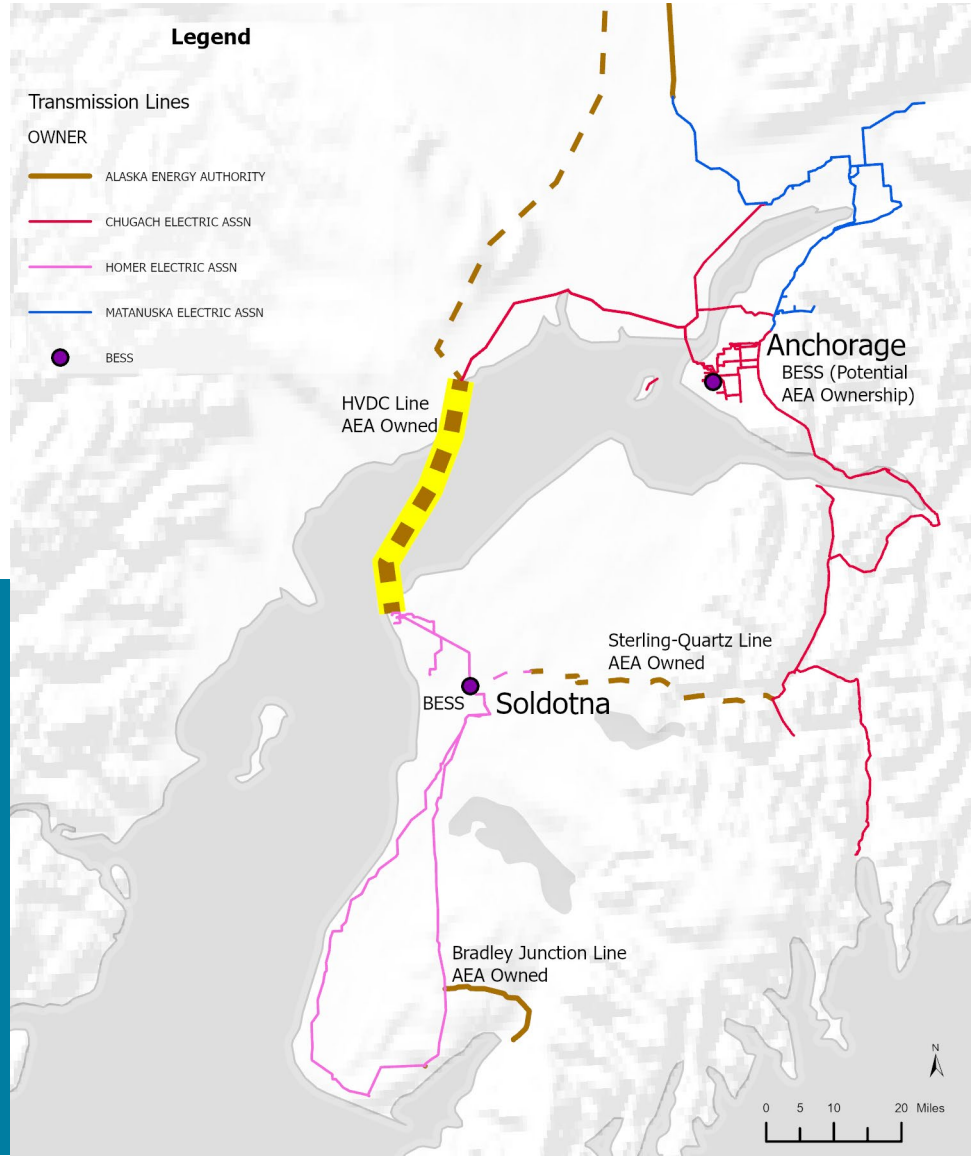
$413 Million (206.5 Million Federal and $206.5 Million Alaska Match)

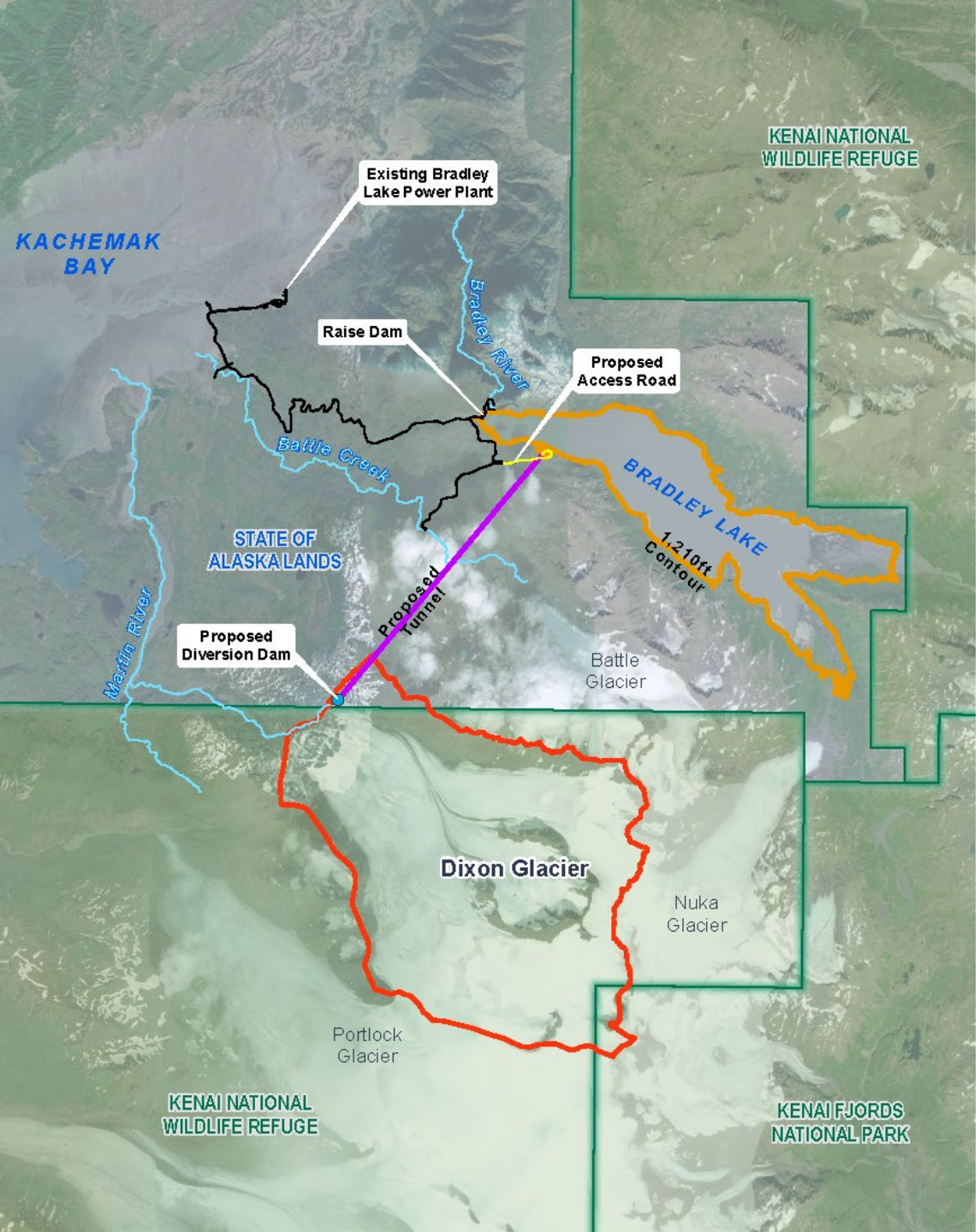
Grid Resilience and Innovation Partnerships (GRIP): HDVC Line

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 (HDVC) 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.





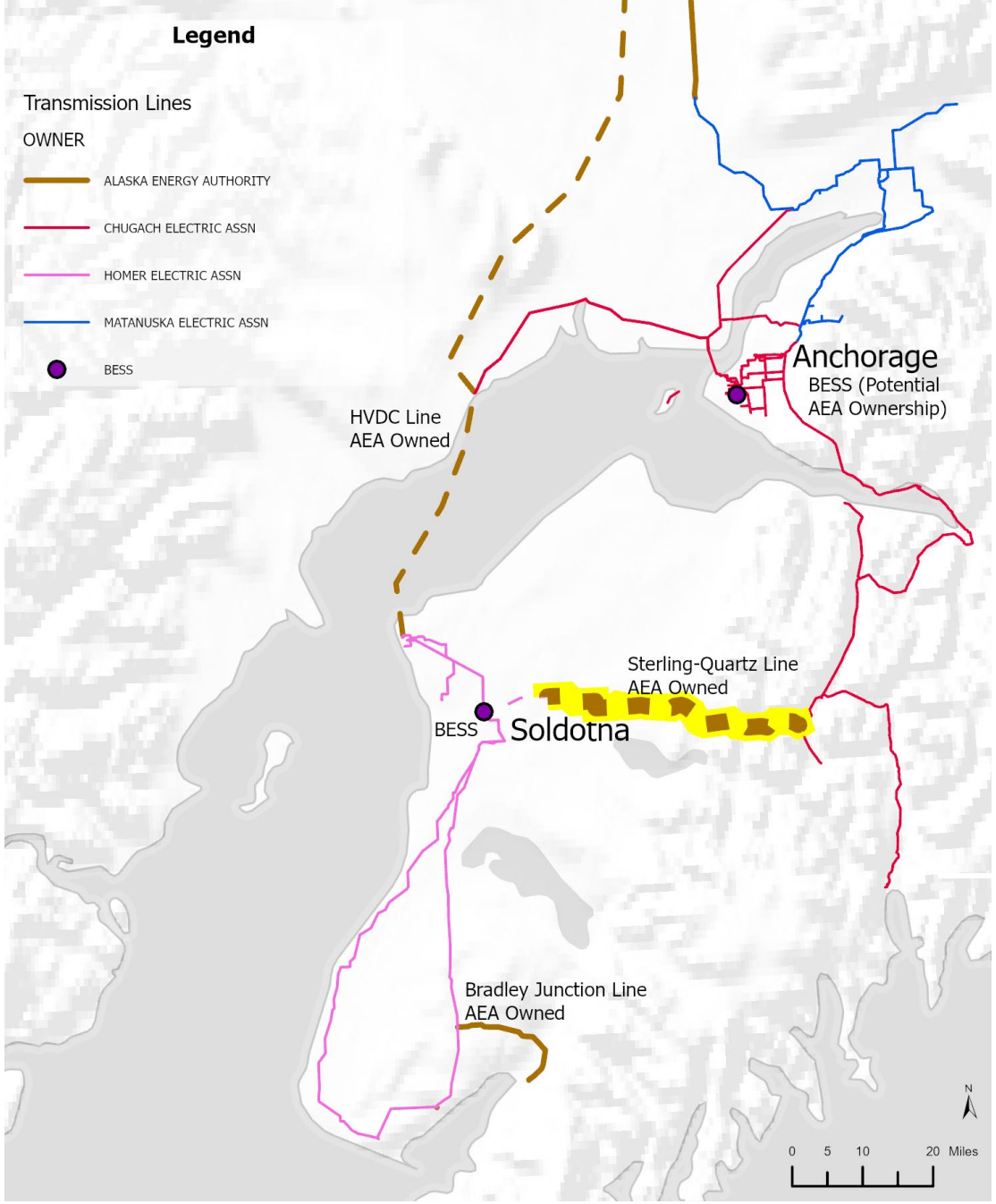
$5-7 Million for Studies and $342 Million for Construction

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).



$90 Million (Under Construction)

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

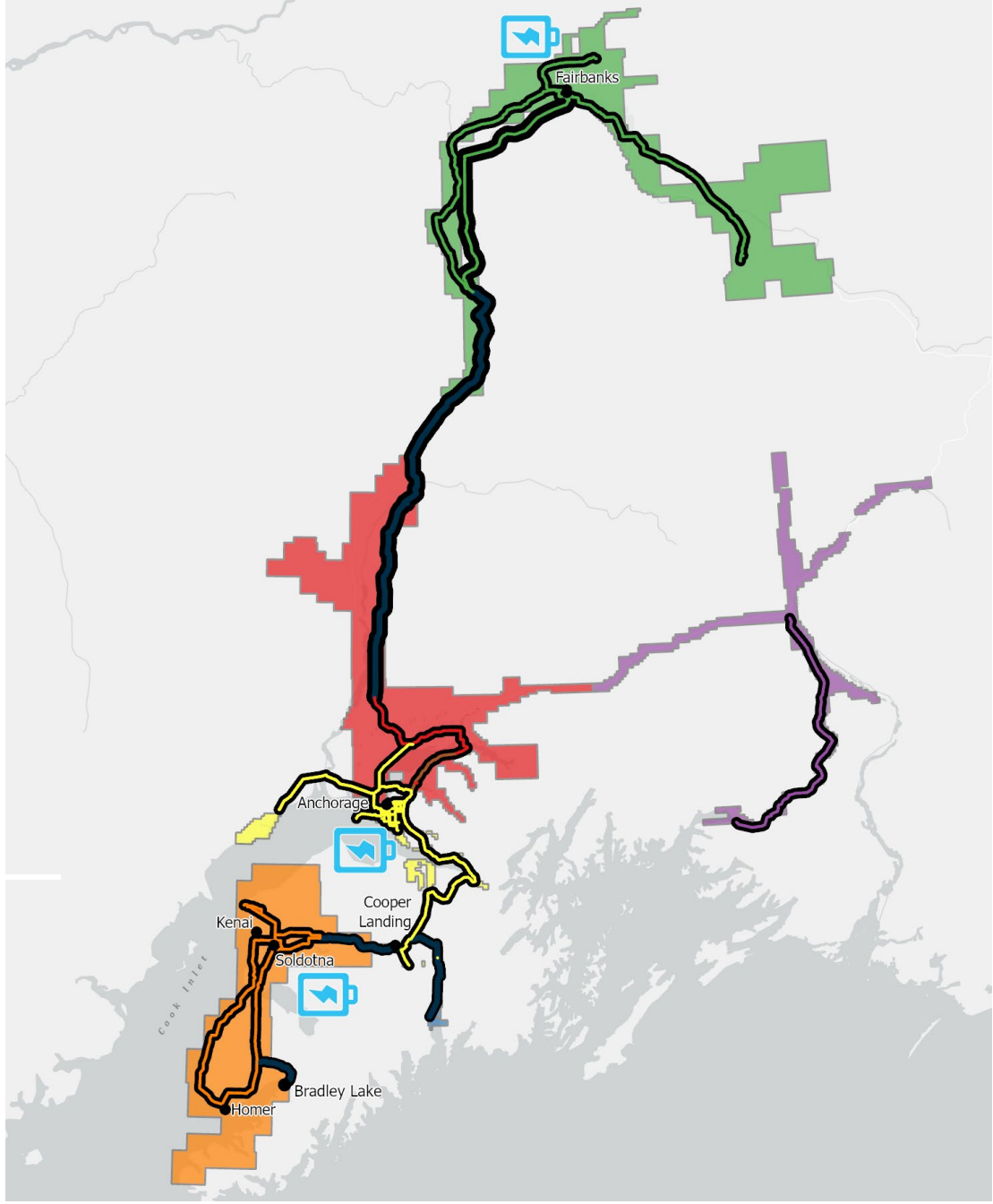
In 2020, AEA acquired the SSQ Transmission Line, a critical component of the interconnected Railbelt transmission system on the Kenai Peninsula, as part of the Bradley Lake Hydroelectric Project.

- **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 & 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 $63 million for SSQ and $27 million for Soldotna to Sterling

$194 Million Total Cost ($57 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.
- **Schedule –** Estimated completion date is 2026:
  - Southern (Kenai) – In service
  - Central (Anchorage) – October 2024
  - Northern (Fairbanks) – To be determined
- **Budget –** Estimated cost is up to $194 million (depending on technology choices and capacity)
- **Benefits** – Increase system resilience, transfer capability, more efficient use of system and lowering impediments to additional renewable generation development



$60 Million (Over Five Years)

Grid Resilience Formula Grant Program, IIJA 40101(d)

Per IIJA section 40101(a)(1),8 a disruptive event is defined as "an event in which operations of the electric grid are disrupted, preventively shut off, or cannot operate safely due to extreme weather, wildfire, or a natural disaster."

- Over the next five years, Alaska will receive **$60 million in federal formula grants** to catalyze projects to increase grid resilience against disruptive events. In August 2023, **the first two years of allocations, $22.2 million**, was awarded to AEA. AEA's competitive solicitation for these funds closed in February 2024. Notification of sub-awards are expected Q2 2024, pending DOE approval. For fiscal year 2025, AEA requested **$17,627,018**, Alaska's formula allocation for year 3, in Federal Receipt Authority and **$1,816,579 in matching funds**.
- Resilience measures include but are not limited to:
  - Relocating or reconductoring powerlines
  - Improvements to make the grid resistant to extreme weather
  - Increasing fire resistant components
  - Integrating distributed energy resources like microgrids and energy storage
- Formula-based funding requires a **15% state match** and a **33% small utility match**.

OTHER FEDERAL FUNDING OPPORTUNITIES

$52 Million (Over Five Years)

State of Alaska Electric Vehicle (EV) Infrastructure Implementation Plan

- AEA and the Alaska Department of Transportation & Public Facilities (DOT&PF), continue their partnership in deploying the **State of Alaska EV Infrastructure Implementation Plan (The Plan)**.
- The **first round of Alaska NEVI awards was announced on September 25, 2023**. AEA and DOT&PF selected projects in nine communities for a total investment of $8 million. The $6.4 million in NEVI funding will be matched with $1.6 million from private entities selected to install, own, and operate the new EV charging stations.
- On September 29, 2023, the Federal Highway Administration approved the fiscal year 2024 plan. This **unlocked $11 million in addition to $19 million** available in the fiscal years 2022 and 2023.
- Phases 2 and 3 of The Plan will develop charging infrastructure in more than 30 communities along the **Marine Highway System** and in hub communities as funding allows.

State of Alaska
Electric Vehicle Infrastructure Implementation Plan FY24

ALASKA ENERGY AUTHORITY

TRANSPORTATION & PUBLIC FACILITIES • STATE OF ALASKA •

Home Energy and High Efficiency Rebate Allocations

AEA is collaborating with the Alaska Housing Financing Corporation to distribute Alaska's allocation of $74 Million

Home Efficiency Rebates

- Rebates for energy efficiency retrofits range from $2,000-$4,000 for individual households and up to $400,000 for multifamily buildings.
- Grants to states to provide rebates for home retrofits.
- Up to $2,000 for retrofits reducing energy use by 20% or more, and up to $4,000 for retrofits saving 35% or more.
- Maximum rebates amounts are doubled for retrofits of low-and moderate-income homes.
- **Alaska's Allocation is $37.4 million.**
- **No State match is required.**
- **Funding is estimated to be available between fall 2024 and spring 2025.**

Home Electrification and Appliance Rebates

- Develop a high efficiency electric home rebate program.
- Inclusive of means testing and will provide 50% of the project cost for incomes ranging from 80% to 150% of area median income. Rebates to cover 100% of the proposed cost for incomes 80% of area medium income and below, with similar tiers applied for multifamily buildings.
- Includes a $14,000 cap per household, with an $8,000 cap for heat pump costs, $1,750 for a heat pump water heater, and $4,000 for electrical panel/service upgrade.
- Other eligible rebates include electric stoves, clothes dryers, and insulation/air sealing measures.
- **Alaska's Allocation is $37.1 million.**
- **No State match is required.**
- **Funding is estimated to be available between fall 2024 and spring 2025.**

$15.7 Million

Black Rapids Training Site (BRTS) Defense Community Infrastructure Pilot Program

AEA partnered with Golden Valley Electric Cooperative (GVEA) was awarded this grant from the Office of Local Defense Community Cooperation under the Defense Community Infrastructure Pilot Program. **Federal Receipt Authority of $12.7 Million received in fiscal year 2024. A $3 million supplemental budget request was submitted by AEA to complete additional work requested by the Department of Defense. No State match is required**.

GVEA will use the funds to extend a transmission line 34 miles along the Richardson Highway to BTRS. Currently, BTRS is powered by three diesel generators that are nearing the end of their useful lives. This extension will improve long-term sustainability and reliability for BRTS by tying them into GVEA's power grid.

Other Federal Funding Opportunities

Energy Efficiency Revolving Loan Fund – $4.5 million
$4,569,780 to establish and capitalize a revolving loan fund, under which the State shall provide loans and grants for residential energy audits, upgrades, and retrofits to increase energy efficiency, physical conform and air quality of existing building infrastructure. AEA will administer the program in collaboration with the Alaska Housing Finance Corporation (AHFC).

State Energy Program – $3.6 million
$3,661,930 to develop Statewide Energy Plan and Statewide Energy Security Profile, as well as (1) update AkWarm Energy Modeling Software to the requirements imposed by the Inflation Reduction Act and (2) modernize Alaska Retrofit Information Systems database to accept the AkWarm modifications in collaboration with AHFC.

Electric Vehicle (EV) Charging Equipment Competitive – $1.6 million
$1,670,000 to (1) increase access to vehicle electrification in multiple rural and underserved communities across Alaska; (2) demonstrate the benefits of EVs to key decision-makers and the broader public to accelerate clean transportation transition; and (3) support the development of community charging equipment. A 20% match is required, shared by AEA and project partners. Funds will become available in Fall 2023.

State-Based Home Energy Efficiency Contractor Training Grant Program – $1.3 million
$1.3 million to fund a State-Based Home Energy Efficiency Contractor Training Grant Program to develop and implement a state workforce energy program that prepares workers to deliver energy efficiency, electrification, and clean energy improvements, including those covered by the Inflation Reduction Act Home Energy Rebate Programs.

$100 Million (Application Pending)

ALASKA ENERGY AUTHORITY

Solar For All Competition

- **AEA and AHFC collaborating to develop a Statewide Solar Program:**
  - AEA focus on development of community solar projects in disadvantaged communities using a Renewable Energy Fund-style grant program.
  - AHFC focus on residential rooftop solar for low income households.
- **Program benefits include:**
  - energy cost savings,
  - increased resiliency,
  - equitable access to solar,
  - asset ownership benefits low income and disadvantaged, communities,
  - workforce development, and
  - reduction in greenhouse gas emissions.
- **This is a competitive grant program — no match required.**
- **AEA and AHFC submitted an application for a $100 million grant.**

AEA PROGRAMS AND PROJECTS

Power Cost Equalization (PCE)

The PCE program was established in 1984 as one of the components of a statewide energy plan.

188
RURAL COMMUNITIES

82
RURAL COMMUNITIES

80,000
ALASKANS

The cost of electricity for Alaska's rural residents is notably higher than for urban residents. PCE lowers the cost of electric service paid by rural residents. Ultimately ensuring the viability of rural utilities and the availability of reliable, centralized power.

750 kWh
RESIDENTIAL
Residential customers are eligible for PCE credit up to 750 kWhs per month.

70 kWh
PUBLIC FACILITIES
Community facilities can receive PCE credit for up to 70 kWhs per month multiplied by the number of residents in a community.

$42M
FUNDS DISBURSED
In the fiscal year 2024, AEA disbursed $42 million to rural electric utilities for the benefit of rural communities.

Rural Power Systems Upgrades and Bulk Fuel Upgrades*

AEA and Federal Partners, Denali Commission (*$2 Million)

Capital Budget - $2.5 Million

Rural Power Systems Upgrade

- ~197 Eligible communities
- 35 Active projects

Capital Budget - $2 Million

Bulk Fuel Upgrade

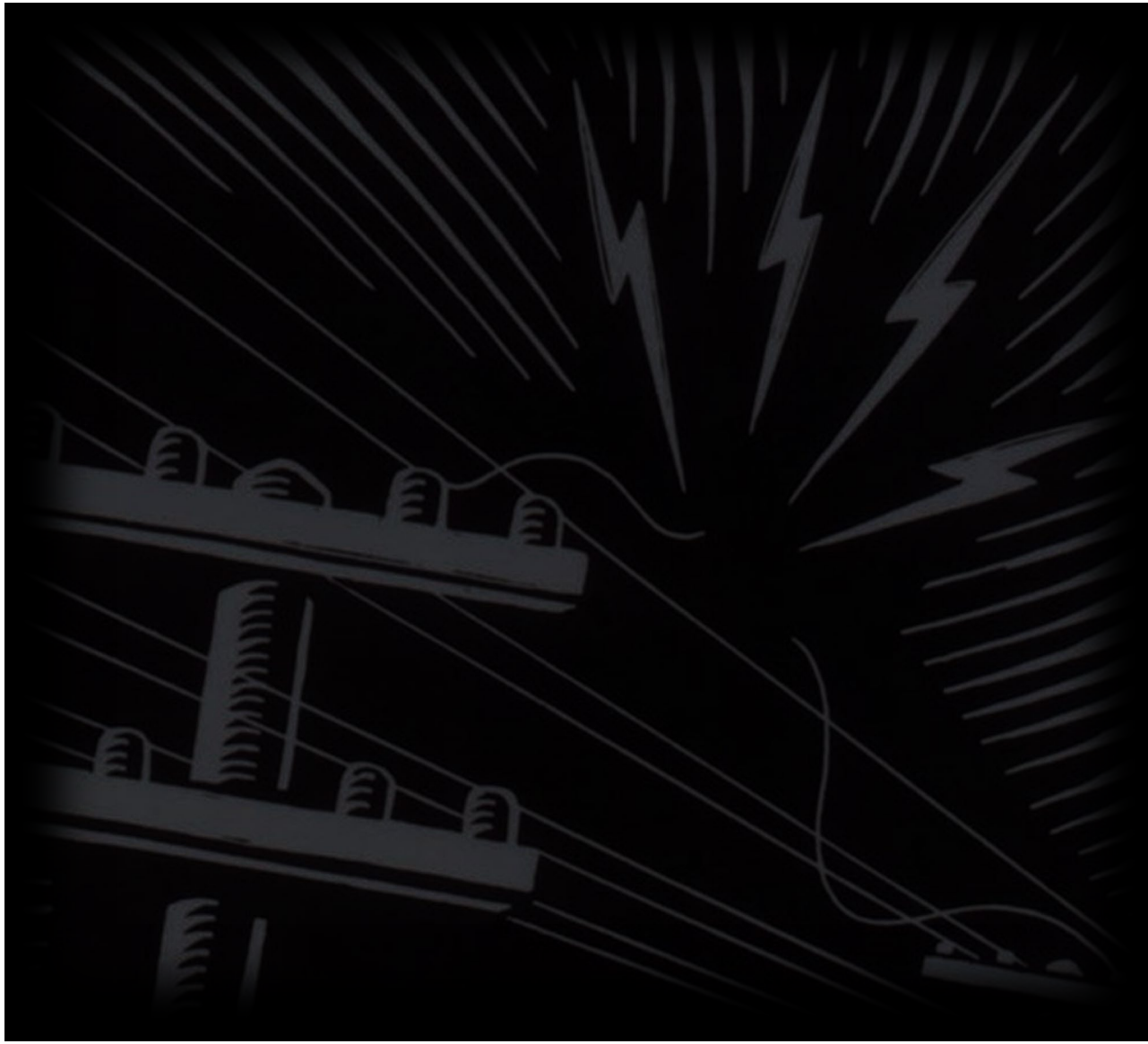
- ~400 Rural bulk fuel facilities
- 35 Active projects

Capital Request: General Fund - $200,000

Electric Emergency Response

AEA provides support when an electric utility has lost or will lose the ability to generate or transmit power to its customers and the condition is a threat to life, health, and/or property. Funding provides the current level of technical support through the Electrical Emergencies Program.

- During the fiscal year 2023 there were six (6) electrical emergencies. Power was restored within 24 hours in each case.
- The average cost of an electrical emergency assistance is approximately $45,000 each.



Renewable Energy Fund (REF)

AEA, in concert with the REF Advisory Committee, has forwarded to the Legislature a capitalization request of $32 million for Round 16 of the REF. An appropriation of $32 million would fully fund all 24 recommended projects. Funding approval for the REF is at the discretion of the Legislature and Governor.

REF Highlights
Round 13: 11 Projects – $4.75M
Round 14: 27 Projects – $15M
Round 15: 18 Projects – $17M
Round 16: 24 Projects - Pending

$317 million invested in the REF by the State since inception.

100+ operational projects and 60 are in development.

The Department of Energy recently announced $125 million for solar and hydroelectric projects in rural Alaska — several of these projects benefited from seed money from REF totaling almost $12 million.

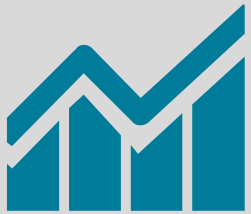
Power Project Fund (PPF) Loan Program

The PPF loan program continues to see an increase in applications due to federal matching fund requirements and other incentives. The Inflation Reduction Act provides tax credits of up to 40%. A fund capitalization would allow for additional funds needed to support the increased demand in funding.

Outstanding Loans
$31 Million
16 Loans

Pending Applications
$755,500
Loans Under Review

Uncommitted Cash Balance
Program in abeyance until additional capital is secured



Competitive Rates
Current PPF Interest Rate
5.43% as of March 2024

Thank You

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

APPENDIX

SUSITNA-WATANA HYDROELECTRIC PROJECT

Susitna-Watana At-A-Glance

The proposed Susitna-Watana Hydroelectric Project is a large hydro project that would provide long-term stable power for generations of Alaskans. The project would result in approximately 70% of the power generated in the Railbelt originating from renewable sources, up from the current 15% — a nearly four-fold increase.

- **Dam Height –** 705 feet
- **Dam Elevation –** 2,065 Feet
- **Reservoir Length –** ~42 miles
- **Reservoir Width –** ~1.25 miles
- **Installed Capacity –** 618 MW
- **Annual Energy –** 2,800,000 MWh
- **Cost –** ~$5.6 billion (2014$)

Why Susitna-Watana?

ALASKA ENERGY AUTHORITY

50 percent

estimated supply of current Railbelt energy demand

100+ years

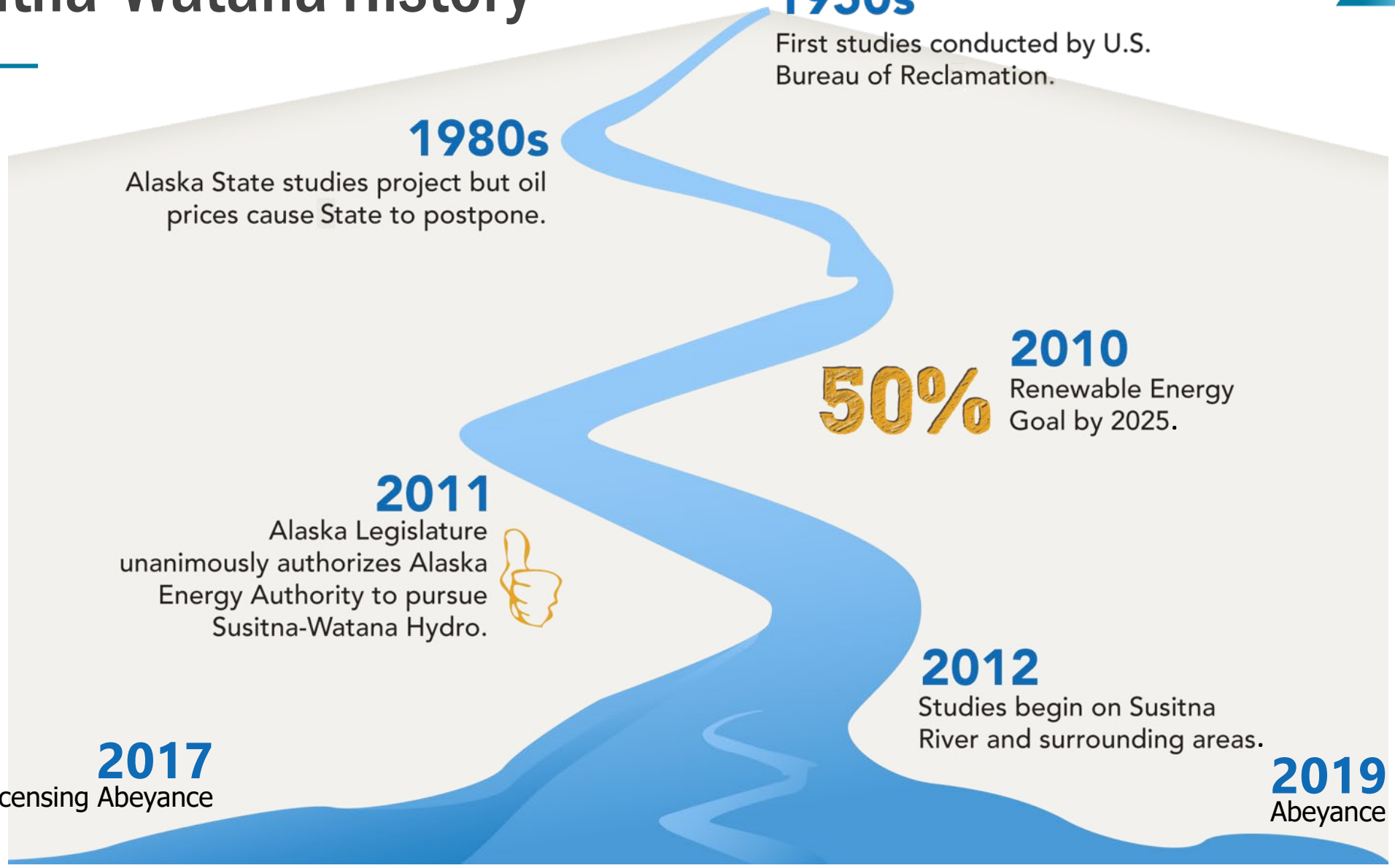
is the project life providing long-term, stable rates

$11.2 billion

estimated energy cost savings ($2014) over first 50 years

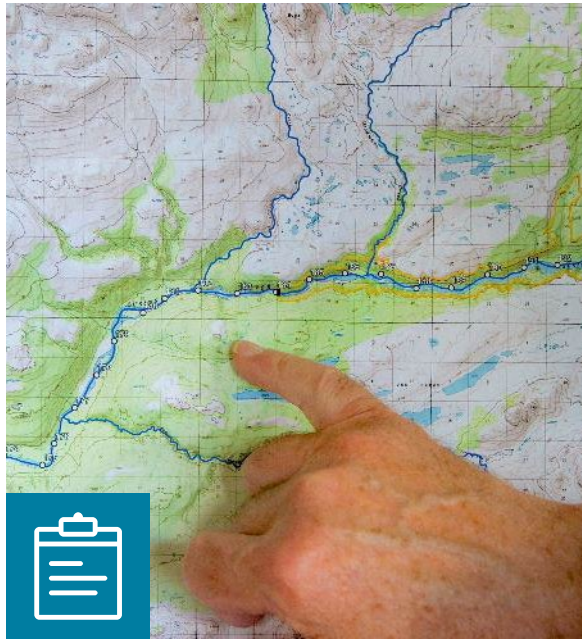
The Susitna-Watana Hydroelectric Project would offset the need for 22.6 billion cubic feet per year of Cook Inlet natural gas if it were operational today.

Susitna-Watana History



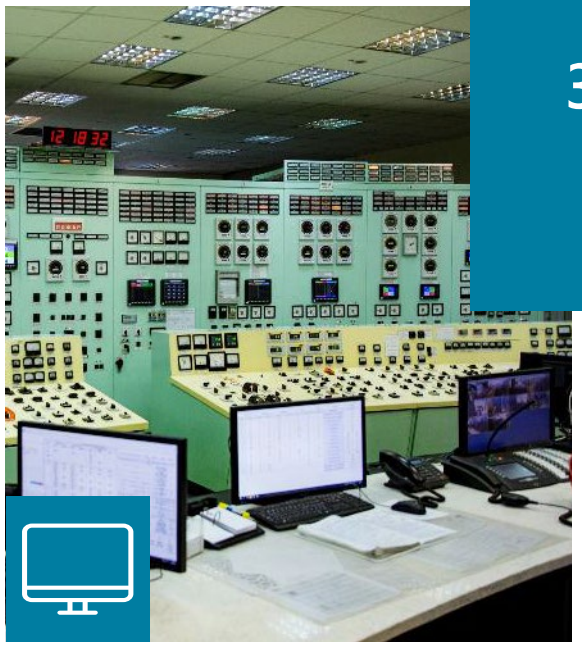
Susitna-Watana Employment Opportunities

32,308 Total Jobs
17,028 Direct jobs
15,280 Indirect jobs



Pre-Construction Employment
~5,000 Direct jobs
~3,870 Indirect jobs

Construction Employment
~12,000 Direct jobs
~11,305 Indirect jobs



Operations Employment
(Life of Project)
~24-28 Direct jobs
~105 Indirect jobs

Susitna-Watana Timeline