ALASKA ENERGY AUTHORITY

GRID RESILIENCE PLANNING

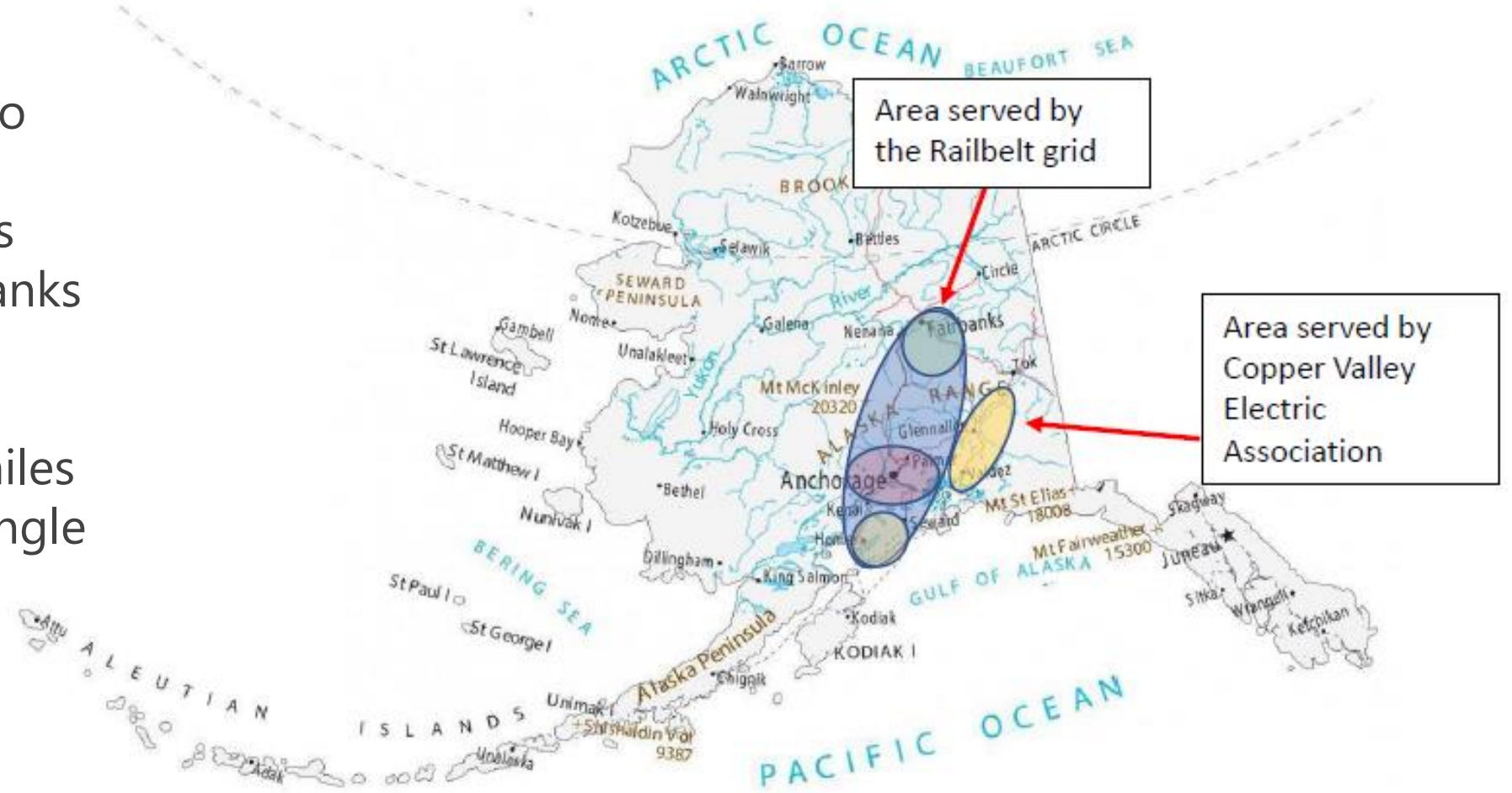
Curtis W. Thayer
Executive Director

Alaska Infrastructure Development Symposium
September 27, 2023

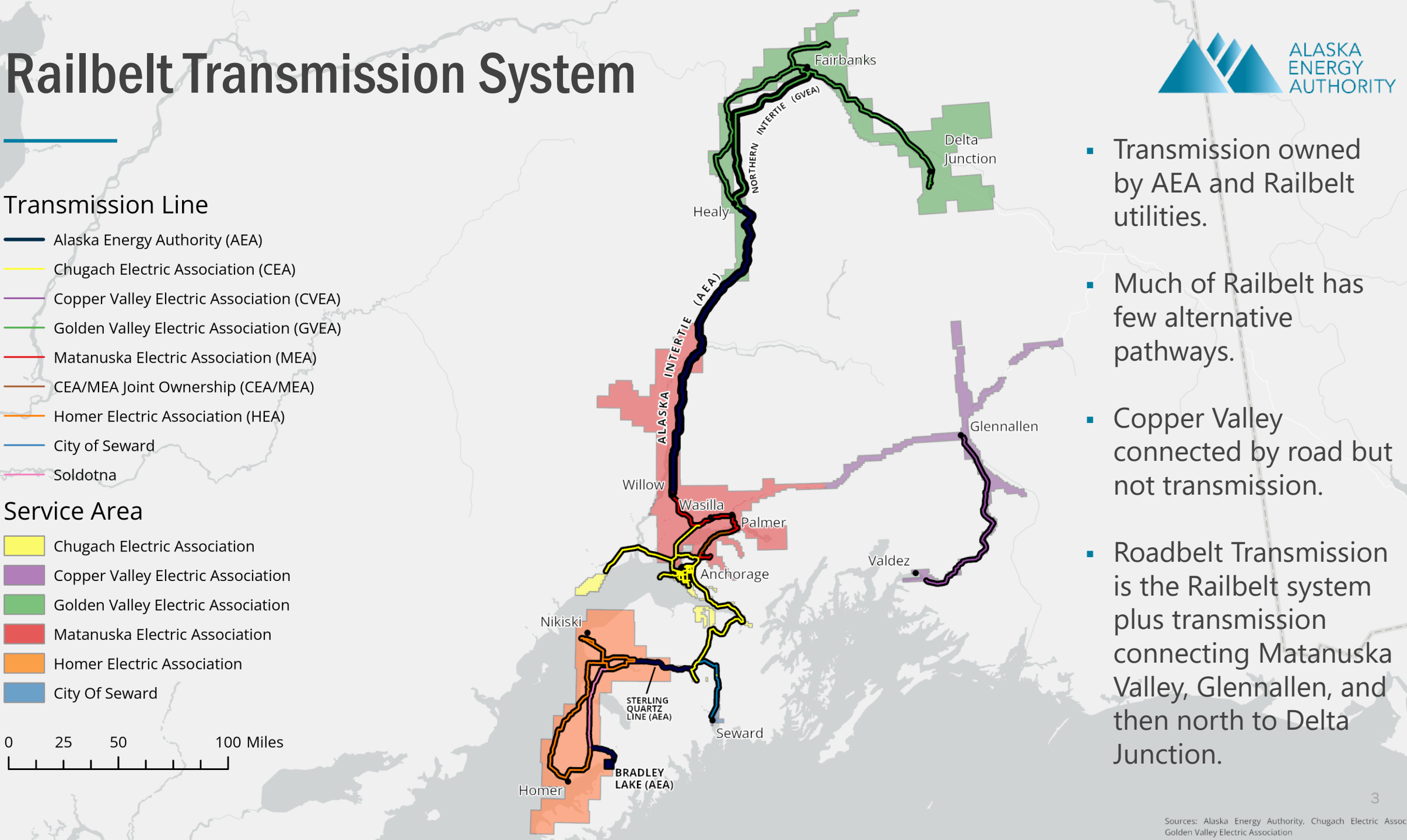
ALASKA ENERGY AUTHORITY

Railbelt Electrical Grid

- The “Railbelt” refers to the interconnected electric grid that goes from Homer to Fairbanks to Delta.
- Approximately 700 miles long connected by single transmission lines.
- The Railbelt electric system serves about 75% to 80% of Alaska's population.



Railbelt Transmission System

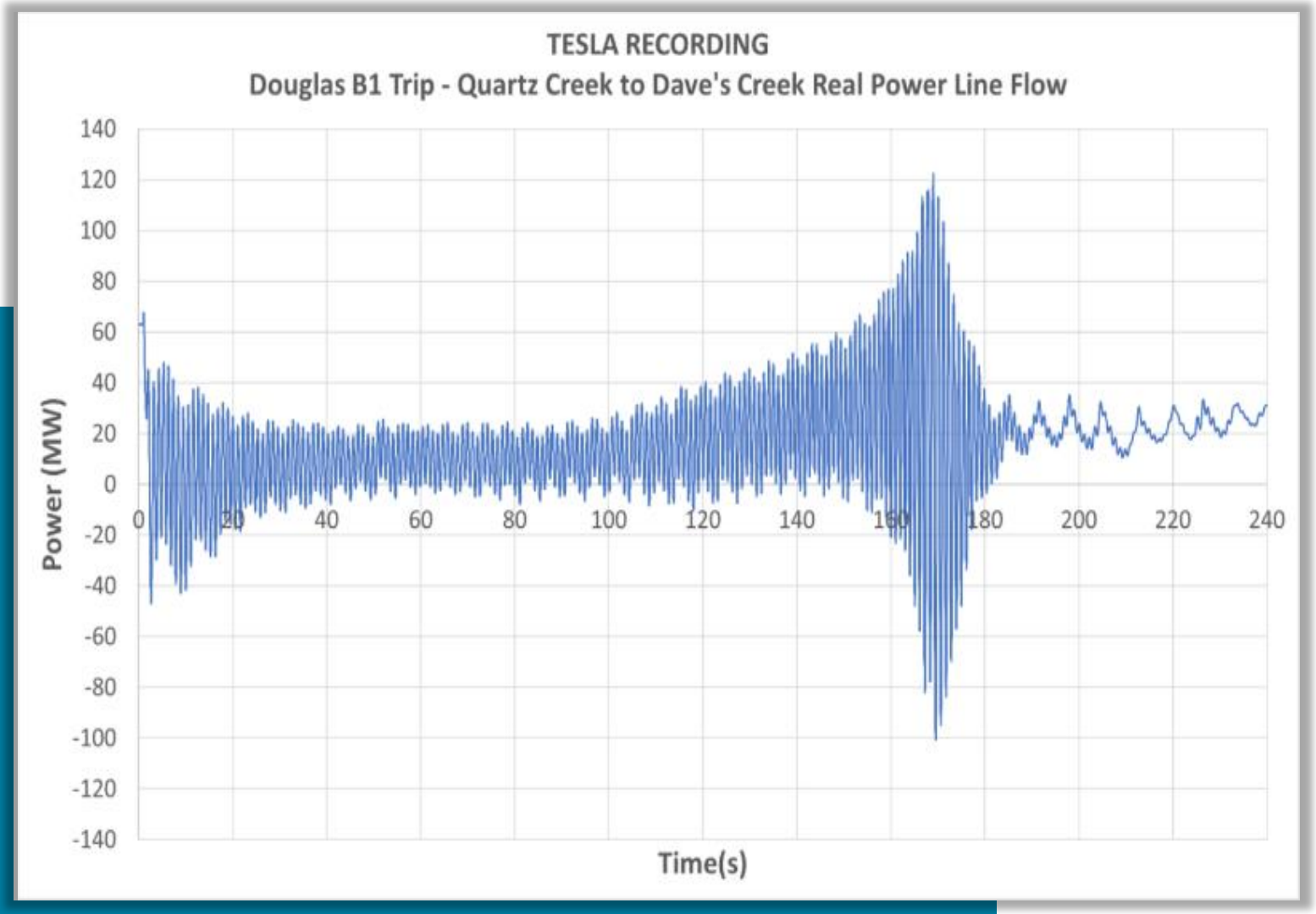


- Transmission owned by AEA and Railbelt utilities.
- Much of Railbelt has few alternative pathways.
- Copper Valley connected by road but not transmission.
- Roadbelt Transmission is the Railbelt system plus transmission connecting Matanuska Valley, Glennallen, and then north to Delta Junction.

Sources: Alaska Energy Authority, Chugach Electric Association, Golden Valley Electric Association

Generation

- Generation along the Railbelt has been moving toward smaller and lighter generators.
- Quicker response with less inertia.



Resilience

- Disruptive events are events in which operations of the electrical grid are disrupted, preventively shut off, or cannot operate safely due to extreme weather, wildfire, or a natural disaster.
- Resilience is the ability to quickly resume normal power grid operations.
- One event can effect power over the entire Railbelt Transmission system in seconds.

Transmission Upgrades and Battery Storage

AEA and the Railbelt utilities closed on **$166 million in bond financing** to improve the efficiency and deliverable capacity of power from the Bradley Lake Hydroelectric Project. The bonding comes at no additional cost to ratepayers or burden on the State treasury.

- Upgrade transmission line between **Bradley Lake and Soldotna** Substation
- Upgrade transmission line between **Soldotna Substation and Sterling** Substation
- Upgrade transmission line between **Sterling Substation and Quartz Creek** Substation
- **Battery Energy Storage Systems** for Grid Stabilization

These projects will reduce constraints on the Railbelt by improving the Kenai Peninsula's transmission capacity to export power from Bradley Lake — and allow for the integration of additional renewable energy generation.

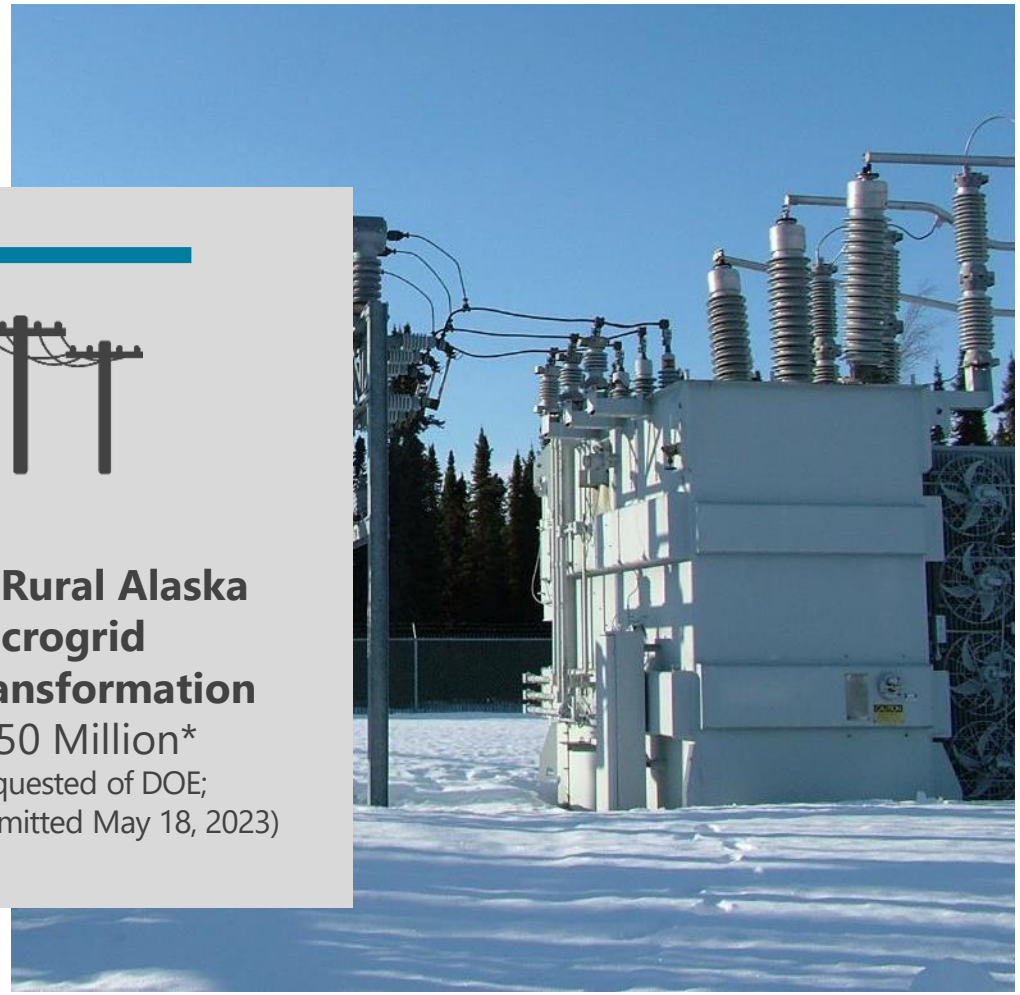
Alaska Intertie

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 2008 and 2021, the Intertie **saved GVEA customers an average of $37 million annually**.
- The Intertie provides benefits to Southcentral customers as well through **cost savings and resilience to unexpected events**.

IIJA Competitive: Grid Resilience and Innovation Partnerships (GRIP)

To enhance the power system's resilience to extreme weather and climate change, the Grid Deployment Office is administering a $10.5 billion GRIP program under the Bipartisan Infrastructure Law.



1) Railbelt Backbone Reconstruction Project
$100 Million*
(Requested of DOE; submitted April 5, 2023)

2) Battery Energy Storage/HVDC Coordinated Control
$16 Million*
(Requested of DOE; submitted March 16, 2023)

3) Railbelt Innovation Resiliency Project)
$413 Million*
(Requested of DOE; submitted May 18, 2023)

3) Rural Alaska Microgrid Transformation
$250 Million*
(Requested of DOE; submitted May 18, 2023)

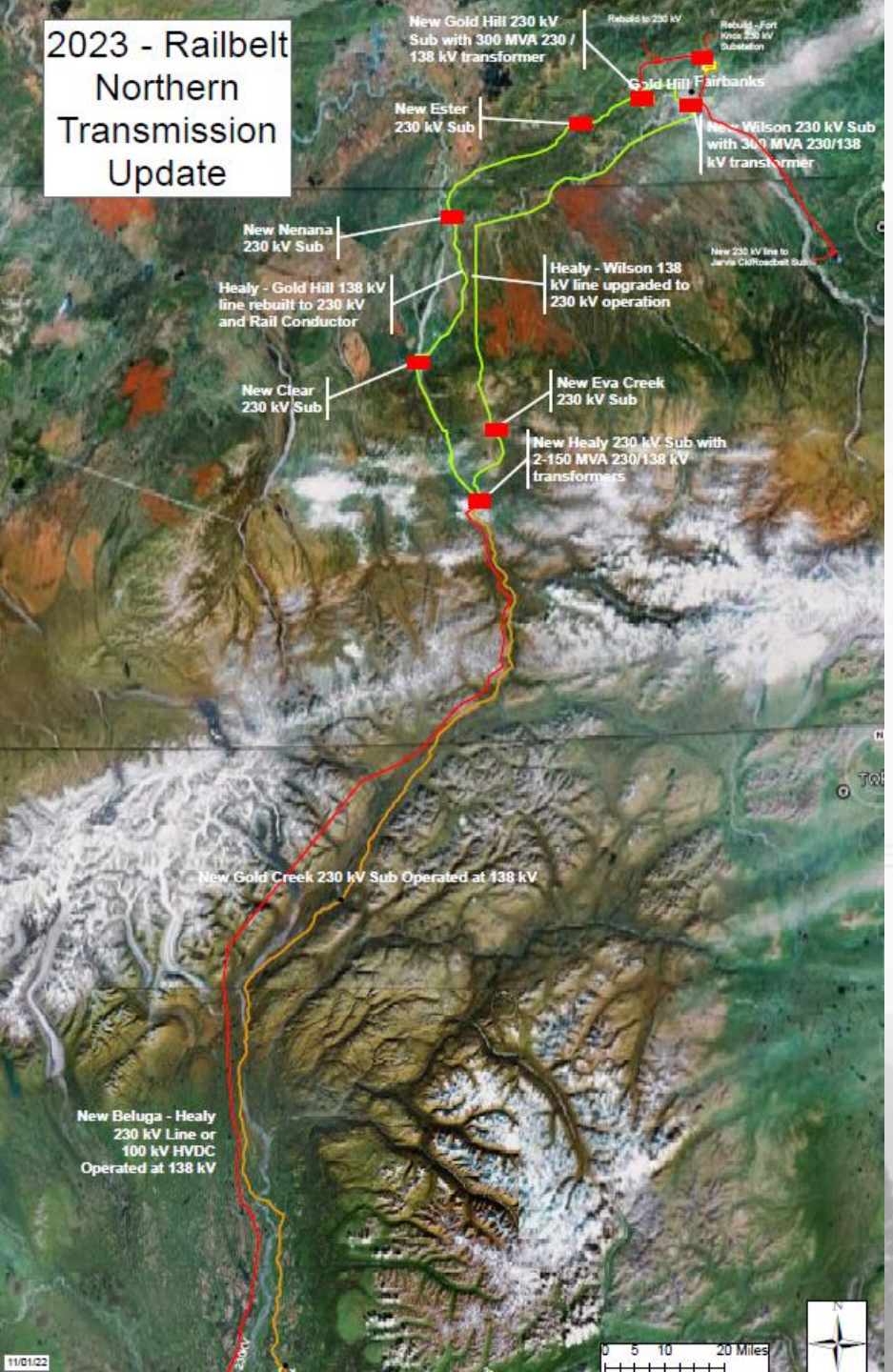
*All four GRIP programs are in application phase.

Resilience Planning (It happens)

Statewide Grid Resilience and Reliability IIJA Formula Grant Program, 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**, were awarded to AEA. After that, AEA plans to launch a competitive solicitation for the funds later in the year. For fiscal year 2025, AEA requests $12,110,523 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**.



Northern Region Transmission

- Owned by State of Alaska and Railbelt utilities.
- Conceptual plan of Northern transmission.

Central and Southern Region Transmission

- Owned by AEA and Railbelt utilities.

AEA provides **energy solutions** to meet the unique needs of Alaska's rural and urban communities.

ALASKA ENERGY AUTHORITY

Alaska Energy Authority

813 W Northern Lights Blvd.
Anchorage, AK 99503

Main: (907) 771-3000
Fax: (907) 771-3044

info@akenergyauthority.org

akenergyauthority.org

@alaskaenergyauthority

@alaskaenergyauthority