Power Generation Decarbonization Strategies Alaska's Railbelt Region

May 2024

HEA

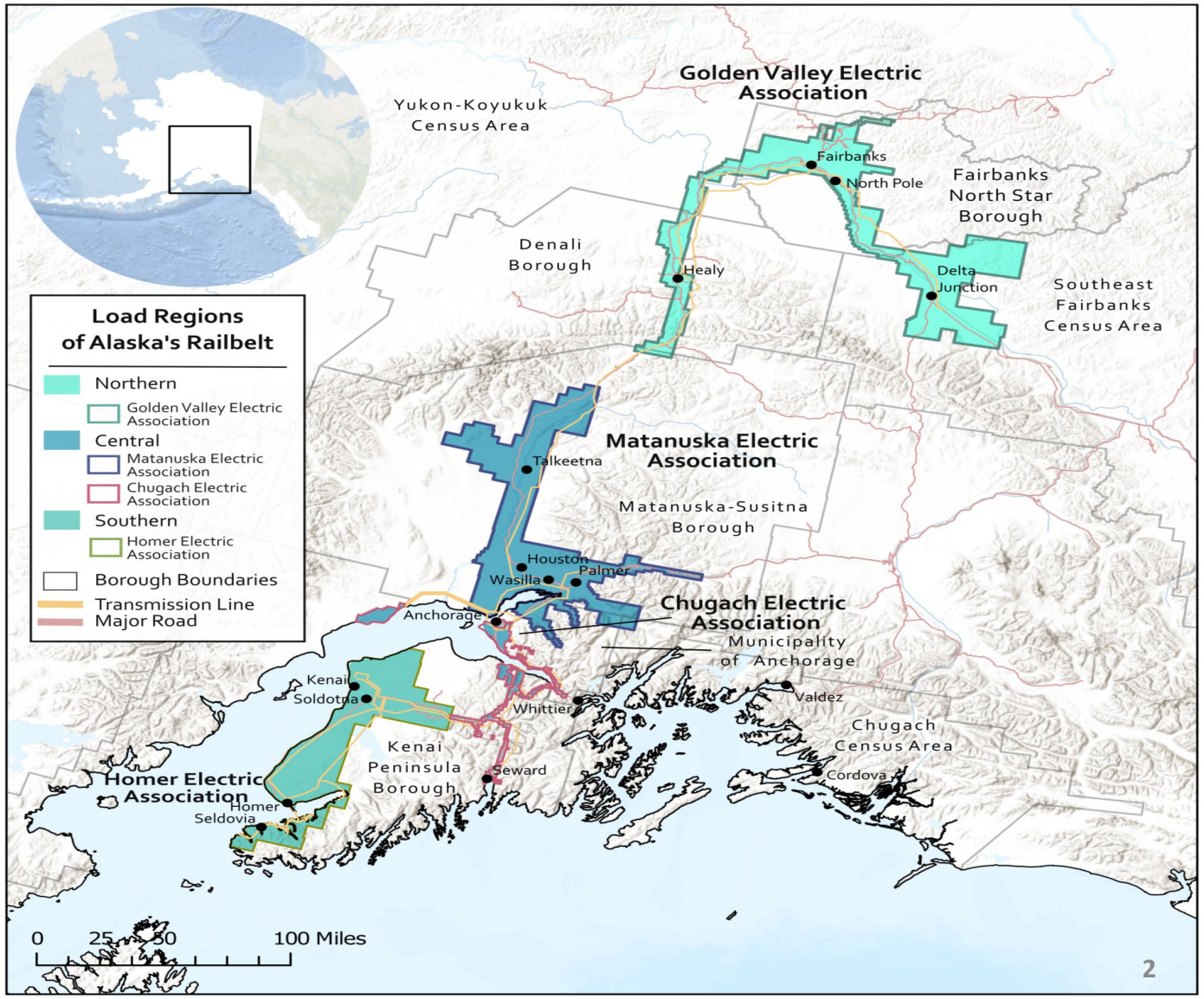
GVEA
Golden Valley Electric Association
Your Touchstone Energy® Cooperative

MEA
MATANUSKA ELECTRIC ASSOCIATION

CHUGACH
POWERING ALASKA'S FUTURE

The Railbelt Transmission System

- Serving four cooperatives with a combined peak of less than 800 MWs
- Stretching over 600 miles
- Covering three regions connected by 300 miles of single transmission lines with 80 MWs of transfer capacity



The Railbelt Generation Fleet

80% to 85% reliant on Fossil Fuels

- Oil
- Coal
- Natural Gas

Most clean energy comes from Hydro

Signs of an Aging Cook Inlet Basin

ANCHORAGE DAILY NEWS

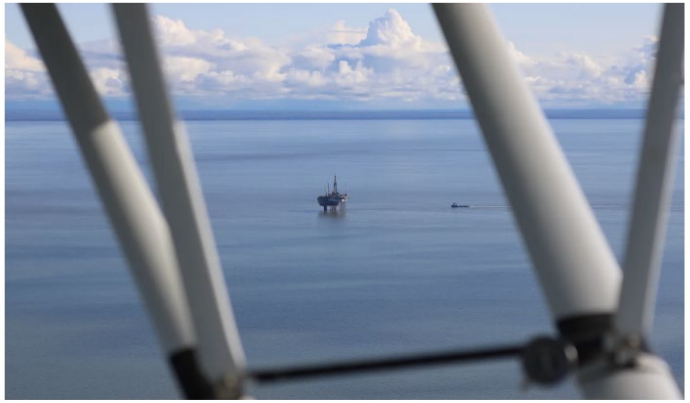
Energy

Hilcorp warns Alaska utilities about uncertain Cook Inlet natural gas supplies

By Alex DeMarban
Updated: May 17, 2022
Published: May 17, 2022

There's lots of gas in Cook Inlet — here's why some companies aren't drilling

By **Nathaniel Herz, Northern Journal** - November 30, 2023



A vessel approaches Hilcorp's Tyonek offshore platform in Cook Inlet, where the company was using the Spartan 151 drilling rig last summer. (Photo by Nathaniel Herz/Northern Journal)

ALASKA PUBLIC MEDIA PBS npr

Lots of ideas, but not much time, to address Cook Inlet gas crunch

By **Eric Stone, Alaska Public Media - Juneau** - March 29, 2024

ALASKA PUBLIC MEDIA PBS npr

Enstar CEO says Cook Inlet gas shortfall more serious than thought earlier

PRESS

By Tim Bradner Mar 26, 2024 Updated Mar 26, 2024

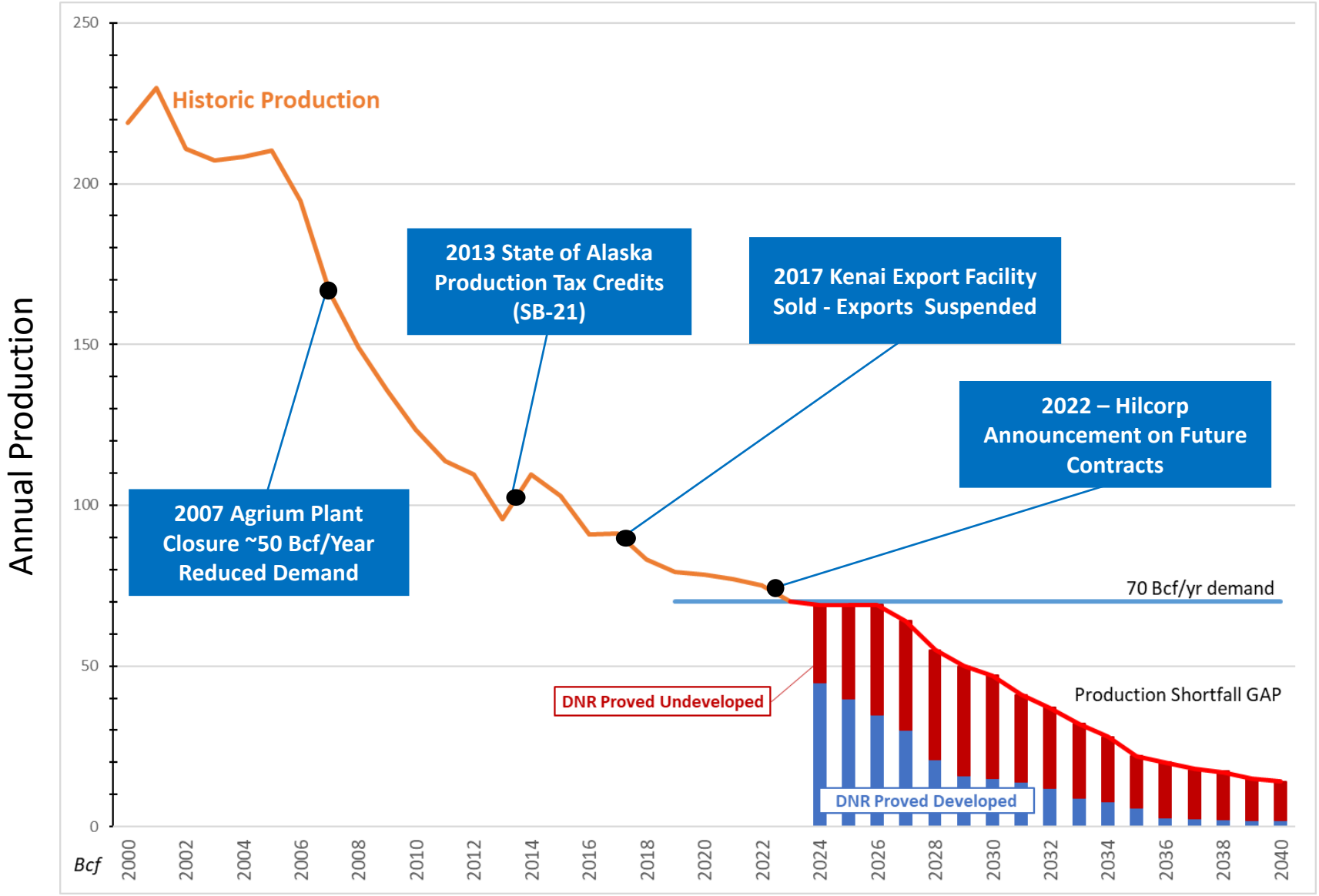
Energy

Railbelt utilities move closer to decisions on importing natural gas as legislators debate energy bills

By Sean Maguire
Updated: April 8, 2024
Published: April 6, 2024

ANCHORAGE DAILY NEWS

Cook Inlet Historic and Forecasted Supply Profile



Multiple Options Will Fill The Gap

- Expand renewables and decarbonize power supply
- Maximize economic production of Cook Inlet gas fields
- Begin LNG imports
- Use Alaska North Slope gas if it becomes available
- Expand gas and electric storage
- Invest in transmission

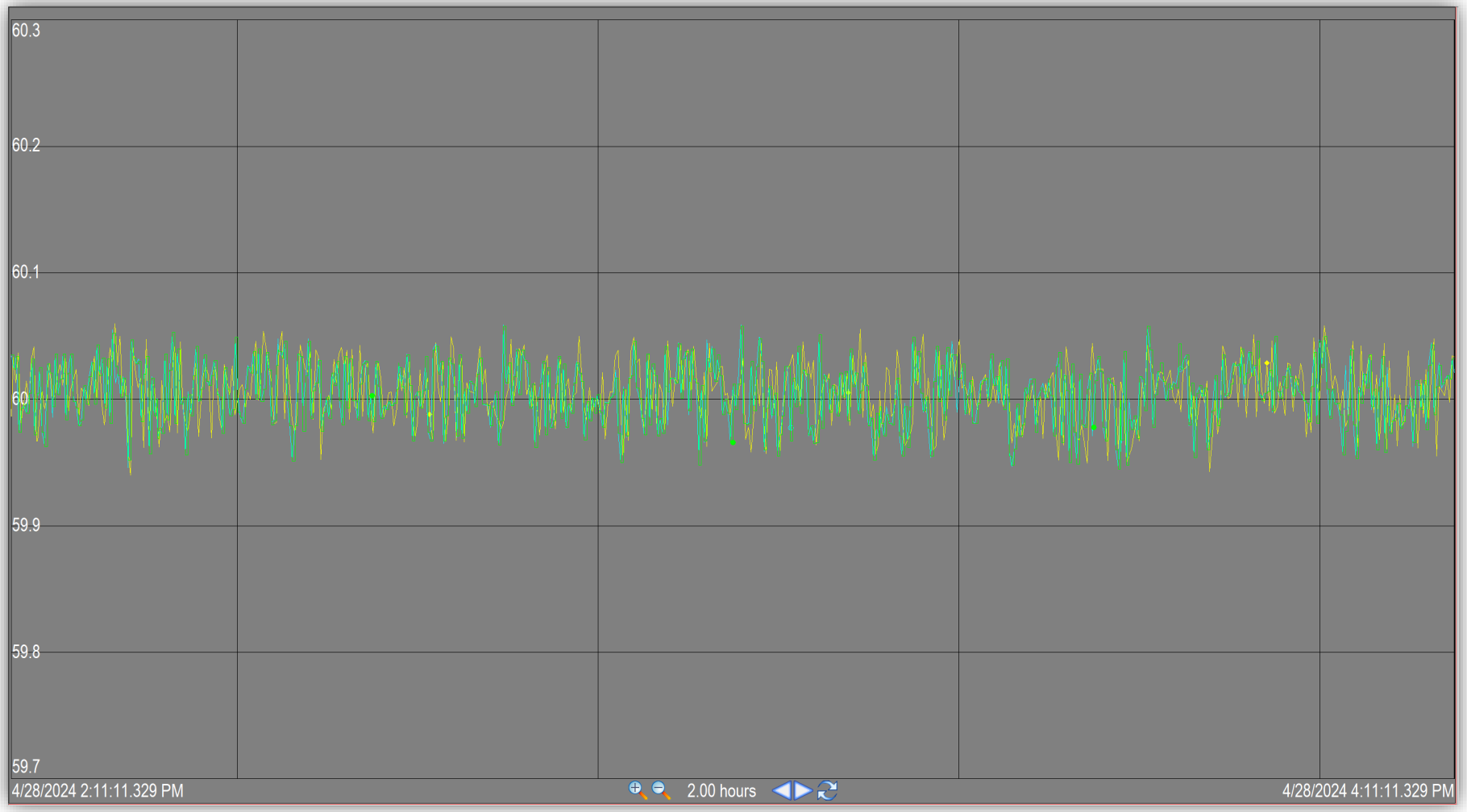
Transformational Change is Underway across Alaska's Railbelt Region

Integration Challenges – System Frequency

Railbelt System Frequency Response (MWs/0.1 Hz) typically ~10 MWs

Reduction of physical inertia increases volatility of system frequency (less stable)

Fast response energy storage systems can decrease volatility (more stable)



Normal (stable) frequency graph

Battery Energy Storage System – Frequency Regulation

BESS mitigates short duration regulation needs.

Longer duration regulation requires rescheduling of base load resources and fuel.

Integration Strategies/Consequences

Partial curtailment of non-dispatchable generation to allow for some regulation.

Improved forecasting of non-dispatchable renewable resources.

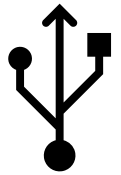
Shorter dispatch periods. Currently one hour. The largest interconnects use 5-15 minute periods.

Install synchronous condensers to increase physical inertia.

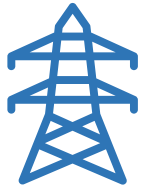
Additional battery storage and regulation systems with response equal to size of non-dispatchable resource.

Shorter gas nomination cycles with larger imbalance volumes.

Increased cycling of thermal resources reduces efficiency and increases maintenance costs.

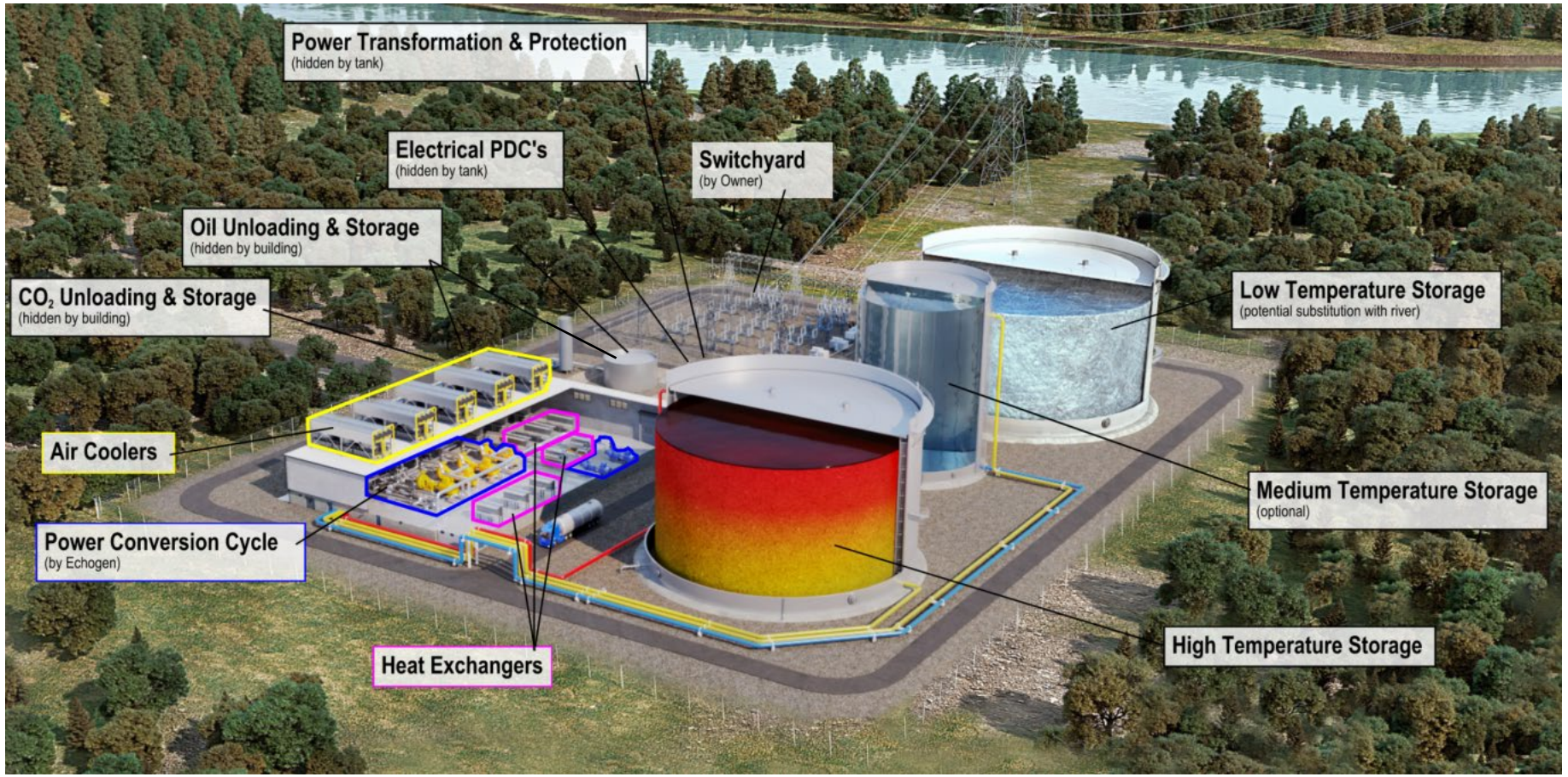


Improved inverter ride through capabilities. May require grid forming inverters.



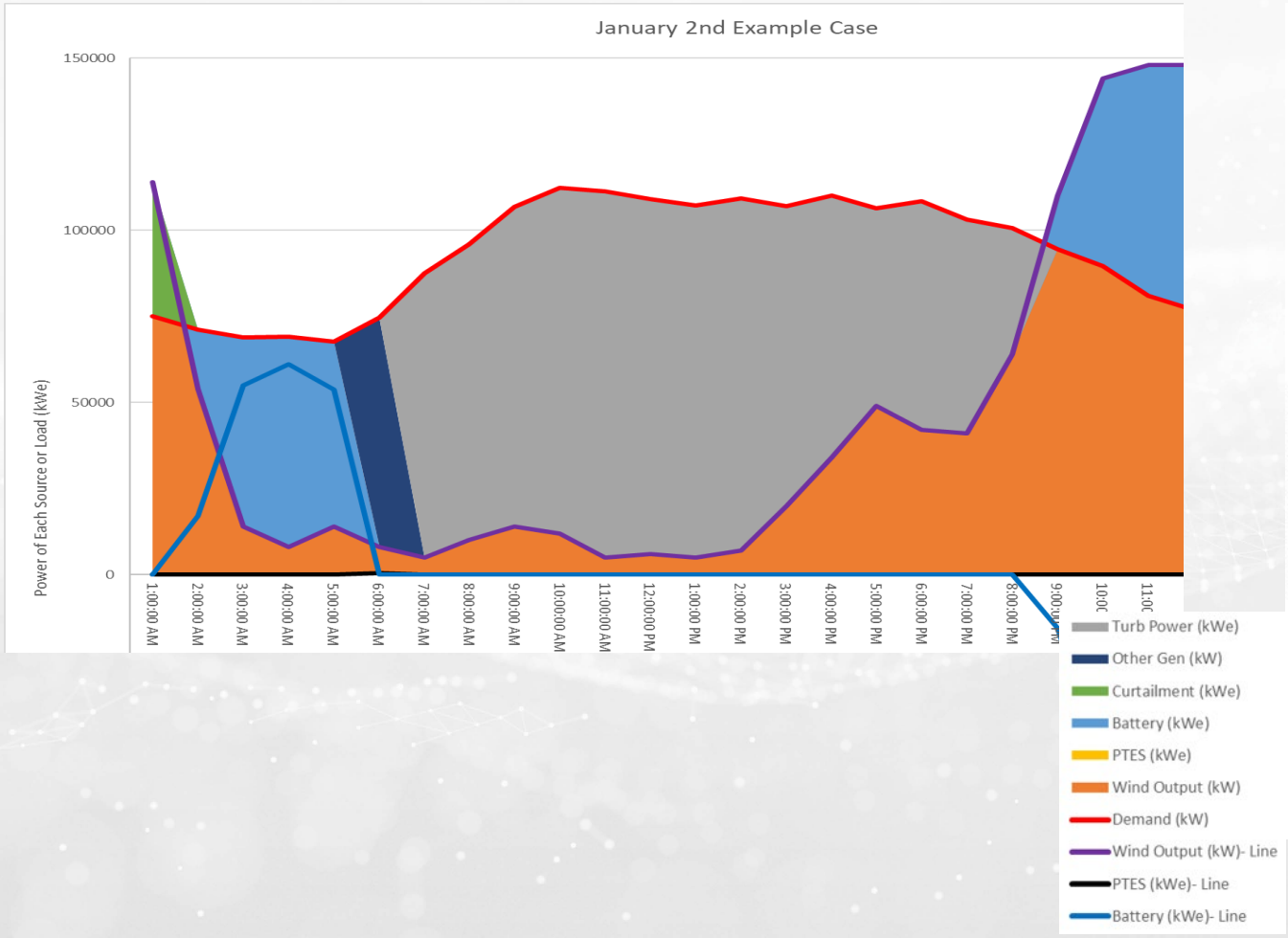
Increased transmission power transfer capacity to facilitate regional coordination.

PTES Basics – Block Diagram

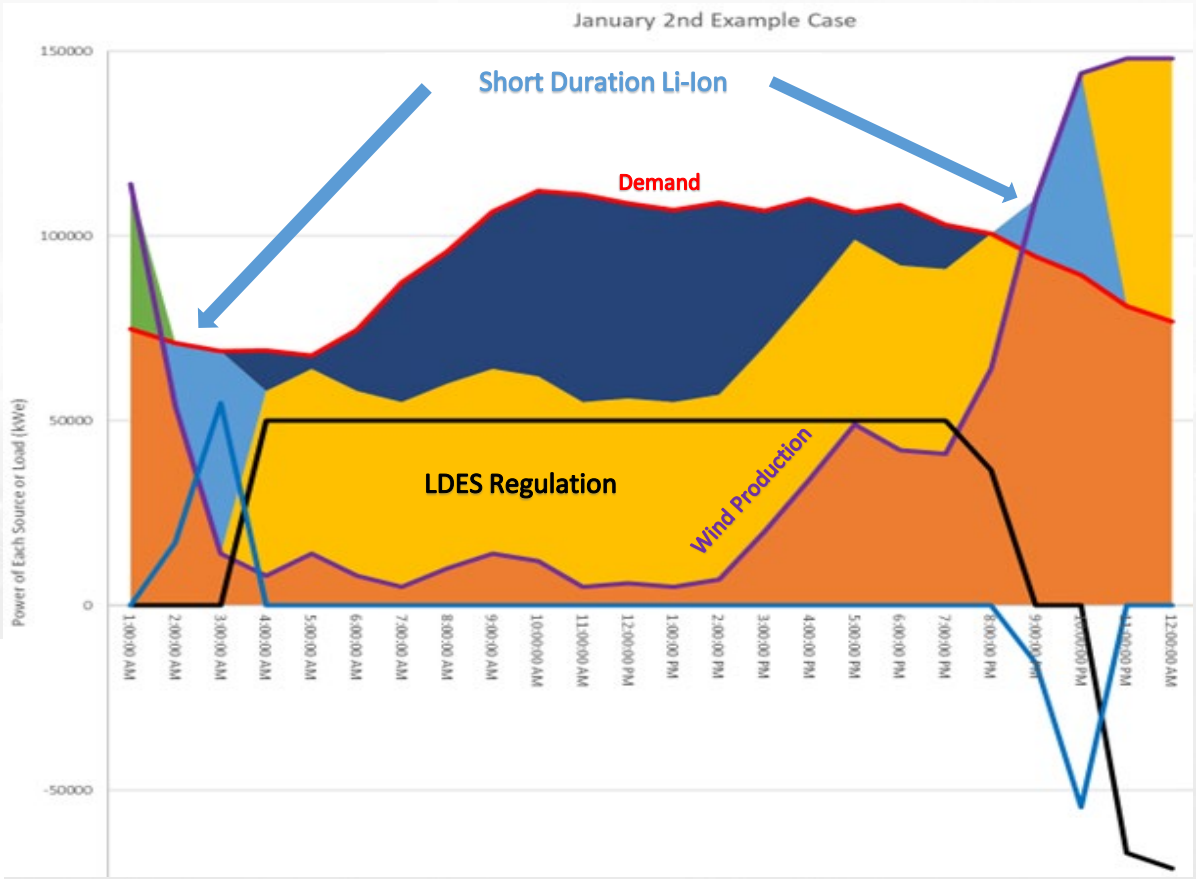


LDES is Critical to Achieve GVEA Goals

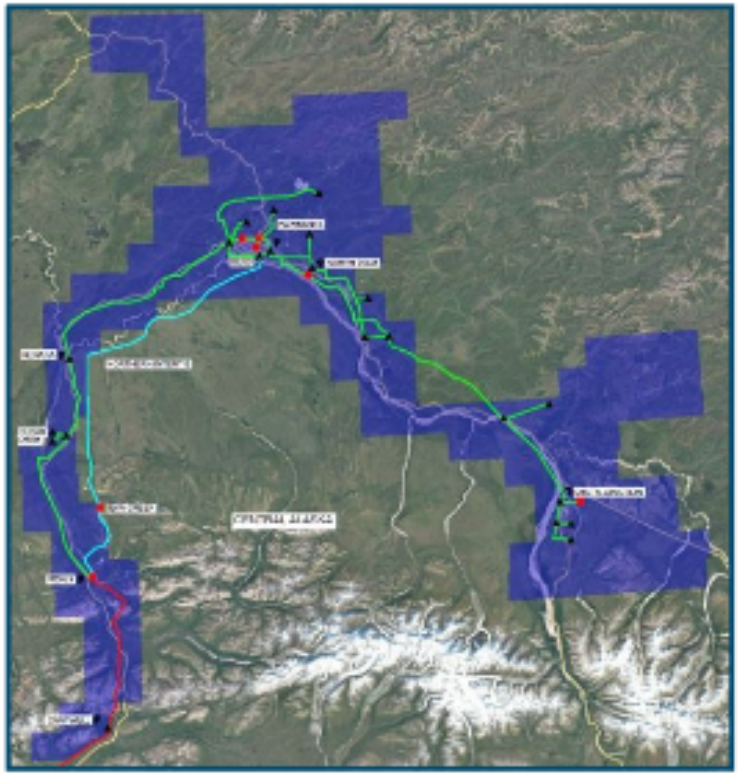
Li-ion



Li-ion + LDES



GVEA at a Glance



01 45,301 electric meters

02 Over 100,000 residents served

03 3,292 miles of distribution lines

04 6,440 square miles of service territory

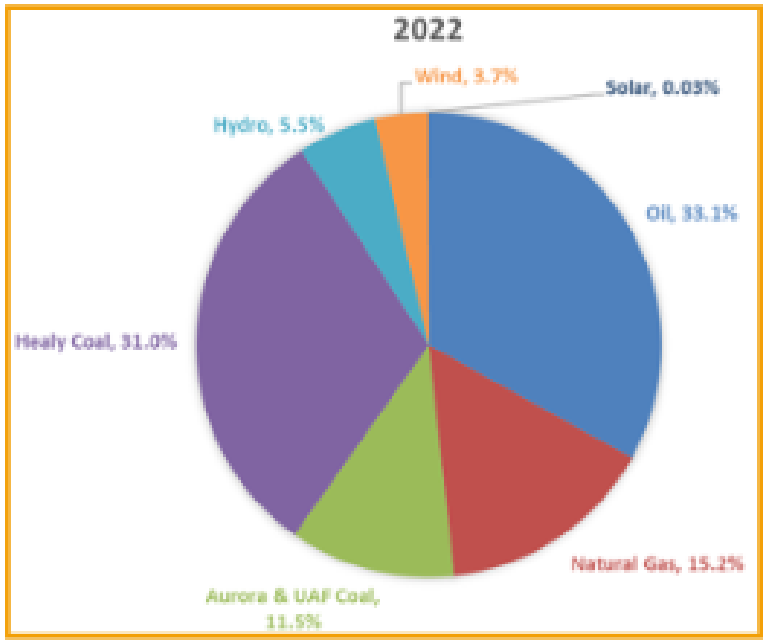
05 1.24 billion kilowatt-hours sold in 2022

GVEA Energy Portfolio

Energy Generation Source

- 4 oil fired plants - 248 MW
  - Zehnder Power Plant (established 1972)
  - Delta Power Plant (established 1976)
  - North Pole Power Plant (established 1976)
  - North Pole Expansion Power Plant (established 2006)
- 2 coal fired plants - 88 MW
  - Healy Unit 1 (established 1967)
  - Healy Unit 2 (established 1998)
- Hydroelectric - 20 MW
  - Bradley Lake (established 1991)
- Eva Creek Wind - 24.6 MW (established 2012)
- Solar - 0.5 MW (established 2018)

Energy Source Mix



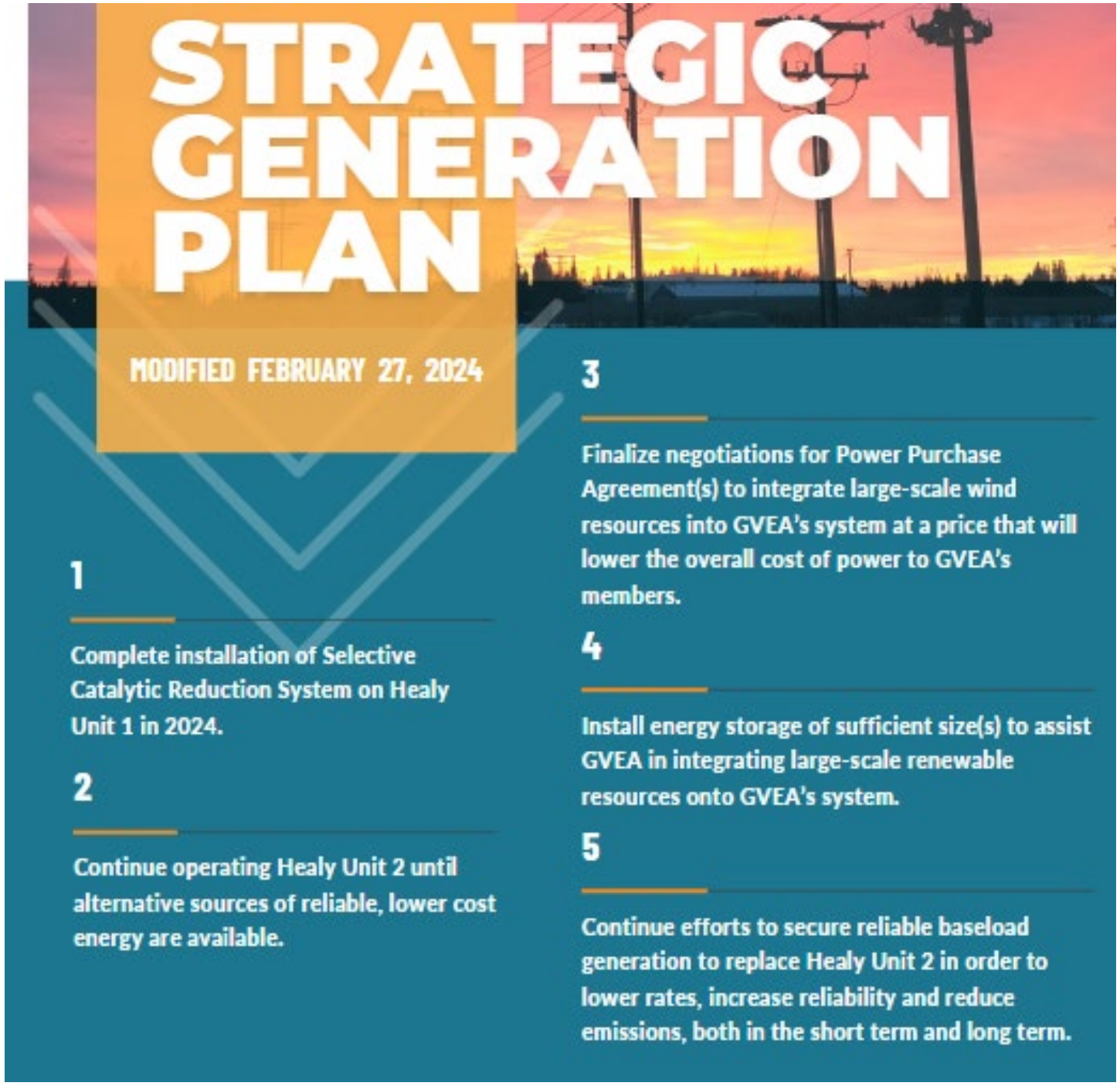
381.5 MW Generation Capacity

2022 Peak Load was 205.5 MW and Low Load was 68.8 MW

Carbon Intensity Reduction Goals*

26%
by 2030

*measured against GVEA's 2012 emissions levels



HEA Summary

Strategic Priorities

INNOVATIVE ENERGY SOLUTIONS

- Landfill Gas Project
- Install 4 wind met towers (LIDAR)
- PACE application for 2nd BESS

ENERGY RESOURCE DIVERSIFICATION

- Geothermal Studies for 2 sites
- 1 large Solar IPP site in progress
- 1 large Wind IPP site in progress
- Bradley Lake – Dixon Diversion

CAPTURING EMERGING MARKETS

- Heat Pump incentive program
- Electric vehicle charger program

MEMBER-CENTRIC MODERNIZATION

- Improved line extension process
- Member application – digital signatures

Statistics

37,074	Total Services
3,166	Service Territory (sq miles)
2,750	Miles of energized line
5	Generation Plants
1	BESS (46.5 MWs / 93 MWh)
1	Bradley Lake O&M

By the Numbers

01	Provides power to 1 in 3 Alaskans
02	$354.5 million in total revenue
03	One of a few utilities in the nation with a direct ownership in a gas field
04	13th largest electric cooperative in U.S. on basis of total asset value
05	$1.8 Billion in total asset value

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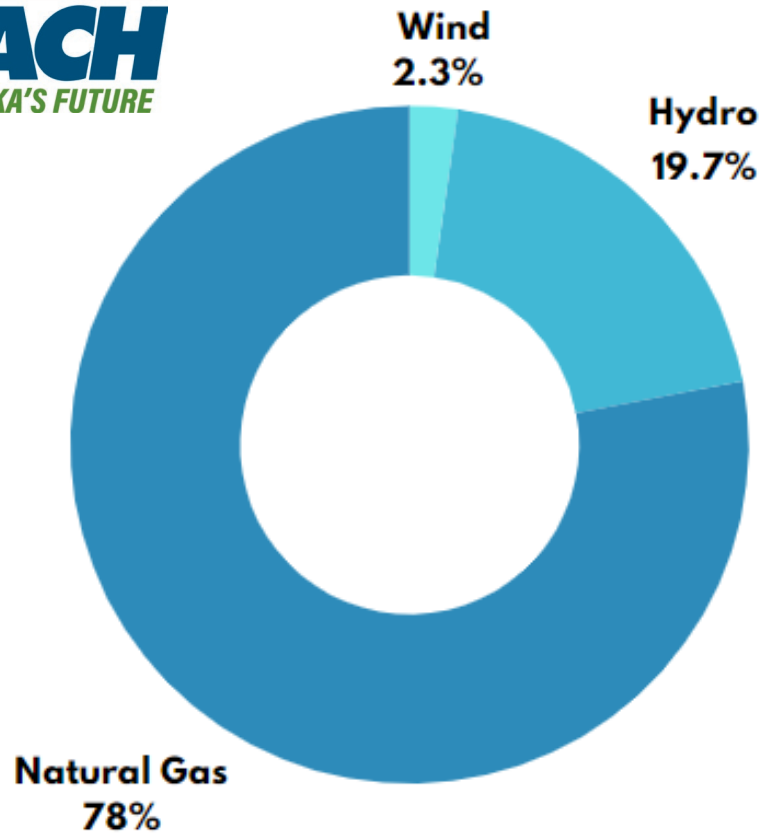

2023 CHUGACH GENERATION MIX

Carbon Intensity Reduction Goals*

35%
by 2030

50%
by 2040

Provided no negative material impact to rates.

* Using 2012 as baseline year

Long Term Resource Strategy

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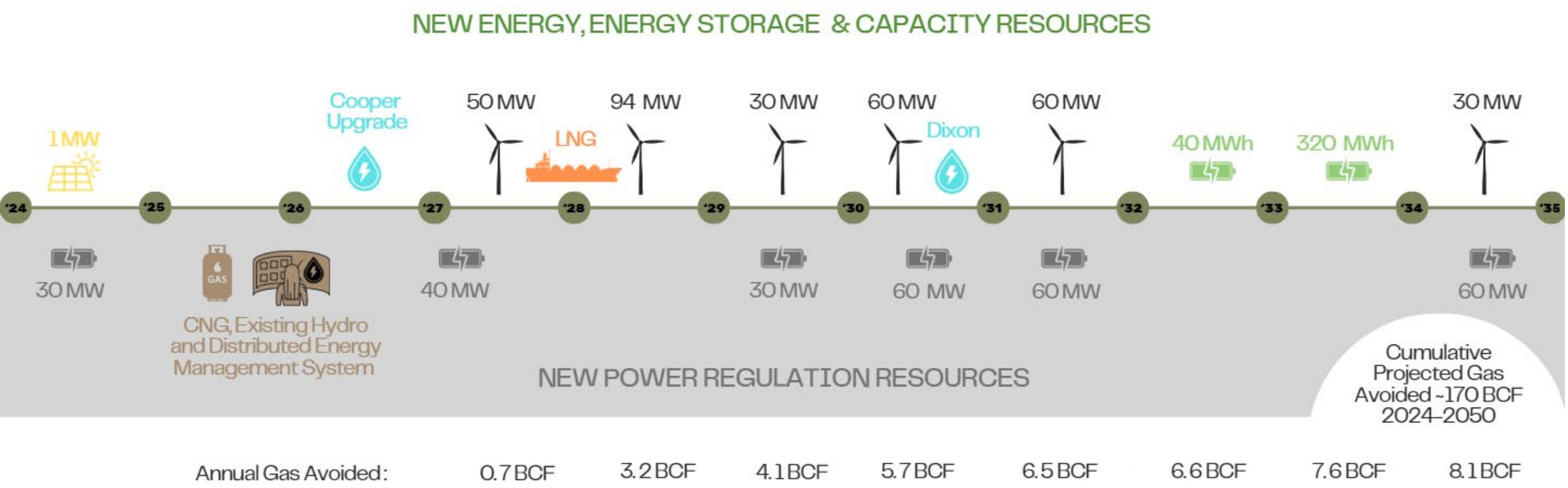

Annual Gas Avoided:	0.7 BCF	3.2 BCF	4.1 BCF	5.7 BCF	6.5 BCF	6.6 BCF	7.6 BCF	8.1 BCF

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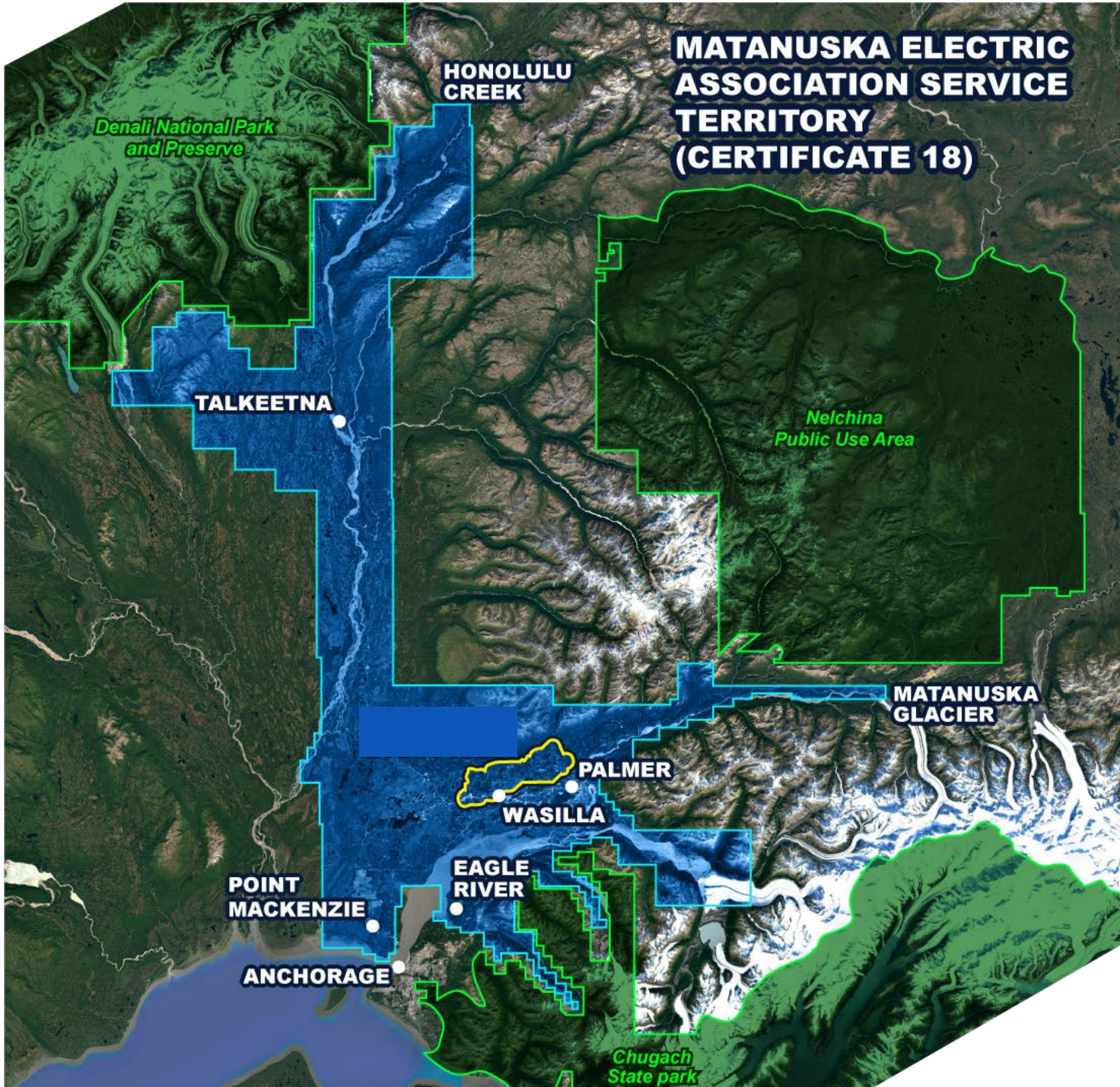
What we are:

- The oldest and second largest utility in the Railbelt serving the Mat-Su Borough and parts of the Municipality of Anchorage (Mat-Su Borough is about the size of West Virginia)
- Vertically integrated owning generation, transmission, and distribution
- Operating and managing more than 4,550 miles of power lines and 26 substations
- We provide safe reliable energy at reasonable rates with exceptional member service and commitment to the community we serve



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Who we are:

A reliable and competent partner working jointly with entities to, among other things, reduce cost and reliance on natural gas.

2018 and forward RIPP brings projects online with MEA.

MEA supports Railbelt reform from 2020 to present.

In 2022 MEA and Chugach start power pooling.

Question & Answer