



LAUNCH ALASKA

CPRG Panel – Transportation

April 3, 2024

Transportation Landscape



The Challenge

- Incumbent system designed for liquid fossil fuels
- Delayed decarbonization increases damages and costs

The Opportunity

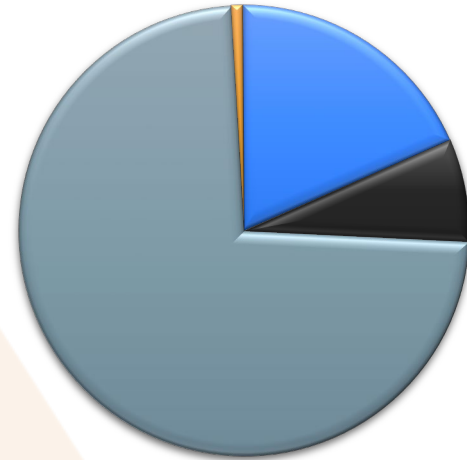
- Innovative technology is here for some forms of transportation, coming soon for others
- Federal funding

Transportation Landscape



First place - aviation @ ~8 million tons CO2e

Alaska Emissions, 2018



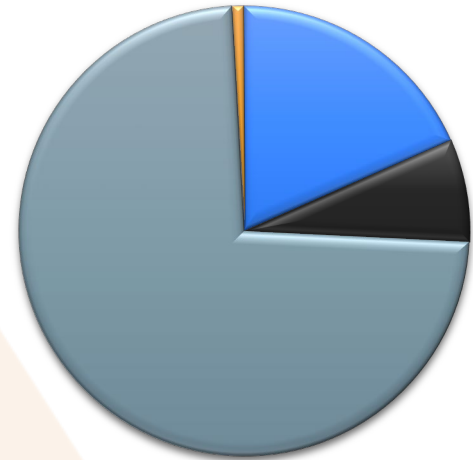
■ Gasoline Highway ■ Diesel Highway ■ Aviation ■ Maritime ■ Locomotive

Transportation Landscape



Second place – Gas Highway @ ~2 million tons CO₂e

Alaska Emissions, 2018



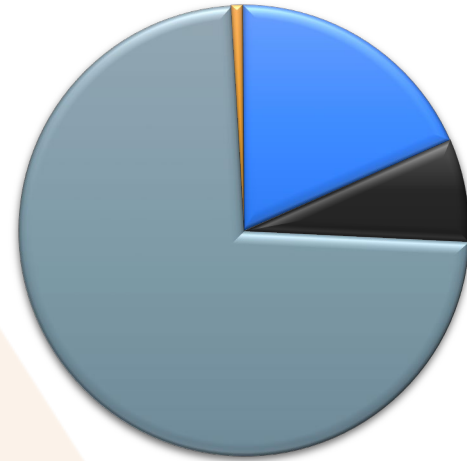
■ Gasoline Highway ■ Diesel Highway ■ Aviation ■ Maritime ■ Locomotive

Transportation Landscape



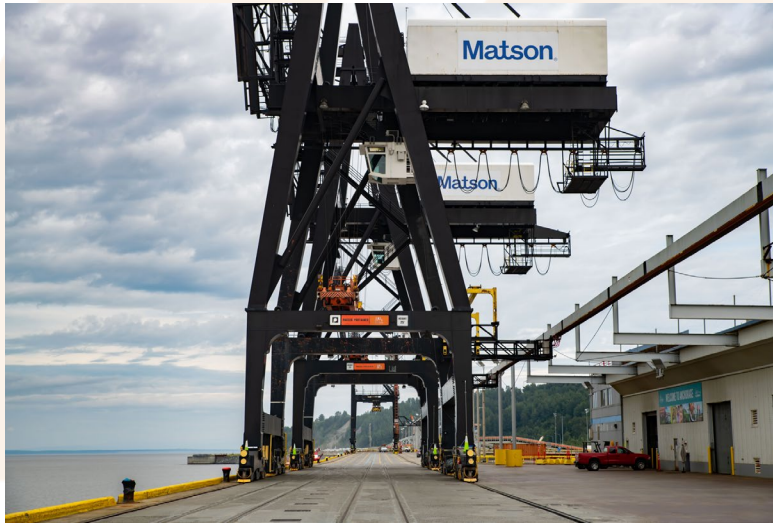
Third place – Diesel Highway @ ~800,000 tons CO₂e

Alaska Emissions, 2018



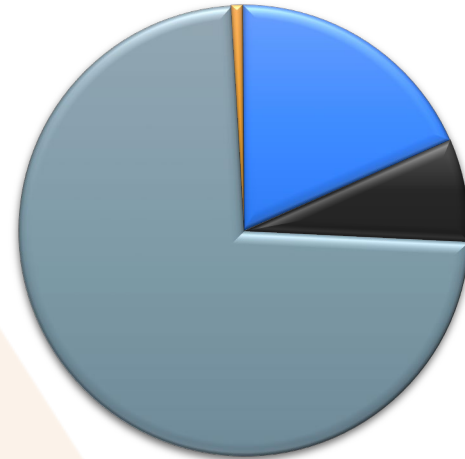
■ Gasoline Highway ■ Diesel Highway ■ Aviation ■ Maritime ■ Locomotive

Transportation Landscape



Fourth place – Maritime @ ~85,000 tons CO₂e

Alaska Emissions, 2018



■ Gasoline Highway ■ Diesel Highway ■ Aviation ■ Maritime ■ Locomotive

Transportation Strategies



Sustainable Aviation Fuel (SAF)

- Up to 80% lower emissions
- Currently available - seven biofuel pathways are certified to produce SAF
- Can be produced from agriculture and forestry waste products, or with carbon from direct air capture and hydrogen from electrolysis or steam methane reformation

Transportation Strategies



Hybrid-electric aircraft

- 50-90% emissions benefit
- 40% lower maintenance and fuel costs
- Retrofits up to 400NM for 3 seat missions and up to 1100NM for 11 seat missions available for pre-order

Transportation Strategies



Hydrogen fuel-cell electric aircraft

- 90% lower life cycle emissions
- 40% lower fuel and maintenance costs
- Retrofits up to 300NM <19 seat missions from 2025 and up to 1000NM 50-90 seat from 2027

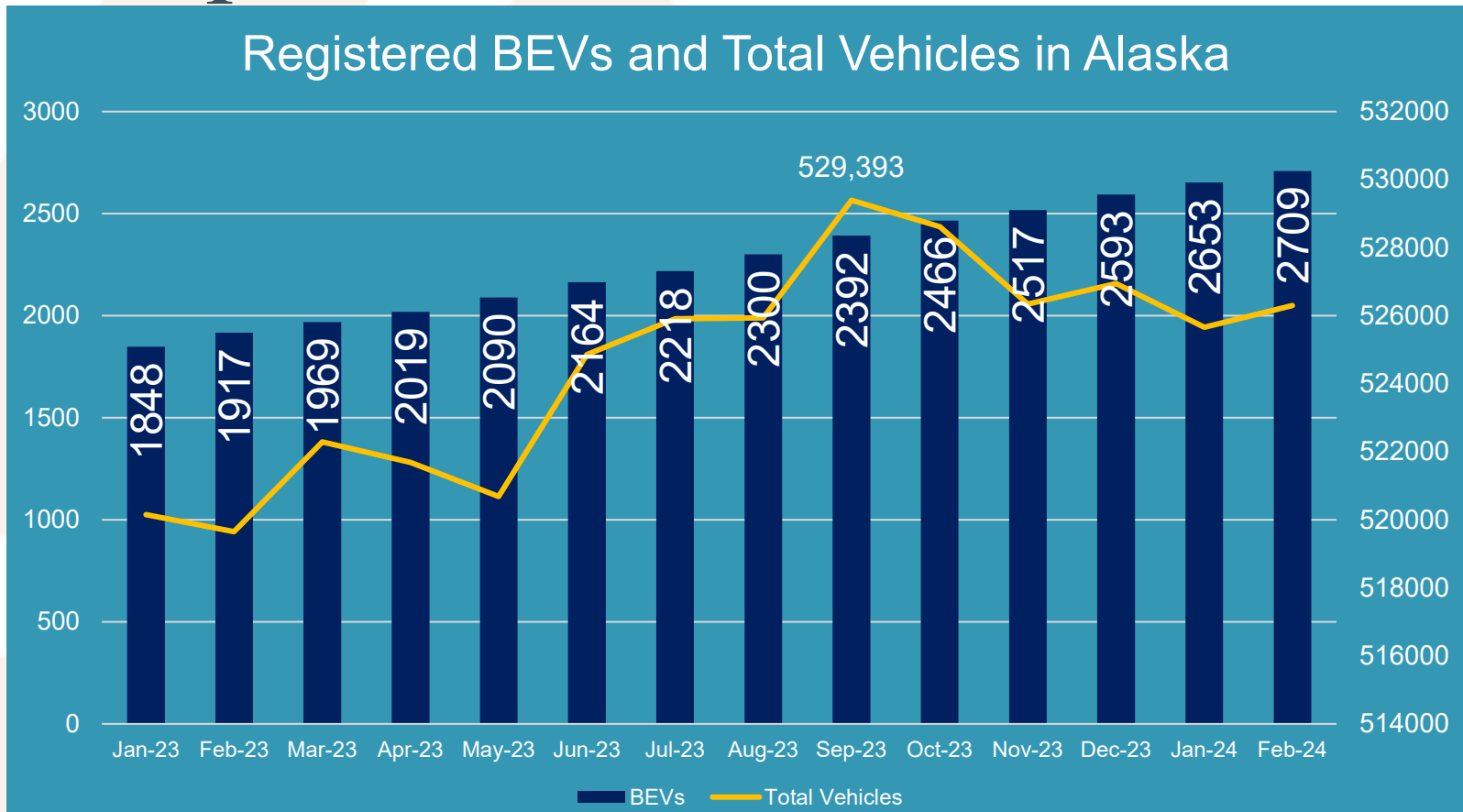
Transportation Strategies



Electric Vehicles

- 50-70% lower emissions on CEA grid mix*
- 50-60% lower fuel costs
- 30-40% lower maintenance costs
- Increasing number of light-duty EV options available, and purchase price gap closing

Transportation Solutions



Transportation Strategies



Electric Vehicles

- 50-70% lower emissions on CEA grid mix*
- 50-60% lower fuel costs
- 30-40% lower maintenance costs
- Increasing number of light-duty EV options available, and purchase price gap closing
- Medium- and heavy-duty vehicle, limited options available

Transportation Strategies



Hydrogen Fuel Cell Vehicles

- ~30-100% lower emissions
- Operations costs high (3x in CA)
- Light-duty vehicles commercially available in US, limited selection
- Medium- and heavy-duty vehicle options for some applications, many are pre-commercial

Transportation Strategies



Hydrogen Fuel Cell Vehicles

- ~30-100% lower emissions
- Operations costs high (3x in CA)
- Light-duty vehicles commercially available in US, limited selection
- Medium- and heavy-duty vehicle options for some applications, many are pre-commercial

Transportation Strategies



Shore Power, Battery Electric, Hybrid & Alternative Fuels Vessels

- ~25-100% lower emissions
- 40-60% lower operating costs in hybrid applications in Norway
- Hybrid-electric is the current main option for longer ferry routes
- Alt. fuels being considered - methanol, ammonia, gaseous, and liquid hydrogen fuel cell,

Transportation Strategies



Infrastructure is
the **key**

Are **you** up for the
challenge?



LAUNCH ALASKA

Thank You

tim.leach@launchalaska.com