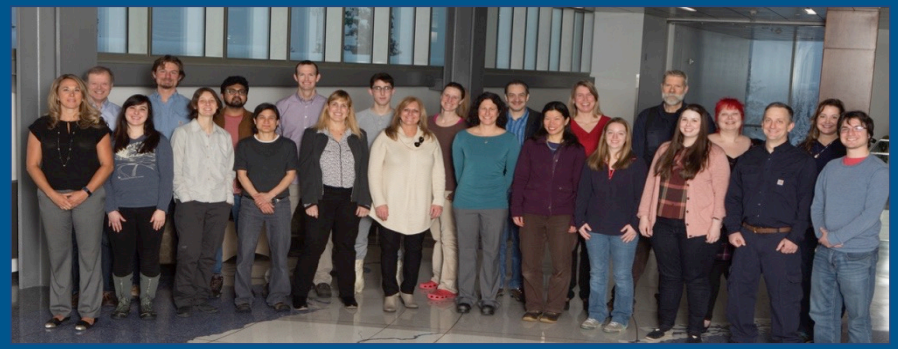
Alaska Center for Energy & Power
University of Alaska Fairbanks

Jeremy Kasper, ACEP Director

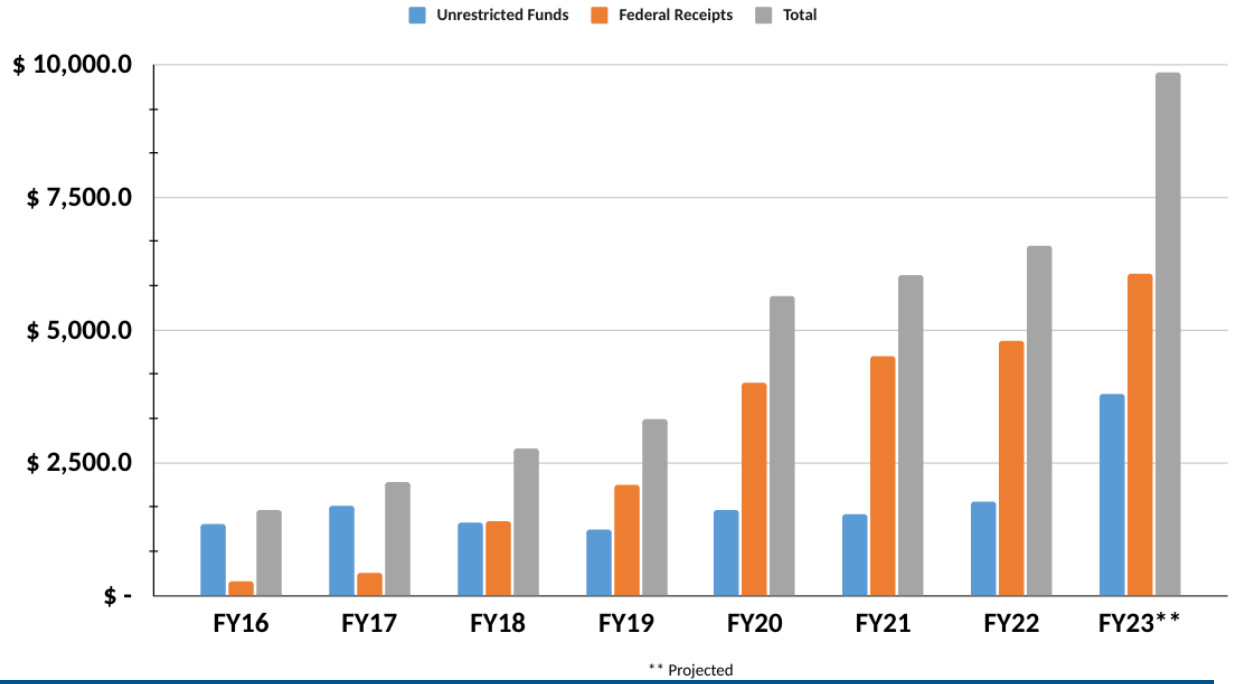
Alaska Center for Energy & Power

Mission: Fostering development of practical, innovative and cost-effective energy solutions for Alaska and beyond

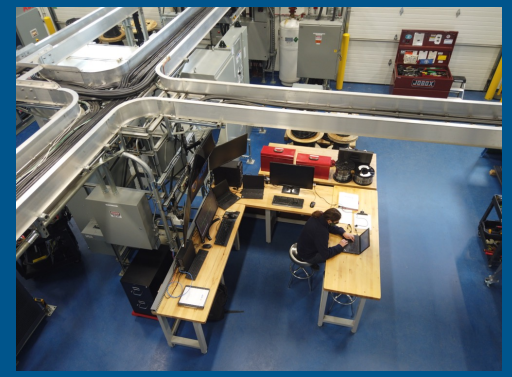
- Applied energy research program
- Technology testing & optimization
- Energy systems modeling & analysis
- Knowledge network creation
- Commercializing energy innovation



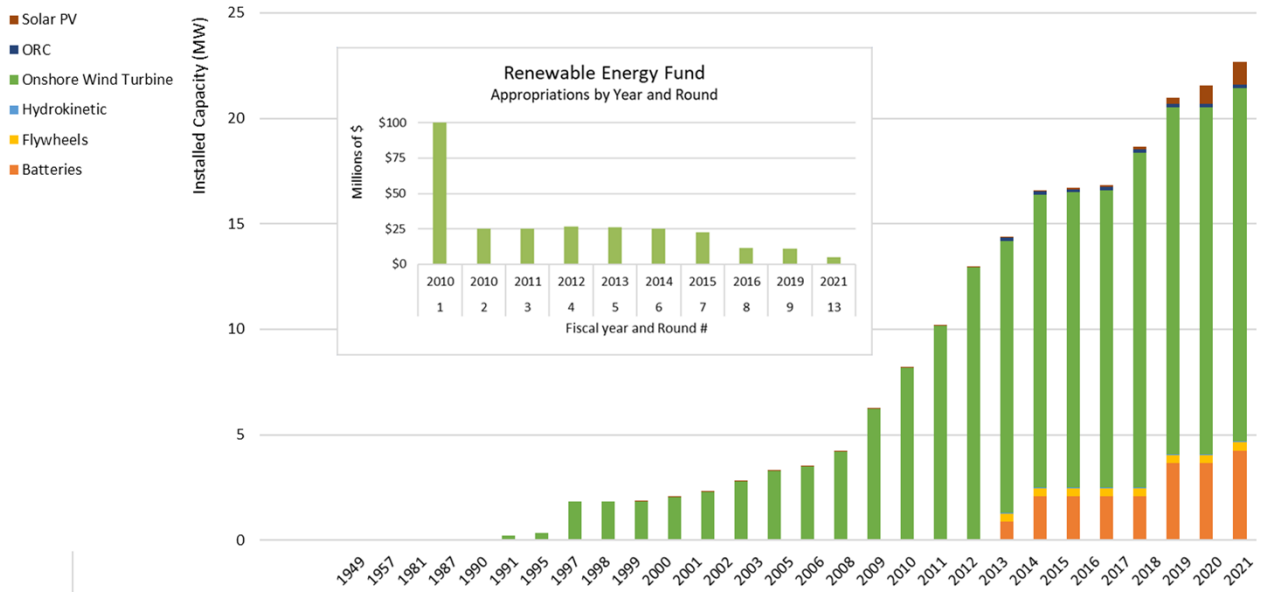
ACEP Unrestricted Funds, Federal Receipts and Total



** Projected



Installed Renewable Energy Capacity by Technology (MW)



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ACEP Research

Our research focuses on innovative, practical, and cost-saving solutions for community and industry-scale power generation, transmission, heating and transportation fuels. We strive to enable greater local energy security, sustainability, and reliability by moving energy solutions from the laboratory to the real world.

Marine Energy

The Pacific Marine Energy Center at UAF (PMEC-UAF) provides practical and innovative solutions for hydrokinetic power generation to help meet Alaska' energy challenges through applied research.

Power Systems Integration

The Power Systems Integration (PSI) program collaborates with local, regional and national stakeholders to increase the resilience of power systems and reduce energy costs and emissions across Alaska and beyond.

Solar Technologies

The solar technologies program supports responsible and equitable development of solar photovoltaic technology in Alaska and beyond.

- Energy Transitions
- Beneficial Electrification
- Energy Policy and Economics
- Geothermal
- Advanced Nuclear
- Energy Storage
- Railbelt Decarbonization
- Energy Innovation
- Microgrids/ DERs
- DoD Energy Needs
- Hydrogen
- CCUS

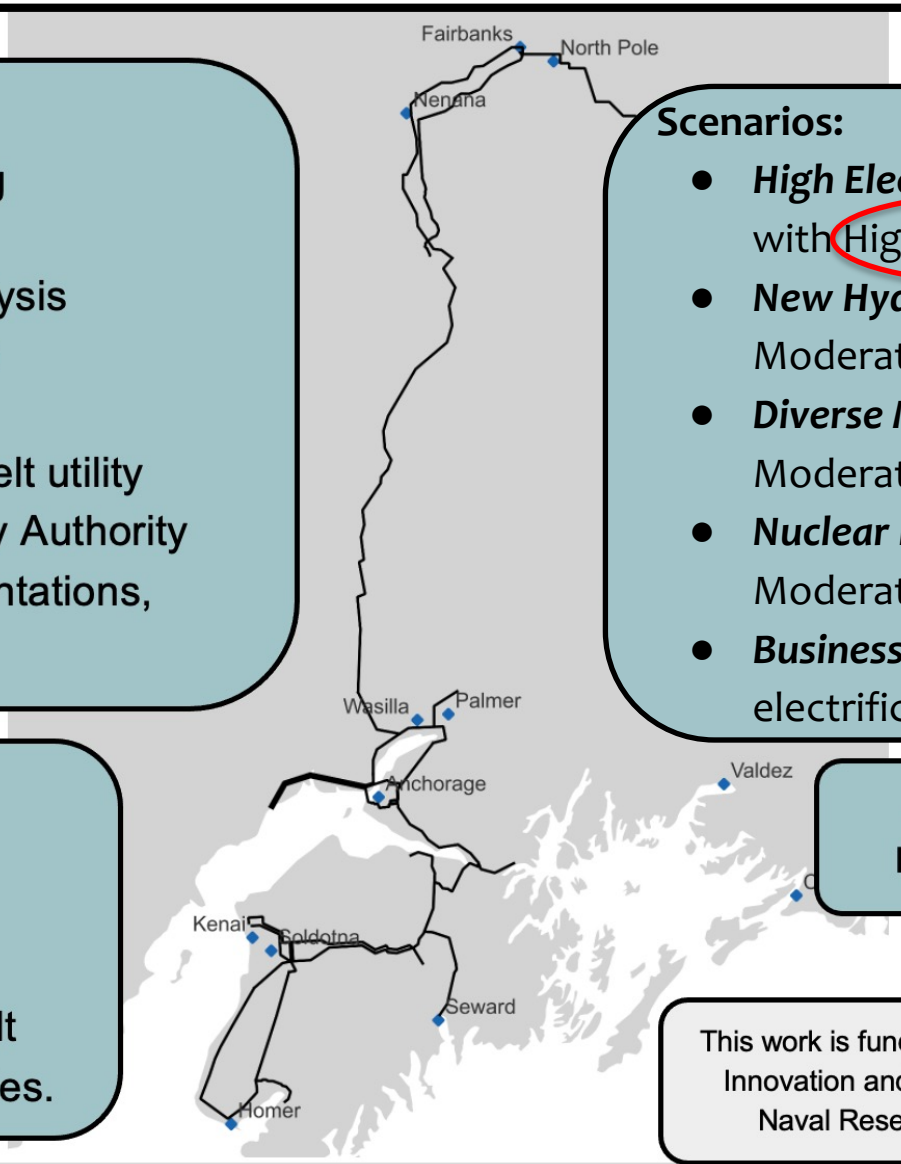
DOI 10.5281/zenodo.7909704

Alaska Railbelt Decarbonization Pathways Study

Exploring and quantifying system-wide pathways toward *100% Railbelt Decarbonization in 2050.*

Study Components:

- Resource assessment and sizing
- Load forecasting
- Transmission modeling and analysis
- Economic dispatch of generation
- Rate analysis
- Technical Advisory Group: Railbelt utility engineers and the Alaska Energy Authority
- Stakeholder Engagement: presentations, workshops, and surveys



Scenarios:

- ***High Electrification Focus***: New Wind, Solar, & Tidal with High Electrification
- ***New Hydro Focus***: New Hydro, Wind, & Solar with Moderate Electrification
- ***Diverse Mix Focus***: New Wind, Solar, & Tidal with Moderate Electrification
- ***Nuclear Focus***: New Nuclear, Wind, & Solar with Moderate Electrification
- ***Business as Usual***: No new generation, no electrification, planned transmission upgrades

Outcomes:

- Quantify the ***economic and reliability implications of decarbonization scenarios***
- ***Create information*** for Railbelt planning discussions and studies.

Questions and more information:
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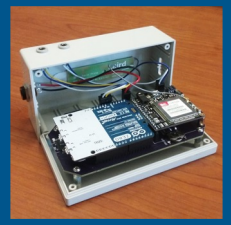
This work is funded through the Alaska Regional Collaboration for Technology Innovation and Commercialization (ARCTIC) program which is an Office of Naval Research (ONR) funded collaboration and the State of Alaska.

High Electrification: what does this mean?

ELECTRIFICATION of HEAT

- Heating: PuMA (Pump Monitoring Apparatus)



  - New System for Quantifying Home Heating Oil Usage
- ***Big Data***: merging AHFC's ARIS/AK WARM database to estimate statewide heating requirements
- Household level surveys
- Research on heat pumps + thermal electric storage stoves

ELECTRIFICATION of TRANSPORTATION

- Electric Vehicles

Alaska Electric Vehicle Calculator

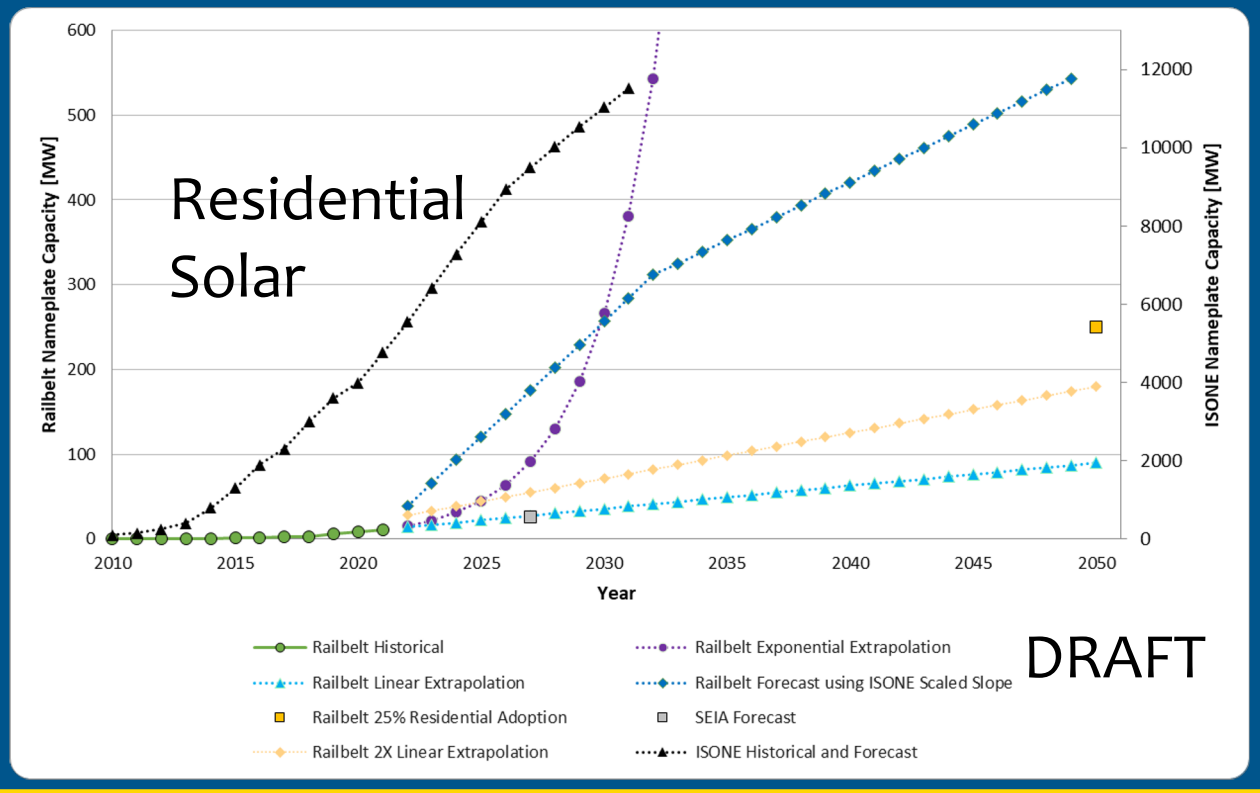
Alaska Electric Vehicle Workshop Report

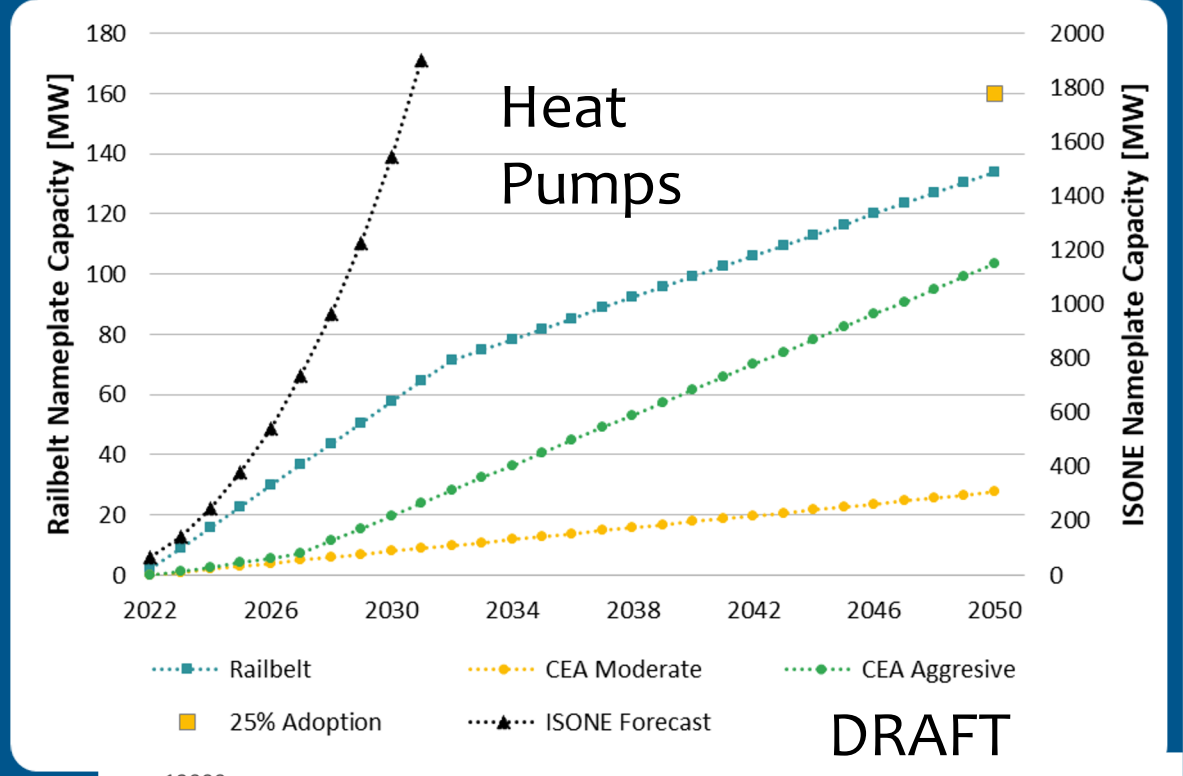
Cold Weather Issues for Electric Vehicles in Alaska

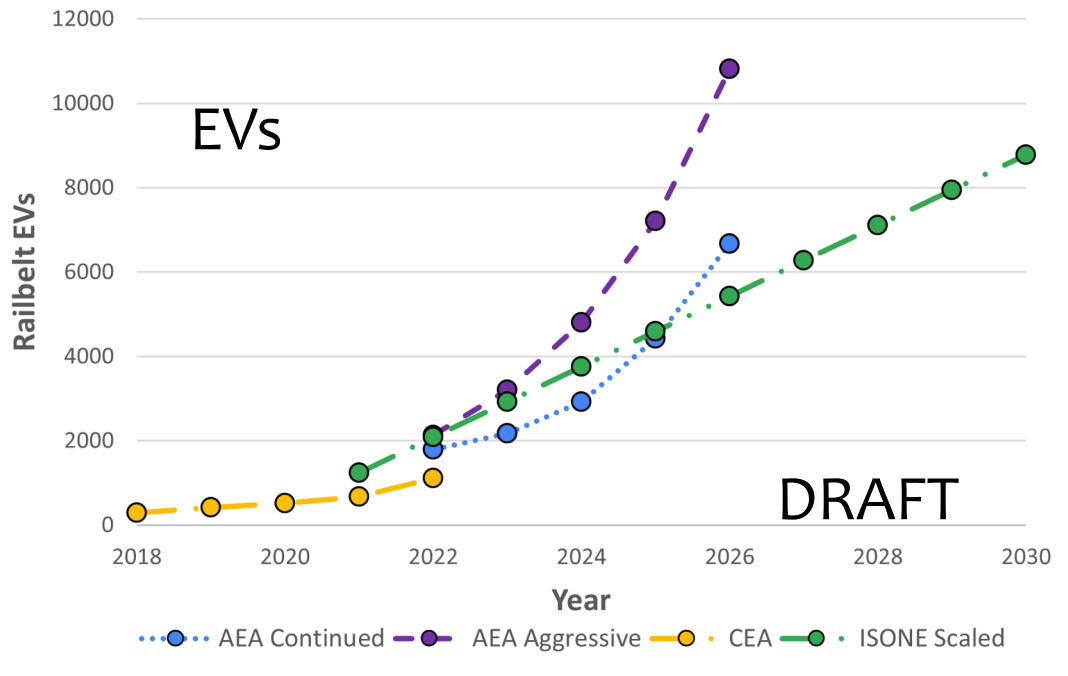
https://uaf.edu/acep/projects/beneficial-and-equitable-electrification.php

Load Forecasting

- Base load
- Electric vehicles
- Residential solar
- Heat pumps







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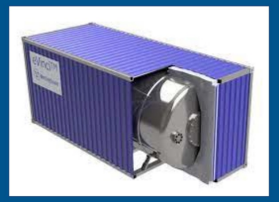
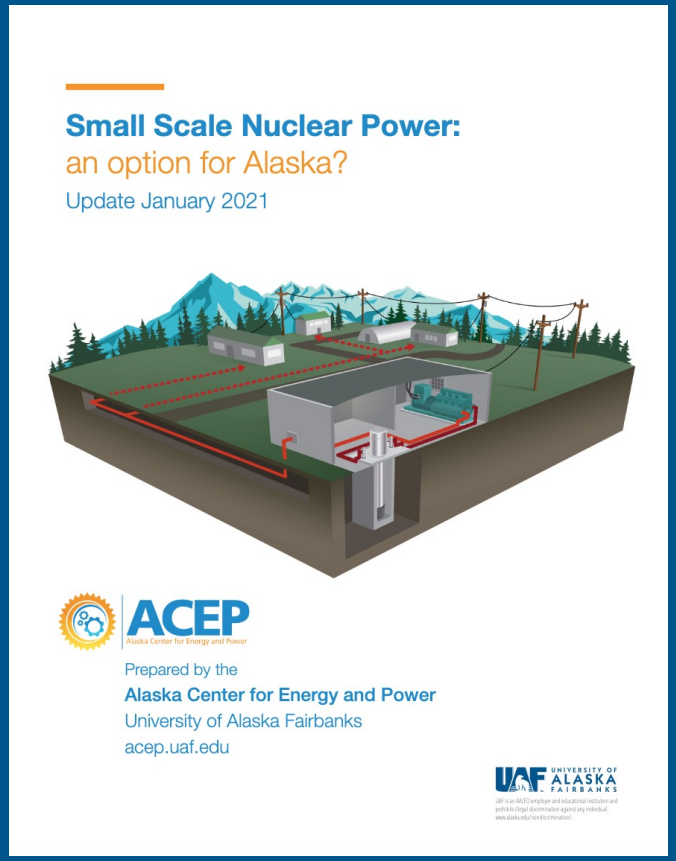
Advanced Nuclear

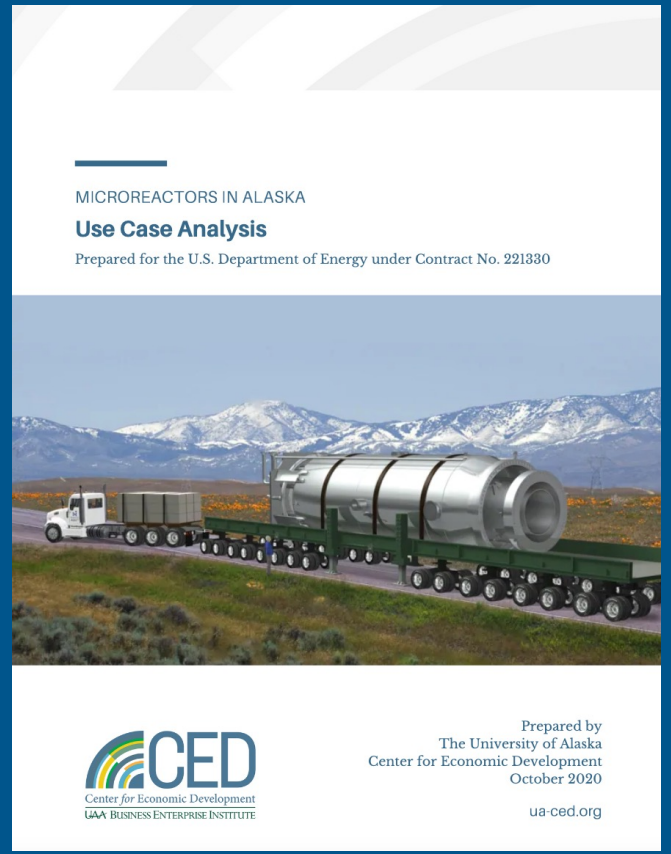
Micronuclear Reactors – an emerging technology



Artist renderings of microreactors under current development

Town Hall meetings in Fairbanks (top, September 2022) and Nome (right, August, 2022)





Nuclear Working Group: https://www.uaf.edu/acep/working-groups/nuclear-energy-working-group.php

Online and In-Person Workshops

Examples:

Micronuclear
Tidal Energy
Ben. Electrification
Hydrogen economy

Carbon Capture Utilization and Storage
Low-carbon energy transitions
Long duration energy storage

WORKSHOP 2: Carbon Capture and Sequestration: The Myth and the Reality

Name: Carbon Capture and Sequestration: The Myth and the Reality
Dates: Tuesday, April 11th and Wednesday, April 12th, 2023
Location: Virtual via Zoom
Cost: Free to attend, must register in advance
Description: Carbon capture utilization and storage (CCUS) covers the suite of technologies used to capture carbon dioxide from stationary point sources, industrial processes, or the atmosphere, and then transport it to either 1) utilize for other beneficial use, or 2) inject deep underground into subsurface formations for permanent storage. Although based on decades-old technology in the oil and gas sector, emissions reduction goals and changes to the federal tax code have ignited a growing wave of implementation on the international scale. Join us for this conversation to learn from project developers, subject matter experts, and regulators to address the myths and realities of this industry and discuss the potential role it may play in Alaska in the coming years.

REGISTER NOW

For event notifications sign up for the ACEP weekly newsletter at:

https://acep.uaf.edu/

The University of Alaska is a key resource for the state

- **Alaska's Skunk Works** – Industry partnerships, innovation, research, designing the future
- **Alaska's Think Tank** – Strategic planning, convening, public education
- **Investing in Alaska's Human Capital** – building the workforce of tomorrow, today

The University of Alaska is a good investment in Alaska's future

Thank you

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