



U.S. Department of Energy's Arctic Energy Office

AEO Brown Bag Lunch and Learn – Juneau, AK

9 March 2022



Who We Are, What We Do & How We Can Help

We are:

A team with expertise in:

- Science and research
- Engineering
- International affairs
- Military and government relations
- Tribal consultation
- Communications



What we do and how we can help:

Our main objectives are to:

- Support U.S. Department of Energy policies, programs and events
- Advance Arctic energy transition
- Ensure all voices are heard
- Collaborate with Arctic stakeholders
- Connect Arctic stakeholders with government resources
- Promote goodwill among the U.S. and other Arctic nations
- Pursue national security in the Arctic

AEO: A Critical Part of the DOE Mission

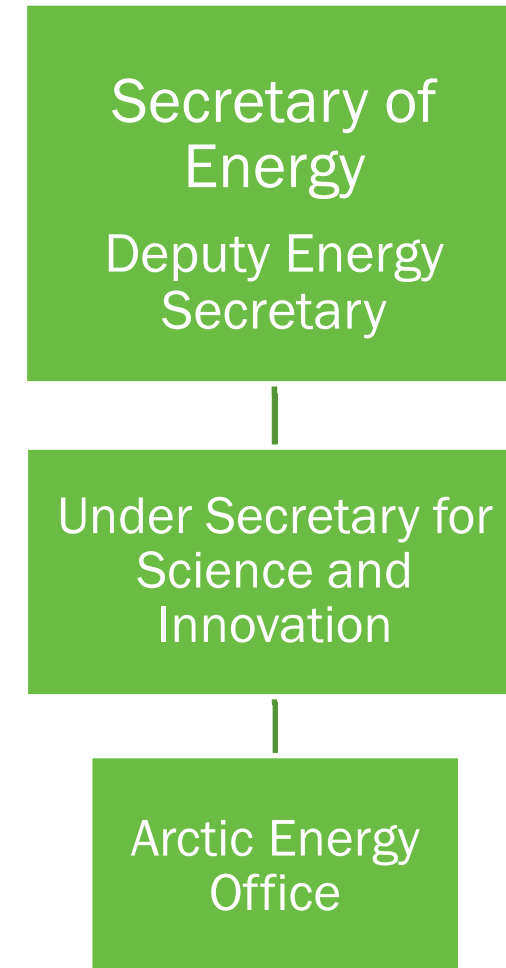
Department of Energy mission

Ensure America's security and prosperity by addressing energy, environmental and nuclear challenges through transformative science and technology solutions.

Priorities:

- Combat the climate crisis
- Promote energy justice
- Create clean energy union jobs

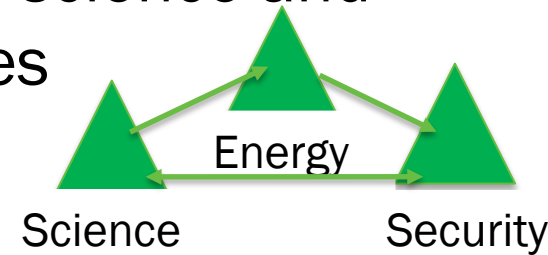
AEO's reporting structure within DOE



Arctic Energy Office Mission & Vision

Mission:

Lead cross-cutting operations in the Arctic to tackle 21st Century energy, science and national security challenges



Vision:

Bring together DOE resources to collaborate in innovative ways to meet the needs of the United States and its allies in the Arctic.

- Coordinate - Consult - Communicate -
- Recommend - Advocate -



AEO
office

University of Alaska
Fairbanks campus



AEO office at the University of
Alaska Fairbanks



Our Team

Michael
McEleney
Senior
Advisor for
Security



George Roe
Interim Director



Matthew
Heavner
Senior
Advisor for
Science



Givey
Kochanowski
Senior Advisor
for Alaska



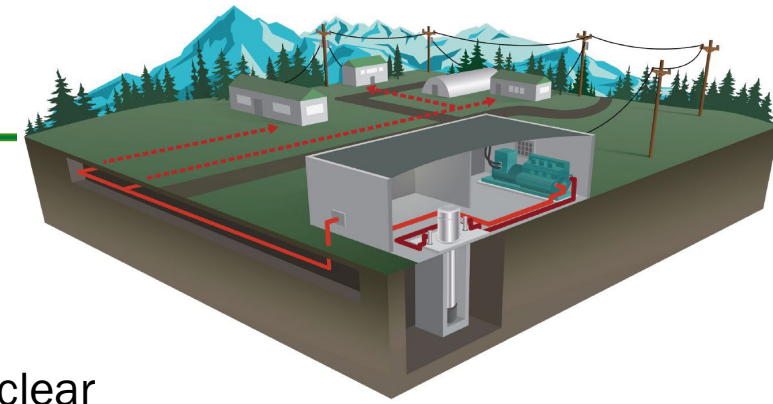
Carolyn Hinkley
Communications
Director



AEO's Focus on Energy

AEO advances existing DOE research and energy programs. These include:

- **Bioenergy:** kelp feedstock for food and fuel
- **Electricity:** grid control, microgrids, resiliency
- **Efficiency:** buildings, sustainability, capacity building, technical assistance
- **Fossil:** carbon capture, carbon transport, use & storage, carbon removal, mitigation of natural gas impacts
- **Geothermal:** Pilgrim Hot Springs, Makushin
- **Hydrokinetics:** research on tidal and marine energy
- **Nuclear:** small nuclear reactors, site monitoring
- **Solar:** installations in Alaskan villages, research
- **Transportation:** electric vehicles (ground, sea, air)



Small nuclear reactor, above; Solar panels at the Village of Deering, AK, middle; and hydrokinetic testing, below



AEO's Focus on Science

Multiple ongoing efforts at DOE Office of Science, national labs, inter-agency, academia, international

- Atmospheric Radiation Measurement observatory
- DOE airspace and environmental research at Oliktok Point
- Next-Generation Ecosystem Experiments (NGEE Arctic)
- Energy Exascale Earth System Modeling (E3SM)
- Arctic Innovators program
- ...



Atmospheric modeling at Utqiagvik, above; NGEE Arctic research, left and Arctic Innovators, right.



AEO's Focus on Security

- AEO helps national energy security in the Arctic by:
 - Promoting STEM initiatives
 - Building / maintaining relationships via international dialogues and information exchanges
 - Coordinating with National Security Council and inter-agency partners on strategies and issues
 - Collaborating with U.S. Arctic Coordinator
- AEO represented DOE at Arctic Circle Assembly 2021, including *Arctic Lab Partnerships for a More Resilient and Secure Arctic* and *A Carbon Neutral Arctic* panels.
- AEO represents DOE at the White House Arctic Executive Steering Committee.



Mike McEleney and Matt Heavner at
2021 Arctic Circle Assembly in Iceland

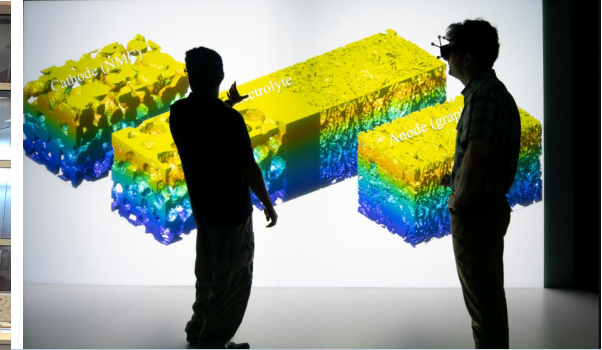
AEO's Focus on Technology

AEO works to advance:

- Microgrids
- Energy storage
- Battery research
- Solar research
- Wind research
- Hydrokinetic research
- Geothermal energy
- Small nuclear reactors
- Efficient buildings
- Electric transportation
- Cold climate heat pumps
- ...

For ...

- Security
- Resilience
- Affordability
- Sustainability



AEO's Focus on Alaska

- The US is an Arctic nation because of Alaska
- DOE values its Alaska stakeholders and partners
- DOE has a presence in Anchorage, Fairbanks, Nome and Oliktok Point
- Alaska's congressional delegation helped re-establish the Arctic Energy Office
- AEO coordinates with the National Renewable Energy Lab at the Cold Climate Housing Resource Center in Fairbanks
 - The Center helps with technical assistance and efficient housing in rural Alaska communities



Opportunities for DOE Work in the Arctic

Needs

- Multiple stakeholders – indigenous, national, commercial
- “All of the above” energy realities
- Opportunities for circumpolar & trans-latitude sharing
- Compelling technology maturation / transition opportunities

Factors to consider

- Rapidly evolving natural, economic, and political conditions
- Wide range in community size, resources, connectivity



AEO's Focus on Science, Technology, Engineering & Math

AEO supports:

- DOE's Arctic Innovators program
- DOE's Minority Educational Institution Student Partnership Program
 - AEO hired 3 student interns in 2021
- Arctic Remote Energy Networks Academy
- DOE Scholars program



Above, George Roe stands with interns Josh, Logan and Nicole; right, Chris Woodruff, Arctic Innovator; and 2017 ARENA cohort, left.



Arctic Challenges and Opportunities

Challenges

- Varied/harsh/changing climate
- Small populations in urban & rural communities
- Isolated from continental grids
- Fragmented local electric grids
- Limited transportation options
- Varied, typically poor, connectivity
- Challenged economy
- High energy costs

Opportunities

- Strong interest in resilience/sustainability
- 10+% of world's microgrids are in Alaska
- Energy transition
- Small nuclear reactors
- Hydrogen/ammonia
- Electric transportation
- Sustainable maritime
- Rare earth elements / critical minerals
- International collaboration

Interagency Research Coordination – AESC & IARPC

- **AESC Clean Energy Initiative (DOE Lead)**
 - *Develop and Implement the Use of Nuclear Microreactors*
 - *Leverage Hydrogen and Ammonia as Non-Wire/Multi-Use Energy Resources*
 - Interagency coordination highlights – March 2022 AESC
- **IARPC Biennial Implementation Plan**
 - Co-lead Priority Area 3 – *Sustainable Economies & Livelihoods (DOE co-lead)*
 - January–March 2022 stakeholder outreach
- **Funding consistent with agency resources**



Tribal Engagement

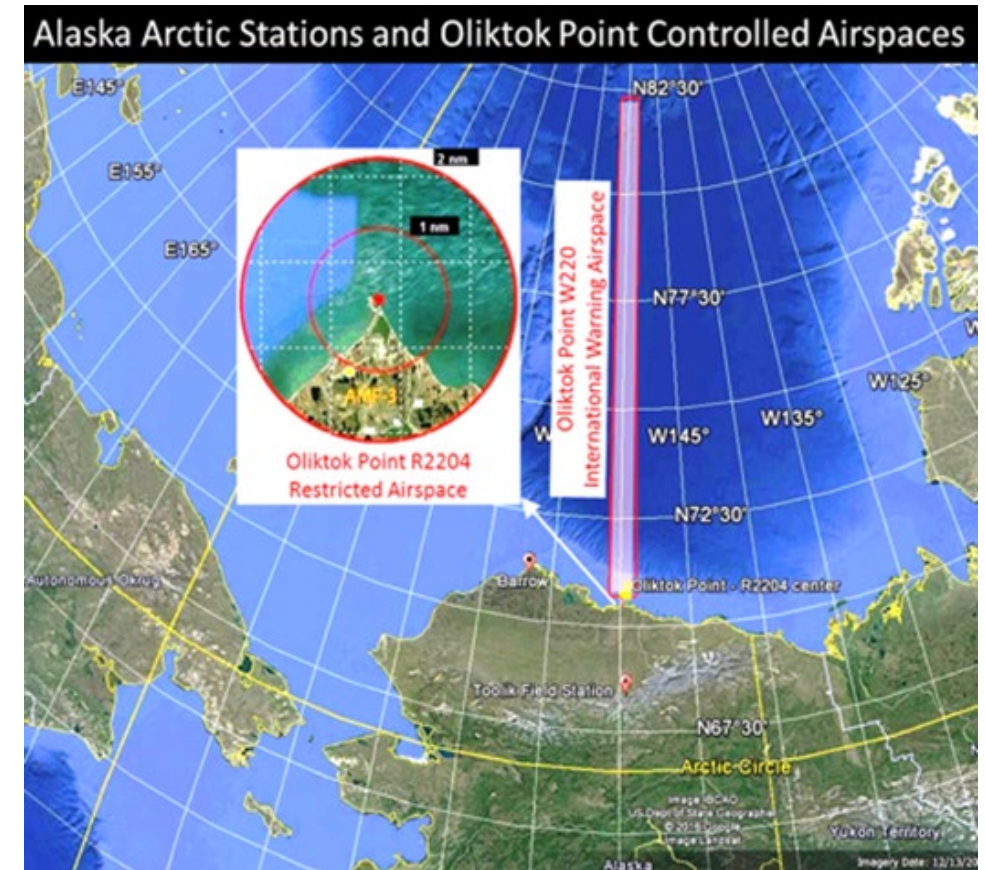
"We're not about showing up with solutions from D.C.—Native Alaskans' lived experiences with energy can teach the Lower 48 a few things. Each community is unique, whether rural or urban, coastal or interior, we're eager to learn from the innovative solutions Alaskans have developed over hundreds—often thousands—of years."

– **Energy Secretary Jennifer Granholm**



Oliktok Site & Airspace Leverage

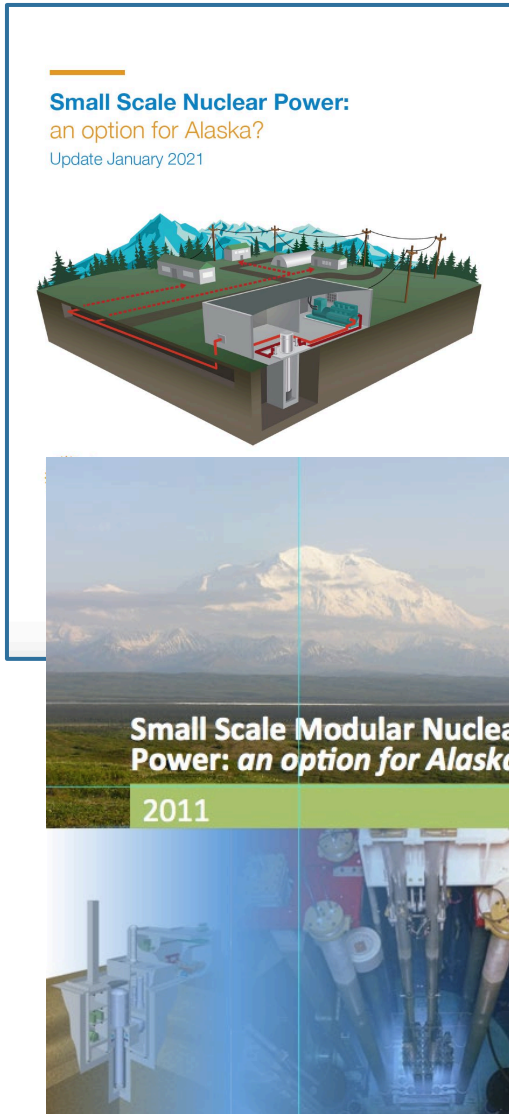
- Oliktok is the farthest north drivable location in the U.S. and has land/sea/air access
- DOE operates two airspaces on North Slope
- DOE/Office of Science/ARM operated at Oliktok 2013-2021
- AEO is finalizing transfer of responsibility for the airspaces
- Coordination ongoing with stakeholders



Standalone Utility Personnel Engagement Resource (SUPER)

- Training and capacity building for underserved utilities
- Focuses on communities with high energy burden
 - Fuel price /operating costs / environment
 - Poor management, maintenance, and operation histories
- Targets approximately 60 utilities not in a cooperative
- Focus on clerks, maintainers, managers, and boards
- Based on pending IAA with Denali Commission
 - Leverages MAP21 authority
 - Partners with AK's largest energy 501(c)3
- Three-year pilot project led by Arctic Energy Office
- Soliciting OE, CESER and other DOE expertise and \$

Small Nuclear Reactors in Alaska?



Cost, scalability, transportability, size, safety zone and regulatory treatment, passive safety features, standardization, fuel, ...

Deployment path??

- Villages
- Hub towns
- Municipal utilities
- Remote industry
- Defense / municipality
- Defense sites

Safety
Environment
Affordability

Integration
Benefit
Timing ...

USNC
STARCORE
OKLO
UBATTERY
eVinci™ Micro Reactor
HITACHI
HolosGen™
Others?

ACEP

- Alaska Nuclear Energy Working Group
- DOE Office of Nuclear Energy
- National Reactor Innovation Center (NRIC)
- Gateway for Acceleration in Nuclear (GAIN)

Arctic Lab Partnerships

- AEO-lead, coordinated via Chief Research Officers Council
- 11 national laboratories & University of Alaska
- Result of 2018 Alaska National Lab Day
- 2020 virtual workshop - arctic research needs
- 2021 collaborative development of research roadmap to inform DOE Arctic Strategy



ALPs DOE Labs: Brookhaven National Lab (BNL), Idaho National Lab (INL), Los Alamos National Lab (LANL), Lawrence Berkeley National Lab (LBNL), Lawrence Livermore National Lab (LLNL), National Energy Technology Lab (NETL), National Renewable Energy Lab (NREL), Oak Ridge National Lab (ORNL), Pacific Northwest National Lab (PNNL), Sandia National Lab (SNL), Savannah River National Lab (SRNL)

INNOVATION χ LABSM

ARCTIC χ

North to the Future of Energy

Information & Registration

energy.gov/arcticx

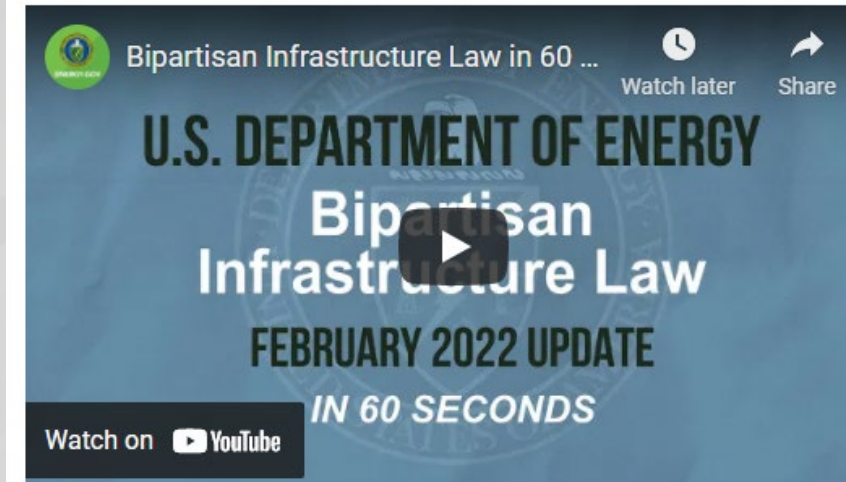
4/6 webinar

5/23 in-person!





Bipartisan Infrastructure Law in 60 Seconds (February Update)



energy.gov/bil

\$62 billion for the U.S. Department of Energy (DOE) to deliver a more equitable clean energy future for the American people by doing the following:

- Investing in American manufacturing and workers
- Expanding access to energy efficiency and clean energy
- Delivering reliable, clean, and affordable power
- Building technologies of tomorrow through clean energy demonstrations

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