ARENA
Arctic Remote Energy Networks Academy
A multi-national knowledge exchange program focused on sustainable microgrid energy systems

Benefits of Attendance:
• Global network of professional colleagues
• Solutions enhancing quality of life and protecting local subsistence
• Pan-Arctic awareness of community, regional, and individual capabilities
• Renewable energy integration and microgrid application insights
• Expanded experience-based familiarity with microgrid energy systems
• Benefits to future microgrid projects in home country and region
• Improved access to emerging $20M USD global microgrid market

“Through ARENA, we can learn from one another and foster Arctic leadership in renewable energy development — to serve our own peoples and to solve the unprecedented global challenges facing this and future generations.” —Gwen Holdmann, Alaska Center for Energy & Power, University of Alaska Fairbanks
**ARENA Overview**

The Arctic Remote Energy Networks Academy seeks to increase human capacity and promote leadership through the creation of a knowledge exchange program emphasizing the development, operation, and management of remote energy networks (microgrids) incorporating renewable resources.

ARENA is targeted at current or emerging leaders in energy development and is designed to promote exchange of information and ideas across the arctic, as well as between arctic nations and the developing world. Its objectives and approach build on four years of multinational discussions by the Alaska Center for Energy and Power with communities, utilities, energy agencies and academic institutions to understand stakeholder needs, values and interests.

ARENA combines internet, classroom, laboratory, and field study learning opportunities, drawing from best practices established through the experience of the organizations operating in the arctic, and throughout the world. Participants will bring back to their home areas the knowledge, skills and tools that facilitate integrating clean energy technologies in their communities, and improve the management of fossil fuel resources used for power production and other local energy needs.
ARENA 2016 Pilot Program

ARENA begins with a series of widely accessible web-based seminars introducing key Arctic energy topics. It continues with approximately twenty early career energy professionals participating in a range of instructional and field learning experiences onsite in Alaska.

WEBINARS: Arctic Communities Share Their Energy Experience with the World
The webinar lecture series will introduce the fundamentals for the design, layout, application and management of remote energy networks in the production of power and heat in isolated communities. All materials will be in English, and provided as brief stand-alone topical modules. The webinars will build a common framework and foundation for participants in the onsite program, but will also appeal to a broader, more diverse audience. Webinars will be prerecorded, and available for viewing via web streaming or download. Speakers, illustrations and case studies will be drawn from multiple arctic locations. Supporting material will be downloadable.

ONSITE: Arctic Energy Professionals Learning Together
Approximately 20 early career energy professionals will be selected to participate in the Onsite Program. Consistent with funding availability, a limited number of scholarships may be available to offset some in-state travel and living expenses. The Onsite Program combines classroom learning with visits to communities operating microgrid energy systems integrated with locally available renewable energy resources. The Alaska Center for Energy and Power will host the Onsite Program in 2016 from its facilities in Fairbanks and Anchorage, with field trips to multiple sites in Alaska. Instructors, industry members, and community representatives will interact with the participants in all venues, providing the opportunity for a rich exchange of ideas, experience and questions tailored to each participant’s areas of interest. Provisions can be made to enable accrual of Continuing Education Units (CEUs).

APPLY FOR THE 2016 ONSITE PROGRAM
ARENA is intended to provide value for a wide range of energy professions. It will include Project Management (e.g., utility managers, project developers, individuals focusing primarily on overall system perspectives) and Technology, Design, and Operation (e.g., technology developers, engineers, technical personnel) areas of emphasis.

Individuals seeking to participate in the onsite portion of the ARENA program should have many of the following characteristics:

- Early-career, with energy as professional focus
- Experience-based familiarity with arctic energy systems
- Microgrid and renewable energy integration opportunities
- Strong English language communication skills

Apply using the ARENA website (acep.uaf.edu/arena).
Alaska – A "Living Laboratory" with Global Relevance

Alaska is home to more than 200 small community microgrids distributed across its geographically and environmentally diverse regions. Over the past decade, investment in renewable generation has increased dramatically to meet both a desire for greater energy independence and to reduce the cost of delivered power. It has been estimated that Alaska has approximately 12 per cent of all the microgrids worldwide that incorporate grid-scale levels of renewable generation, with more than one million hours experience every year operating these systems in some of the most challenging locations on the planet. This has led to the development of microgrids as a niche industry in Alaska, with significant experience in the design, development and operation of these hybrid energy systems.

Please see [acep.uaf.edu/arena](http://acep.uaf.edu/arena) for additional information and to apply for the 2016 Onsite Program

**ARENA Spring/Summer 2016 Webinars**

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<th>TOPIC</th>
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<td>Remote Energy Networks in the Arctic</td>
<td>Introduction to ARENA program and overview of remote energy networks across the Arctic, with emphasis on integration of locally available renewable energy resources.</td>
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<tr>
<td>Diesel Power Plants</td>
<td>Attributes of diesel-fueled power generation systems for Arctic microgrids, including current experience with their operation and control when integrated with renewable energy resources.</td>
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<tr>
<td>Variable Renewable Energy Resources in the Arctic – Solar</td>
<td>Discussion of Arctic-appropriate solar energy systems at community-scale power levels, addressing resource assessment considerations, solar photovoltaic and solar thermal options, and integration with other energy resources.</td>
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<tr>
<td>Variable Renewable Energy Resources in the Arctic – Wind</td>
<td>Discussion of Arctic wind energy resources, Arctic wind turbine technologies, Arctic-specific installation / integration challenges, and integration with other energy system elements.</td>
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<td>Electrical Energy Storage</td>
<td>Key principles, technologies and in-field examples related to the integration of electrical energy storage with diesel and hybrid diesel / renewable-energy systems.</td>
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<td>Integrated Energy Perspectives – Heat Generation and Distribution (Part I)</td>
<td>Introduction to district heating systems, discussing their attributes, options, and benefits as either stand-alone or integrated elements of an overall community energy system.</td>
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<tr>
<td>Integrated Energy Perspectives – Heat Generation and Distribution (Part II)</td>
<td>Approach for design of effective district heating systems, including requirements analysis, development of system-level architecture and component-specific attributes, and tools for predicting performance.</td>
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<td>Project Development &amp; Community Involvement</td>
<td>Principles related to community participation for understanding and focusing on local priorities and commitments, with insights from past experience (positive and negative) related to the development of sustainable energy projects in Arctic communities.</td>
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<td>Basic Economics of Remote Arctic Energy Systems</td>
<td>Identification of primary factors determining operating costs for Arctic microgrids and strategies for their mitigation.</td>
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