Microgrid Technologies Competition

Alaska Center for Microgrid Technologies Commercialization
A program supported by the U.S. Economic Development Administration, the Office of Naval Research, and ACEP

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Webinar #1 - August 4, 2017
Overview

• Introduction and meeting logistics
• Power Systems Integration team capabilities
• Power Systems Integration Laboratory overview
• Proposal guidelines for the competition
• Question & answer session

Note: All content from this webinar is in the public domain – including presentation materials, verbal comments, Chat box entries, etc. Please do not disclose any information considered sensitive or proprietary.
Meeting logistics

• All guest audio lines will be muted by the host during the presentations

• Questions should be posed via the Chat box in the meeting window, addressed to all participants

• If you have trouble, send a message to the host via the Chat box (if that doesn’t work, email Heike at hmerkel@alaska.edu)
Alaska Center for Energy and Power

- **Mission**: Develop practical, cost-effective, and innovative energy solutions for Alaska and beyond
- **People**: Faculty and staff scientists, research engineers and technicians
- **Resources**: Researchers from all disciplines, good stakeholder relations, Hybrid-Diesel and Hydrokinetics Test Beds, access to supercomputing resources
- **Funding sources**: Federal (DoE, DoD), State (AEA), Private Partnerships.
Research Objectives & Trajectories

- Increase utilization of local resources
  - Practical, cost effective, sustainable, reliable, resilient

- Diesel Power
- Diesel & some RE Power
- Diesel & lots of RE Power
- RE with diesel backup

- Electricity and some heat
- Electricity and more heat
- Heat and power delivery systems

System and Process Efficiency
ACEP Team

• Dr. Marc Mueller-Stoffels
  Director of PSI Lab
• Dr. Asher Simmons
  Postdoctoral Fellow
• David Light
  PSI Lab Engineer
• Jeremy Vandermeer
  Research Engineer
• Rob Cermak
  Programmer
• Heike Merkel
  Project Management
• Graduate Research Assistants
ACEP Power Systems Integration Lab

A 500 kW islanded hybrid-diesel grid emulator
Overview
Generation

- Caterpillar C-15 400 kVA
  - Electronically controlled
  - Woodward EasyGen 3100
- Wind Turbine Emulator 100 kVA
  - Motor-Generator Setup
  - Induction machine
- Fronius 25 kVA PV Inverter
  - Driven by Magna Power 1000 VDC 100 kW high slew rate source
  - DC bus capable of up to 100 kW PV inverters
Energy Storage System

- ABB ESSPRO (PCS100) 313 kVA
  - 6 Modules
  - High DC Voltage (500 to 1000 VDC)
  - Self-contained
    - SACE Emax AC and DC CB
    - AC800 PLC top-level control
  - Voltage-source capable
    - V/F-droop or isoc
    - Can black start lab grid
- Absolyte 1000 Ah VRLA battery
  - 270 Cells, 540 VDC nominal bus
  - ACEP custom BMS on AC500 PLC
  - Previously: Williams Hybrid Power Flywheel
    - 200 kW, 1.5 kWh, 30,000 RPM
SCADA

• Custom ‘Manual’ controls
  • Allows scripted (pre-defined) testing
• High-volume, high-speed data acquisition
  • Over 1000 channels at 3 Samples/s
  • Electrical and mechanical data
  • Modbus, CAN, UDP, TCP/IP, etc.
• ABB M+ Microgrid controller
  • Generator, Wind, PV, Energy Storage, Feeders
  • Automated dispatch based on system state
  • Soon: full diesel-off functionality
• Objective: Accelerated development and availability of microgrid technologies
  • Consultation with Alaska-based experts
  • Technology & integration testing in PSI lab

• 3 Technology Seed awards – up to 125 hours (each)
• 1 or 2 Microgrid Project awards – up to 40 days total in PSI lab
• Total value: $308,000 (no cash awards will be made)

• Awards based on recommendations from independent advisory team’s review of application packages
Technology Seed award

- Research & Development support
  - Design reviews and consulting
  - Assistance with drafting, specification development, identification of necessary improvements, support of software development, interface specification, model development, etc.
- 125 hours of ACEP PSI team labor
- Maximum duration: 6 months
Microgrid Project award

- Provides access to ACEP PSI lab and staff for in-system consultation & testing
- 40 dedicated lab days to address:
  - R&D and review work
  - Re-tooling of PSI Lab & installation of awardee’s equipment (cost of materials excluded)
  - Operation of lab for component / integration testing (PSI Lab equipment operated solely by ACEP Staff)
- Maximum duration: 12 months
The Application

- Application contents:
  - Technology, product, or service description
  - Project plan
  - Financial plan
  - Commercialization plan
  - Market analysis
- SBDC resources available to assist with development of application contents
- Email as PDF to acmtc.competition@alaska.edu no later than 11:59 PM (Alaska time) on 1 Sept 2017
Application evaluation criteria (1/2)

• Positively impact microgrids by increasing technical efficiency, renewable contribution, and stability
• Consistent with technical and safety protocols
• Compatible with program budget & schedule
• Leads to commercialization
• Applicant provides supplemental resources
  • Matching funds - cash for additional ACEP staff time and/or lab time
  • In-kind awardee labor
  • In-kind hardware for integration of awardee equipment
Application evaluation criteria (2/2)

• Potential for large economic impact
  • Reduction of energy cost in remote microgrids
  • Creation of jobs in U.S. EDA Western Region (with preference on Alaska)

• Proof of concept, a prototype, and/or intellectual property ownership

• Business ownership and/or business plan

• Letter of endorsement from Alaska utility

• Physical presence in U.S. EDA Western Region
Key dates for 2017

☑️ Aug 2 - Statement of interest
☑️ Aug 4 – Webinar #1
☐ Aug 21 – Webinar #2
☐ Sept 1 – Applications due (by 11:59 PM Alaska)
☐ Nov 10 - Communication of results
• Please post all questions during the webinar via WebEx chat box.
  • Responses will be provided in real time when possible and posted at the program website.

• Post-webinar questions can be submitted via email to acmtc.questions@alaska.edu
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146 New Businesses in 2016

$19M Capital Infusion in 2016
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Adventure Guru
Alirmed Medical Apparel
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Alaska Dinner Factory
Alaska Flying Adventures
Alaska Premier Closets, LLC
Alaska Premier Services
Alaskan Sweet Thing's
Aqua Vac
Architectural Hardware Supply
Arkose Brewery
Artworks
Ascension Rock Club
Authentic Alaska Travel
Badger Towing and Recovery LLC
Bateau Bridal Boutique
Be Happy Home Maintenance
Becoming Images
Birch Leaf Chapel
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Bolding's Enterprises, LLC
Bright Minds Learning Center
Brown Bear Espresso
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Denali Bio Technologies, Inc.
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Israeli Krav Maga Alaska
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Lemon Tree Family Medical
Lime Solar
Midnight Sun Home Care
Mrs. Claws Chocolate Bar
Naknek Family Fisheries
Nauti Otter Inn
Nida's Party Creations
Nomad Shelter
Northern Comfort
Northwest Van Campers
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NSEW Awards
Ohlson Mountain Mineral Springs
Onsite Wellness Network LLC
Pingo Bakery-Seafood House
Piter Drilling & Pump Alaska
Port Chilkoot Distillery
Rainbow Fiberglass & Boat Repair, LLC
Rock-On Climbing
Russell's
Sea Fur Sewing
Sipping Streams Tea Company
SkyTrek Alaska
Sound Reinforcement Specialists
Sound Web Solutions
Stonetree Veterinary Clinic
Sustainable Design Group, LLC
Summit Spice & Teas - The Sweet Smells of Success
Sweet Chalet
Terra Bella Organic Coffee
The Barista Cats
The Boardroom
The Hoarding Mammot
The Rookery
The Salon
The Silva Chair
The Spice & Tea Exchange
Tranquil Healing Community
Trax Outdoor Center
TSS, Inc.
V's Cellar Door
Wild Scoops
William Fraser Digital Creative Agency
Willet House Chocolate Company
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Wylie Inc.
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