



January 23, 2012

Re: ACEP/AEA Partnership on the EETF Program

Dear Applicant:

We are pleased to announce a new partnership between the Alaska Center for Energy and Power (ACEP) and the Alaska Energy Authority (AEA) centered on the Emerging Energy Technology Fund (EETF). ACEP is an applied energy research program at the University of Alaska Fairbanks, with a focus on technologies that can reduce or stabilize the cost of energy for Alaskan communities with high energy costs. We believe an AEA/ACEP partnership will strengthen the EETF program by taking advantage of existing University resources and infrastructure to support interested applicants and assist AEA with program management. The details of the partnership are outlined in an MOU that is available for review on the AEA website, and includes 2 main areas related to the program as follows:

- 1) ACEP will assist AEA in managing the program, by providing staff to assist with development of the RFA, technical review of applications to support the Advisory Committee, and data collection and interpretation once projects are funded and developed.
- 2) ACEP will make University-owned testing and research facilities operated by ACEP available on a contractual basis, to any successful applicants to the EETF at a state-negotiated reduced rate. AEA and ACEP believe that having an option to use these facilities will strengthen the public-private partnerships established through this program and result in significant cost savings to both applicants and to the State of Alaska. To facilitate this process, we have published rates and information on existing equipment and capabilities associated with our Diesel Engine Testbed, Hybrid Applications Laboratory, and Nenana Hydrokinetic Test Site.

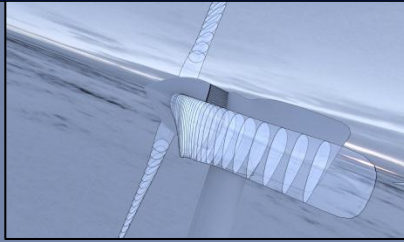
On the following pages, you will find additional information on ACEP's facilities and rates. These published rates are intended to provide a guideline for costs associated with use of these facilities; for a firm quote or questions related to our ability to run a specific test please contact ACEP Research Manager Brent Sheets at 907-474-1194 or brent.sheets@alaska.edu.

We wish you luck with your proposals, and hope to have the opportunity to work with you in the near future.
Sincerely,

Gwen Holdmann
Director, ACEP
Sincerely,

Gwen Holdmann, Director
Alaska Center for Energy and Power
University of Alaska Fairbanks
Gwen.Holdmann@alaska.edu
(907) 590-4577

Alaska Center for Energy and Power



Diesel Test Bed and Hybrid Applications Laboratory

Meeting the needs of Alaskans

'ACEP plays a critical role in the state's energy industry, assessing and validating technology for Alaskans and serving as a laboratory where emerging solutions can be researched, improved, and matured for deployment'

- Ethan Schutt, ACEP Advisory Committee Chair and CIRI Senior Vice President for Lands and Energy

With over 300 islanded communities that rely on diesel or diesel-hybrid power and some of the highest energy costs in the nation, Alaska has a strong interest in improving the performance of both new and existing systems. In response to this need, ACEP has established a Diesel Test Bed and Hybrid Application Laboratory. Designed for maximum flexibility, these systems are capable of testing a range of microgrid and distributed generation scenarios as well as individual components in a controlled setting prior to installation in the field. These facilities are located at ACEP's newly completed Energy Technology Facility on the University of Alaska Fairbanks campus. Existing hardware and software integral to the test beds include:

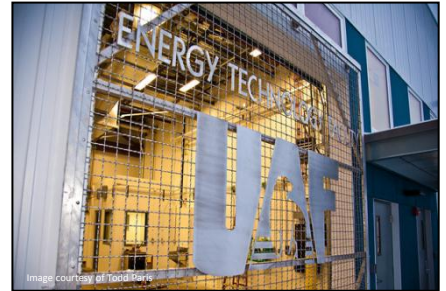
- 100kW wind turbine simulator (3-phase 480 VAC 60 Hz input motor coupled to a 3-phase 480 VAC 60 Hz output induction generator).
- Grid-forming Energy Storage Power Converter (200 kva 480 VAC 60 Hz).
- MatLab/Simulink model of diesel generator, inverter, battery and primary loads.
- Load banks to simulate village or industrial loads (250 kW/208 VAC).
- Lead acid battery bank (336 VDC, 896Ah).
- High resolution data acquisition capabilities.
- 125 kW, electronically controlled Detroit Diesel gen-set with data acquisition capabilities including fuel flow, intake air mass flow, electrical output, intake air temperatures and pressures at each stage, coolant temperatures, engine vibration data, real time combustion pressures, exhaust temperature, ambient air temperature, humidity, and barometric pressure. In addition, the ETF facility can accommodate up to three additional diesel engines.
- Emissions analysis equipment includes CO, O₂, NO_x, and SO₂ with future plans to add particulate monitoring equipment. EPA certified emissions testing can be performed through a third party contractor.



Current Testing Capabilities

ACEP's flexible test bed architecture permits a wide range of testing capabilities, and are available to industry on a contractual basis. For details on a particular application, please contact us directly. Examples of potential research topics include:

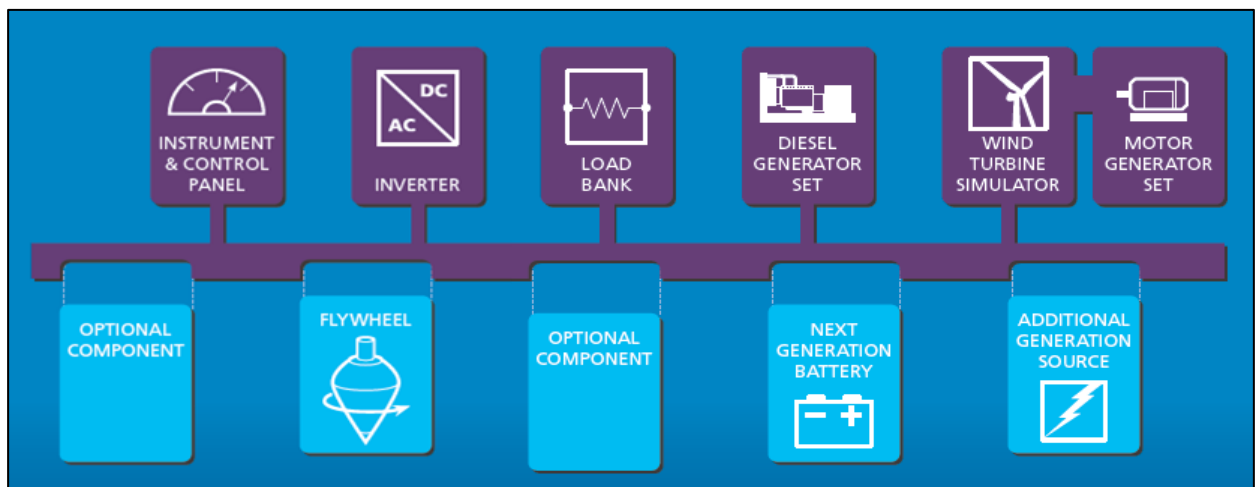
- Validation and demonstration of grid stability and power quality for proposed hybrid power systems.
- Characterization of individual power components to verify performance claims, document and investigate reliability issues, and verify interoperability between components.
- Testing to support the development of products designed to improve performance of remote power systems in energy efficiency, emissions, and energy cost.
- Development and testing of control strategies and advanced storage technologies to support operation in a diesel-off mode.
- Assessing and testing strategies for using excess power from renewable resources for space heating and other, non-power applications.
- Advanced modeling and model verification of diesel hybrid systems for grid optimization.
- Waste heat recovery and utilization for diesel gen-sets, including jacket water and stack heat recovery.
- Fuels and fuel additive testing.



ACEP's primary research facility is a 5000ft² dedicated energy research laboratory located on the UAF campus



Hybrid Applications Laboratory
Wind Turbine Simulator



For more information or rates, please contact:

ACEP Research Manager Brent Sheets at (907) 474-1194 or brent.sheets@alaska.edu

Alaska Center for Energy and Power

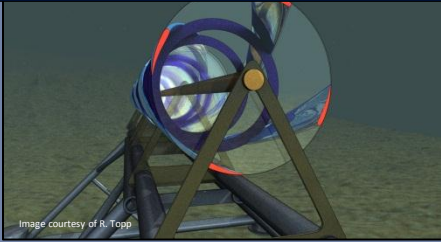


Image courtesy of R. Topp



Image courtesy of J. Paris



Image courtesy of T. Paris

Hydrokinetic Test Bed and Mobile Test Capability

Meeting the needs of Alaskans

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Alaska has an interest in pioneering the use of hydrokinetic energy, with over 100 islanded communities located next to rivers with significant hydrokinetic power potential and some of the highest energy costs in the nation. In response to this need, ACEP has established a hydrokinetic device test bed on the Tanana River in Nenana, Alaska, and mobile hydrokinetic testing capability for device testing at other locations.

Designed for maximum flexibility, the hydrokinetic test bed is capable of testing surface and subsurface deployed hydrokinetic devices, measuring river flow conditions, and monitoring device performance. The Nenana test bed is well characterized and has completed baseline fish studies that are required before device testing can be conducted. Experienced engineers and fisheries biologists are available to facilitate the setup, including working with customers to obtain necessary permits, and to conduct data collection and analysis as desired. In addition, mobile test capabilities to characterize other test locations and monitor river conditions and device performance is available.

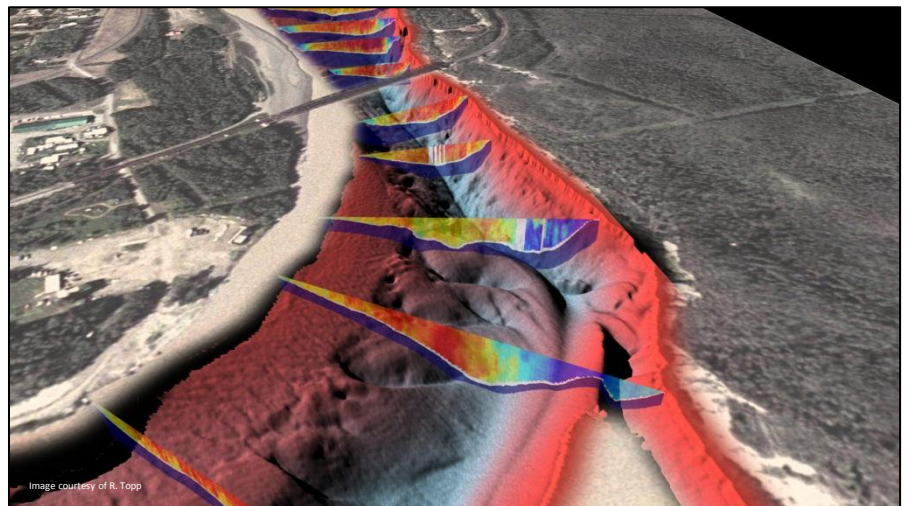
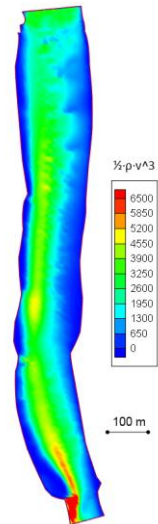


Image courtesy of R. Topp

Nenana is served by major rail and highway infrastructure and offers a variety of technical services to deploy, recover, and modify or repair devices under test (e.g., welding, tugs, barges, and a dock-operated crane).

Integral hardware and software components

- Acoustic Doppler Current Profilers (ADCPs) to measure current velocity and turbulence.
- Sonar and side scan sonar for bathymetric and riverbed characterization and Echoview software for data analysis.
- Anchoring locations (at the Nenana test bed).
- Floating platforms and boats.
- River modeling capability to extend river measurements to determine optimal locations to install devices to maximize power and reduce river debris impacts.
- River surface debris diversion system.
- Inclined plane fish trap.



Understanding power density and turbulent flow is critical to proper siting of hydrokinetic devices.

Current Testing Capabilities

- Advanced river characterization measurement and modeling to evaluate the state of the river during testing or to identify the optimal location to place a device.
- An installed anchor attachment point for surface or subsurface deployment.
- Characterization of the effect of a hydrokinetic device on fish (required by Alaska Fish and Game as a condition of receiving a permit to conduct tests).
- Capability to measure and evaluate device performance as a function of river conditions (current velocity, turbulence).



ACEP's researchers conduct frazil ice studies to assess potential impact to devices operating in cold weather conditions .



ACEP works closely with UAF's School of Fish and Ocean Sciences to conduct fisheries research related to deployment of hydrokinetic devices in Alaska's

For more information or rates, please contact:

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