ACEP’s Energy Technology Testing Facilities

ACEP’s facilities are designed to offer a testing environment to technology developers. Envisioned as an intermediate step to full commercial deployment, these test facilities have been carefully designed to be easily reconfigured for a range of testing needs, thus permitting assessment of product performance based on many real world conditions.

Power Systems Integration Lab

The Power Systems Integration Lab operates on the same scale as a village power system, and has the ability to be modified for individual test scenarios. The lab transforms a potentially chaotic field testing environment into a continuously improving process for optimizing efficiencies.

Designed for maximum flexibility, this system is capable of testing a wide range of islanded microgrid and distributed generation scenarios, as well as the performance of individual components. Examples include next generation utility energy storage such as innovative battery systems and flywheel technology, diesel-off operation, power electronics development and testing, and model verification.

**PERMANENT TESTBED COMPONENTS**

- 100 kW wind turbine simulator (VFD-controlled 3-phase 480 VAC 60 Hz input motor coupled to a 3-phase 480 VAC 60 Hz output induction generator)
- Energy storage power converter (160 kVA 480 VAC 60 Hz 3-phase)
- MATLAB/Simulink model of diesel generator, inverter, battery and primary loads
- Ability to connect with the Diesel Testbed to test various arrangements of distribution grid models and inter-operability scenarios
- Programmable reactive load banks to simulate actual village or industrial loads (250 kW 208 VAC 3-phase and 250 kW 480 VAC 3-phase)
- Lead acid battery bank (336 VDC, 1000 Ah)
- Distributed control system
- High-resolution data acquisition equipment
ACEP's Tanana River Test Site is used to test hydrokinetic power-generating devices, related technologies, and to characterize the river environment under realistic Alaska river conditions.

Researchers and industrial clients can use the test site to assess interaction between hydrokinetic devices and the environment in a controlled fashion at a well characterized site. Examples include fish interactions, debris management, turbine placement, hydrodynamic analysis, sediment transport and icing. Information collected from these studies is also used by permitting agencies to inform and streamline their decision making process.

HYDROKINETIC TEST SITE FEATURES

- Potential deployment locations have been identified based on river velocity, bathymetry, sediment transport, hydrodynamics, power density and turbulence.
- Mandatory baseline fish stock studies have been completed for the site.
- Demonstrated technology to divert surface woody debris, a major impediment of operating devices in Alaska, is available to all users; A prototype for protecting devices from subsurface debris is in development.
- The site's anchored mooring system, located mid-channel, supports a floating platform able to secure a load up to 50,000 pounds.
- AHERC has various imaging devices in its inventory, including:
  - Blue View P900-2250-45 imaging sonar
  - Acoustic Doppler Current Profiler
  - Simrad EK60 split beam sonar (120 kHz)
  - Novatel RTK/L1 positioning system (20 cm accuracy)
- All required permits are secured. Placement of turbines in river is subject to final regulatory review.

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