Data Collection and Management (DC&M) Program

**Mission:** To support Alaska communities, agencies, and utilities in the collection, management, and dissemination of high quality technical energy data.
DC&M Program Objectives

• Facilitate data-driven decisions, design, analysis
• Reduce data “friction”
• Support robust, high-quality research
• Open data
• Cooperation, synergy, and compatibility
• Communicate Alaska experience and expertise
DC&M Program Services

Collection
- Instrumentation, acquisition, programming, technical assistance

Management
- Processing and standardization, quality assurance, archiving, access

Product
- Project-specific tasks (reporting, analysis, dissemination, etc.)
## DC&M Program Team

<table>
<thead>
<tr>
<th>Photo</th>
<th>Name</th>
<th>Position</th>
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<tbody>
<tr>
<td><img src="image1.jpg" alt="Jason Meyer" /></td>
<td><strong>Jason Meyer</strong></td>
<td>Program Manager</td>
</tr>
<tr>
<td><img src="image2.jpg" alt="Tom Johnson" /></td>
<td><strong>Tom Johnson</strong></td>
<td>Research Engineer</td>
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<td><img src="image3.jpg" alt="Heike Merkel" /></td>
<td><strong>Heike Merkel</strong></td>
<td>Data Manager</td>
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<td><img src="image4.jpg" alt="Chris Pike" /></td>
<td><strong>Chris Pike</strong></td>
<td>Research Engineer</td>
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<td><img src="image5.jpg" alt="Brendan Babb" /></td>
<td><strong>Brendan Babb</strong></td>
<td>Data Manager</td>
</tr>
<tr>
<td><img src="image6.jpg" alt="Nathan Green" /></td>
<td><strong>Nathan Green</strong></td>
<td>Student</td>
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DC&M Program Infrastructure

**Arctic Region Supercomputing Center**
- Computing services
  - Linux workstations
- Website services
  - Alaska Energy Data Gateway
- Storage services
  - Bigdipper (9 TB)
  - Automated tape library (29 PB)

**Alaska Energy Data Gateway**

The Alaska Energy Data Gateway (AEDG) is a public resource funded by a grant from the Department of Energy’s E2SCOR program. It provides comprehensive energy data to assist communities in their decision-making processes. The data can be accessed through their website or via the Alaska Energy Data Gateway (AEDG), which is available to anyone with an internet connection. The site includes a variety of tools to help users navigate and analyze the data, including a data search tool and a fuel price survey data tool.
Overview of RSA #1420
RSA Summary

• Develop REF “data oversight services” with ability to:
  ▫ Collect accurate and appropriate performance data
  ▫ Measure and report project effectiveness

• ACEP products include:
  ▫ Data processing, management, archiving, and dissemination (methods, tools, and infrastructure)
  ▫ Automated reporting
  ▫ *Data collection plans

• Utilized historic data from relevant projects
  ▫ Cordova, Nome
Data and the REF

• Data critical to informing funding decisions, project design, best practices, lessons learned, project/program performance, etc.
• Limited technical performance data available, especially at higher resolution
• Current reporting could significantly benefit from automated data collection
• Publicly funded projects, publicly available data
Value of High Resolution Data

- Increased complexity of energy systems rely on data-driven design and analysis
  - Integration of renewables, system optimization
- High resolution data needed for modelling efforts
  - Power-flow studies, power integration, HOMER
- In many cases, already generating high resolution data, just “throwing it away”
“Making data more “liquid” (open, widely available, and in shareable formats) has the potential to unlock large amounts of economic value, by improving the efficiency and effectiveness of existing processes; making possible new products, services, and markets; and creating value for individual consumers and citizens.”
Summary of RSA #1420 Activities
Data Work Flow

Alaska Energy Data Gateway

Alaska Energy Data Gateway :: technical data portal
Data Processing Stages

- **Raw (.CSV) Data**
  - Formatting
  - Field correction

- **Raw Matlab Data**
  - Time standardization/conversion
  - SI unit conversion

- **Q/A Matlab Data**
  - Filtering (thresholds, data irregularity)
  - Calculated values, statistics

- **Q/A NetCDF Data**
  - Metadata addition
Data Processing Considerations

- Use of state/national/international IDs and standards
- Improper use of commas, tabs
  - 6,030
- Extraneous information
  - Headers, proprietary system information
- Missing information
  - Metadata
- Time conversion, synchronization
  - Coordinated Universal Time (UTC)
Nome Joint Utility System

- 2 years of data, 132 weeks
  - May 2011 – October 2013
  - New turbines online April 2013
- 1 second or less data, CSV format
  - 1,056 files
- 99 channels / 127 channels
- NJUS uses Canary Labs
  - Limiting data format (CSV or Excel) and proprietary interface
  - Not meant for data dissemination, public interface
  - No modelling ability
- Initial file processing:
  - 1 week, 14 channels, ~400 MBs
  - >3 million rows on Excel
- Optimized file processing
  - 33 days to process 132 weeks
  - 11 hours utilizing ARSC services
- Matlab file is 15x smaller
  - Channel data and time stamp
- Monthly netCDF file for each channel with all metadata
Cordova Electric Cooperative

- 1 year of data
- 1 second data, CSV format
- 56 channels
  - Orca Diesel, Humpback Creek and Power Creek Hydroelectric
- Hard drive download
  - 15hr download
- CEC uses Canary Labs
Orca Diesels, 1 Year
Orca Diesels, 1 Week
Orca Diesels, 1 Day
Orca Diesels, 12 Hours
Orca Diesels, 1 Hour

![Graph showing Generator Power (kW) over time]
Summary of RSA #1420 Products
Automated Reporting

- Reporting that is automatically produced and published
  - Customized time-scales, data resolution, audiences, content
- Quality assurance a key aspect to reporting
- Examples:
  - Weekly Report, Annual Report
  - “Roll-Up” / Program / Summary Report
- Collaboration with ISER Program/Project Reporting
Please select required files below and place in the shopping cart:

**Location:** Cordova

**Technology:** Diesel Generator

- Cordova-OrcaDieselPlant-BusP02012-1B-01T000000Z@P1M0PT1S.nc
- Cordova-OrcaDieselPlant-BusP02012-11-01T000000Z@P1M0PT1S.nc
- Cordova-OrcaDieselPlant-BusP02012-12-01T000000Z@P1M0PT1S.nc
- Cordova-OrcaDieselPlant-BusP02013-01-01T000000Z@P1M0PT1S.nc
- Cordova-OrcaDieselPlant-BusP02013-02-01T000000Z@P1M0PT1S.nc
- Cordova-OrcaDieselPlant-BusP02013-03-01T000000Z@P1M0PT1S.nc
- Cordova-OrcaDieselPlant-BusP02013-04-01T000000Z@P1M0PT1S.nc
- Cordova-OrcaDieselPlant-BusP02013-05-01T000000Z@P1M0PT1S.nc

**Technology:** Hydropower Turbine

- Cordova-PowerCreek-BusP02012-11-01T000000Z@P1M0PT1S.nc
- Cordova-PowerCreek-BusP02012-12-01T000000Z@P1M0PT1S.nc
- Cordova-PowerCreek-BusP02013-01-01T000000Z@P1M0PT1S.nc
- Cordova-PowerCreek-BusP02013-02-01T000000Z@P1M0PT1S.nc
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- Cordova-PowerCreek-BusP02013-05-01T000000Z@P1M0PT1S.nc
- Cordova-PowerCreek-BusP02013-06-01T000000Z@P1M0PT1S.nc

Download
Continuing Efforts

- Additional filters for data identification and selection
- Enhanced data retrieval based on archiving
- Increased integration of Alaska Energy Data Gateway
- Cross-database functionality (scripts, APIs, etc)
- Retrieval, export, and file format tools
- “Low resolution” product
  - Socrata, ckan
- Optimized processing, data receipt
Contact Information

Jason Meyer
Program Manager
Data Collection & Management
Alaska Center for Energy and Power
jason.meyer@alaska.edu
(907) 272-1521

https://akenergygateway.alaska.edu

Project Partners and Contributors

- Alaska Energy Authority
- Department of Energy
  - Experimental Program to Stimulate Competitive Research
- Institute of Social and Economic Research
- Arctic Region Supercomputing Center
- Cordova Electric Cooperative