



Data Center Sector Meet-Up

2019 Better Buildings Summit

Wednesday, July 10th

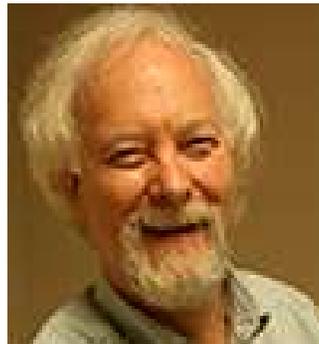
10:30-12:30PM



Welcome & Introductions



Rachel Shepherd
DOE
Data Center Lead



Dale Sartor
LBNL
Data Center
Subject Matter
Expert



Ryan Livingston
Allegheny Science
and Technology
Account Manager



Izzy Ballet
RE Tech Advisors
Account Manager

Around the Room

Please Share:

- *Your Name*
- *Your Organization*
- *Your Role*

- What are you working on? Any exciting projects and/or a challenge that you are working through?



Better Buildings Data Center Challenge Partners



IRON MOUNTAIN

SABEY
Data Centers



DIGITAL REALTY

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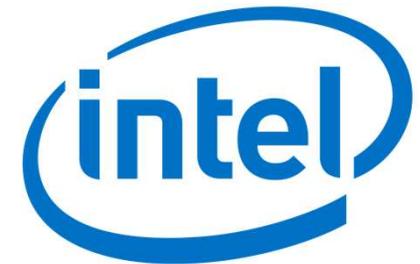


MICHIGAN STATE
UNIVERSITY

Schneider
Electric



CenturyLink



Better Buildings Data Center Accelerator Partners

- Argonne National Laboratory
- Georgia Institute of Technology
- Lawrence Livermore National Laboratory
- National Energy Research Scientific Computing Center
- U.S. Department of Justice – Drug Enforcement Agency (DEA)
- U.S. Social Security Administration (SSA)
- Defense Health Agency (DHA)
- Department of Defense - DISA
- Los Alamos National Laboratory
- National Renewable Energy Laboratory
- U.S. Department of Veterans Affairs (VA)
- University of Colorado
- Environmental Molecular Sciences Laboratory
- Lawrence Berkeley National Lab
- NASA Armstrong Flight Research Center
- Oak Ridge National Laboratory
- U.S. Environmental Protection Agency (EPA)
- Stanford University

Better Buildings Data Center Accelerator – Data Parameters

	Agreement Signed before Dec. 2014		Agreement Signed after Dec. 2014	
Partnership Agreement	<p>Baseline Data</p> <p>Partners can pick a baseline year anytime between the year their agreement was signed to three years prior.</p>	<p>5th Year Data</p> <p>Partners are expected to submit data for the fifth year after their baseline year.</p>	<p>Baseline Data</p> <p>Partners can pick a baseline year between the year their agreement was signed and three years prior.</p>	<p>Baseline Data</p> <p>Partners are expected to submit data for the last year of the accelerator (2019).</p>
Example	<p>Partner joined May 2013. Partner picks baseline year Oct. 2012 – Sept. 2013 and submits data.</p>	<p>Partner submits data for Oct. 2016 – Sept. 2017.</p>	<p>Partner joined in Jan. 2016. Partners picks baseline year Jan. – Dec. 2016 and submits data.</p>	<p>Partner submits data from Jan. – Dec. 2019</p>

Better Buildings Data Center Accelerator – Data Collection

The goal of a data center partner is to reduce data center infrastructure energy (or PUE -1) by 25% over 5 years.

Data Requested	Method to Submit Data
<ul style="list-style-type: none">• Property Information (name, location, type)• Type of data (weather-normalized or adjusted)• Stand alone or embedded data center• Annual IT energy usage (kWh)• Annual total data center site electricity use (kWh)	<ul style="list-style-type: none">• Share information through Portfolio Manager• Fill out Better Buildings reporting template• Partner provides their own spreadsheet / form

Better Buildings Data Center Accelerator - Timeline

March 2019

Baseline year selected

Method for submitting data determined

May 2019

Baseline year data due

Dec. 2019

5th year or 2019 data due
(depending on when agreement was signed)

Better Buildings Program Updates

- **Opportunities to get involved**

1. Waste Reduction Pilot

- Set public goal in partnership with DOE
- Network with peers to share waste reduction solutions and earn recognition
- Receive guidance from DOE and other organizations on issues such as waste data tracking and waste management best practices, and

2. Technology Research Teams (see following slides)

Engage with the Technology Research Teams

Plug and Process Loads Team

- Covers best practices and innovative technologies for controlling these loads in commercial buildings. PPLs are expected to increase with respect to the other building end use energy loads, and now is a great time to get involved.
- Lead: Kim Trenbath: kim.trenbath@nrel.gov



Smart Energy Analytics Campaign

- Look for Eliot Crowe to talk about the Energy Information System (EIS) or Fault Detection and Diagnostics (FDD) tools you have implemented in your buildings, and how you can get started with a monitoring-based commissioning process.
- Lead: Eliot Crowe**: ecrowe@lbl.gov

Envelope Tech Research Team

- Air infiltration accounts for 20% of primary energy consumption in buildings. Learn more about advanced window, wall, and roof technologies to improve your building enclosure.
- Lead: Melissa Lapsa: lapsamv@ornl.gov



Contact your Account Manager for Introductions!

Engage with the Technology Research Teams

Interior Lighting Campaign

- Facility owners and managers can receive guidance and recognition for lighting upgrade or new installation of high efficiency interior lighting solutions.
- Lead: [Michael Myer**](#): Michael.Myer@pnnl.gov



IoT Lighting Challenge

- Facility owners and managers can help define the performance characteristics of a competitively priced new-to-market light fixture that will be easily upgradable to provide for internet connectivity. Connect to learn more or participate in the IoT Lighting Challenge.
- Lead: [Michael Myer**](#): Michael.Myer@pnnl.gov

Space Conditioning Team

- Commercial HVAC accounts for about 40% of total commercial energy use in the US. Through the Space Conditioning Technology Research Team, partners work to deploy energy-saving space-conditioning strategies by partnering with industry, coordinating real world building demonstrations, and generating tools.
- Lead: [Miles Hayes**](#): Miles.Hayes@nrel.gov



Contact your Account Manager for Introductions!

Join us!

Better Buildings Alliance *Renewables Integration* Team

Buildings-to-Grid Working Group

FOCUS AREAS:

- Strategic integration of renewables
- Energy storage
- Building load flexibility
- Grid coordination



EFFICIENT



CONNECTED



SMART



FLEXIBLE

- Bimonthly, 1-hour conference calls
- Kick-off meeting in early August
- Also looking for participants for two studies:
 - **Portfolio analysis:** understand potential for load flexibility (optimized demand management)
 - **Field study:** implementing building load flexibility solutions

Interested? Email us!

Rois Langner: Rois.Langner@NREL.gov

Selam Haile: Selam.Haile@NREL.gov

Open Discussion

Open Discussion Topics

- Warm Liquid Cooling
- Workforce Development
- The “Edge” (small data centers close to the end user yet integrated with larger central facilities)
- DOE/Better Buildings Expanded Initiatives
- Other Topics?

Topics/Areas of Interest From Recent Partner Discussions

- Benefits of top-down culture of energy efficiency
- Submitting data via Portfolio Manager, Metering, and accurately tracking PUE
- PUE, WUE & other KPIs and metrics
- Modular data center design, high density, and scalability
- Energy Modeling
- Technology Research Teams, “Tech Teams”
- Edge computing
- IT vs OT vs IoT (and iloT)
- Liquid cooling
- Consolidation
- Managing efficiency when transitioning from legacy to new system
- Energy vs Water
- Other Topics

Warm Liquid Cooling

- What is holding back wider adoption of warm liquid cooling in data centers?
- When do you anticipate seeing a tipping point?
- Will an open specification to encourage a multi-vendor solution help?
- How can liquid cooling be deployed in a co-lo environment?
- How can reuse of waste heat be encouraged?

Workforce Development

- What are your workforce development needs relative to energy efficiency in data centers?
- How well has the DCEP program addressed those needs? What could be improved?
- Besides DCEP, are there other activities we (as the data center community) could promote to assure a current and future workforce is capable of optimizing energy performance?

The “Edge”

- Do you see the “Edge” coming, and if so, how do you define it?
- What will be the impact of edge data centers on energy efficiency? Will they be any more energy efficient than existing small data centers?

DOE/Better Buildings Expanded Initiatives

- In the past year BB partners have been asked about water efficiency and increasing their savings targets; what other activities should we pursue?
- How can DOE and BB partners collectively help each other and the rest of the industry?
- What else should DOE be doing, what tools and resources are missing?

Thank You

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