

PROGRAM

# CONNECTED BUILDINGS CHALLENGE DEMONSTRATION

August 3, 2016

Seattle, WA | Smart Buildings Center



**Pacific Northwest**  
NATIONAL LABORATORY

*Proudly Operated by **Battelle** Since 1965*

U.S. DEPARTMENT OF  
**ENERGY**

*Truly connected smart buildings should not only benefit their users without needing intensive user intervention, but should also benefit the larger community as a whole by helping strengthen the grid and build a more resilient and reliable utility network. With our partners, the Connected Building Challenge aims to deliver infrastructure, intelligence, support, and connections to scale any developed solution without limits.*



Nora Wang, Project Lead for the Connected Building Challenge

## A SPECIAL THANKS GOES TO OUR PARTNERS



We'd also like to thank the following for their great support

**Connected Building Challenge Team:** Xiaoli Duan, Alex Vlachokostas, Shannon Bates, and Shannon Colson

**VOLTRON Development Team:** Bora Akyol, Robert Lutes, Jereme Haack, and Srinivas Katipamula

**Cloud Architects:** Clay Hagler and Matt Macduff

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# AGENDA

TIME	ACTIVITY
<b>8:30 - 9:00</b>	Registration
<b>9:00 - 9:15</b>	Welcome and Overview (Stan Price)
<b>9:15 - 9:30</b>	Vision and Challenge (Nora Wang)
<b>9:30 - 10:45</b>	<b>Project Pitches</b>
9:30 - 9:45	Team 1: Enerphant
9:45 - 10:00	Team 2: Neighborhood Air-Conditioning Coordinator
10:00 - 10:15	Team 3: OPAS
10:15 - 10:30	Team 4: Smart Building Re-Tuning with VOLTTRON
10:30-10:45	Team 5: VENTOS – Scheduler
<b>10:45 - 11:00</b>	Break
<b>11:00 - 12:00</b>	Research & Industry Collaborations
<b>12:00 - 1:30</b>	Tech Fair & Lunch
<b>1:30 - 2:15</b>	Judge Panel Feedback
<b>2:15 - 2:45</b>	Open Discussion: Accelerating the Market (Sean McDonald)
<b>2:45 - 3:00</b>	Closing Remarks (Joe Hagerman)
<b>3:00 - 4:30</b>	Ceremony & Social
<b>4:30</b>	Adjourn

## CHALLENGE TEAMS

### Enerphant

**Team Members:** Warodom Khamphanchai, Thamrongpan Chaiyamas, and Tony Chotibhongs

**Description:** Many consumers want to understand their electricity bill, and are looking for ways to save money. Enerphant, a free mobile app, offers a simple way for utilities to communicate with end-use customers in real-time, especially during peak period when there is the most need to reduce power demand.

### Neighborhood Air-Conditioning Coordinator

**Team Members:** Andy Hjortland, Donghun Kim, and Jim Braun

**Description:** Today, there simply isn't an effective demand response program for the residential sector. Our supervisory control system for residential HVAC systems uses web-connected thermostats to reduce peak electrical demand by coordinating when systems are used.

### OPAS (SES Consulting)

**Team Members:** Nigel David, Han Bao, David Putney, Rav Clair, Christopher Naismith, and Arrvindh Shriraman

**Description:** Low-cost control solutions can be difficult to find. Our VOLTTRON web-based solution will allow engineers to quickly find energy conservation measures (ECM), owners to easily verify effectiveness of their ECM investments, and occupants to view their building's performance relative to others.

### Smart Building Re-Tuning with VOLTTRON

**Team Members:** Da-Wei Huang, Kirk Tryone Shillingford, and Marco Ascazubi

**Description:** Many buildings are lacking automation systems. Our solution utilizes building re-tuning concepts and VOLTTRON for rule-based processing of system performance and weather data. Time-series visualizations can help optimize building operations and educate operators.

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## VENTOS – Scheduler

**Team Members:** Lourdes Gutierrez, Priyank Kapadia, and Saurabh Wani

**Description:** Energy is wasted by overcooling/reheating buildings that assume full occupation. But occupancy can be predicted on educational buildings and office buildings with scheduled events and VAV systems. VENTOS integrates different sources of data with different building automation protocols.

## JUDGES

### Joe Hagerman



**Joseph Hagerman** is a Senior Advisor at the U.S.

Department of Energy's (DOE) Energy Efficiency and Renewable Energy Office focusing on building energy efficiency and new building technology development. He is at the forefront of the effort to develop clean, healthy, competitive building technologies for the 21st century.

Mr. Hagerman oversees all of BTO's grid integration activities, various negotiated federal regulatory and related matters, and new initiatives for the program & including all activities on smart and connected equipment, cybersecurity in buildings, and interoperability.

Before joining DOE, Mr. Hagerman was the project manager for the Building Technologies group at the Federation of American Scientists (FAS). At FAS, Mr. Hagerman conducted research in new building technologies while demonstrating these technologies in the public sector. His efforts helped address environmental and energy injustice in affordable housing. Mr. Hagerman received his Bachelor of Architecture from Mississippi State University and his Masters in Civil Engineering at the Fu Foundation School of Engineering at Columbia University. His academic work focused on engineering mechanics and construction technology.

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### George Hernandez



**George Hernandez** joined PNNL in 2009 and works in the Advanced Building Controls group. Mr. Hernandez is a Staff Scientist and senior demand side management professional and is on detail at the Department of Energy. While at DOE, he has co-authored the High Performance RTU Challenge, the Buildings Performance Database, the Low Cost Wireless Metering Challenge, Energy Information Handbook, the Portable Sensor Suitcase, Open Source Small Building Control System, and the Transactional Network project.

Most recently, as Chief Evangelist, he assisted with the development and commercialization of an open source software platform called VOLTTRON, used to deploy Transactional Control strategies for buildings to grid integration. Mr. Hernandez has extensive knowledge, skills, and capabilities derived from a substantial career in demand side utility management across a wide variety of commercial and industrial sectors and utilities as both a corporate employee and an independent consultant. Mr. Hernandez received his BS in Mechanical Engineering from California State University and his Masters in Mechanical Engineering from The University of California at Berkeley. He is a Licensed Professional Engineer (PE) by the State of California.

### Jereme Haack



**Jereme Haack** is a Senior Research Scientist at PNNL. For the past 4 years he has been a co-lead for the VOLTTRON™ platform which enables deploying agent-based solutions at the edges of the smart grid and in buildings to improve energy efficiency and load responsiveness. This platform serves as an integration point for devices, remote resources, and agent applications, thereby greatly decreasing the amount of effort to move research from simulation to actual deployment.

Other agent research includes the application of bio-inspired solutions to cyber security as part of the Digital Ants project which has been covered in Scientific American, NPR, and others. Jereme has also been researching how computer science solutions can best assist information analysts through evaluating their

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effect on the information analysis process. As part of this research, he has been involved in the VAST Challenge producing datasets with ground truth and evaluating software used to discover the hidden threat. These datasets have become an open resource for research and university courses in the information visualization field.

## Grant Brohard



**Grant Brohard** is currently the Manager of Pacific Gas and Electric Company's Demand Response (DR) programs. As Manager of the DR Programs Team his responsibilities include oversight of PG&E's Demand Response Programs, design, regulatory approval, dispatch decisions, reporting and program enhancements. PG&E's current portfolio of DR programs include commercial, industrial and agricultural interruptible programs, residential AC cycling,

thermal storage, emergency response programs and pilot testing an auction mechanism for DR. Part of Mr. Brohard's responsibilities includes managing the company's Automated Demand Response program (ADR). Mr. Brohard's current focus is looking for more efficient methods to control loads to meet California's rapidly changing grid needs. The company's current DR portfolio is contains over 500 MW of interruptible load.

Mr. Brohard has 35 years of experience in utility operations, spanning the fields of gas and electric construction, research and development, codes and standards, EM&V and managing the company's energy efficiency engineering team. He holds a BSME from UC Berkeley and an MBA from Holy Names University.

## Chad Curry



As Managing Director for NAR's Center for REALTOR® Technology & CRT Labs, **Chad Curry** investigates emerging technologies, educates NAR members & the public through presentations, webinars, blogs and podcasts, and manages the development of products for use by members. He's presented to REALTORS® on the national, state and local levels.

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Currently, Chad's work is focused on research and development of smart home devices, iBeacons and wearables as well as renewable energies. Specifically, he is investigating how these trends will impact the real estate industry and benefit members. To support this initiative, Chad and his team has started CRT Labs focused on testing and developing devices for the home to help improve quality of life. He is an Advisory Board member of the Internet of Things Council and is leading the Case Studies Group. Chad is also a Board Member for the Real Estate Standards Organization, where he works to streamline real estate transaction technology. He was recently named to Inman New's Top 101 Most Influential People in Real Estate. He lives in Chicago with his family where he enjoys music, art, soccer, and travel.

### Dave Cuthbert



**Dave Cuthbert** is a Senior Solutions Architect at Amazon Web Services, working with NASA and various Department of Energy laboratories including PNNL to integrate research workloads onto distributed computing platforms. He enjoys tackling IoT and HPC problems from top to bottom, whether designing high level architectures or debugging bitstreams from sensors.

Prior to his current role, Dave was a software developer at Amazon, working on a variety of problem domains including payment security, database automation, and distributed storage; and a software developer at an electronic CAD startup, working on automating analog integrated circuit layouts. He resides with his wife and two kids in their home on Bainbridge Island, which doubles as their personal IoT/smart home test bed.

Dave holds a BS in electrical engineering from the California Institute of Technology and an MS in electrical and computer engineering from Carnegie Mellon University.

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## Sephir Hamilton



**Sephir Hamilton**, Engineering & Technology Innovation Interim Officer, joined Seattle City Light in 2013 as Chief of Staff. Prior to this position, he was Director of Operational Excellence at Central Hudson Gas & Electric Corp. in New York. He also worked as an engineer and investment officer at the utility.

Sephir began his career with Arthur D. Little, Inc. in Cambridge, Mass. where he worked on energy-efficiency standards for the U.S. Department of Energy. He holds a master's degree in Business Administration from Cornell University, a master of science in Engineering from the Massachusetts Institute of Technology, and a bachelor of science in Engineering from Clarkson University.

## Steve Hoberecht



**Steve Hoberecht** is a Principal Program Manager for the Microsoft Azure Internet of Things (IoT) program. During his multi-year career in Microsoft he oversaw the design, development and commercial delivery of a first-version product (PerformancePoint Server 2007). He led multi-year efforts at Microsoft based on market understanding, customer feedback, partner requests and technology opportunities. He is responsible for designing

major features and functionality to align to product vision and works with development teams to ensure detailed design met required capabilities coordinating development activities across 7 separate feature teams.

Steve implemented and managed an early adopter program that exceeded 50 “high-touch” customers and over 10,000 total customers worldwide. He developed training materials and executed training for senior members of Microsoft’s Global Systems Integrators partner community. Steve spoke at numerous events ranging from small C-Level executive briefings to user conference sessions of over 250. Topics ranged from Microsoft Business Intelligence vision and strategy to functional and technical product details of PerformancePoint Server. He also supported field sales team with direct pre-sales engagements, presentations and competitive reviews with customers.

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### Matthew Porreca



**Matthew Porreca** is a Principal at BNIM and leads the firm's presence in San Diego, California. In his 21 years of architectural experience, Matthew's leadership in high profile, integrated design teams have allowed him to produce award-winning designs. His involvement with large, complex projects has allowed him to hone his ability to understand and solve challenging project issues related to functional design, technical integration, long-range scheduling and project needs management.

Matthew served as project architect for the Nelson-Atkins Museum of Art Addition and Renovation. The building was named Time Magazine's "Building of the Year" in 2007 along with receiving a national AIA Honor Award. Matthew recently performed a similar role on the Pacific Center Campus for a Fortune 500 client, which is LEED Gold Certified, and utilizes integrated passive and active design strategies to increase energy efficiency and thermal comfort.

Matthew sees great promise in ways to integrate technology, smart building devices and architecture to make improvements in the wellbeing of workspace environments.

### John Wallace



**John Wallace** is Director of Innovation, Retail Solutions at Emerson Climate Technologies. He has been active in the design and development of electronic control systems for more than 20 years. Wallace graduated from the University of Kentucky with a bachelor's degree in electrical engineering and the University of Missouri with a master's degree in electrical engineering.

He is a member of ASHRAE has served on many industry committees' including the Lonmark Refrigeration committee, Department of Energy's Better Building Alliance and he currently chairs the NAFEM (North American Food Equipment Manufacturers) Data Protocol standardization committee and the AHRI Air Conditioning & Refrigeration Electronics section.

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## ACCOMMODATIONS

### **Meeting Location**

Pacific Tower  
1200 12th Ave. South  
Seattle, WA 98144  
Phone: (206) 954-6418

### **Lodging**

Crowne Plaza Hotel - Seattle  
1113 - 6th Avenue  
Seattle, WA 98101  
Phone: (206) 464-1980

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