36th West Coast Energy Management Congress (EMC 2018)

Seattle, Washington, USA 20 - 21 June 2018

ISBN: 978-1-5108-6959-2

Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2018) by AEE Energy Books All rights reserved.

Printed by Curran Associates, Inc. (2018)

For permission requests, please contact AEE Energy Books at the address below.

AEE Energy Books 3168 Mercer University Drive Atlanta, Georgia 30341 USA

Phone: (770) 279-4388 Fax: (770) 381-9865

kat@aeecenter.org

Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA Phone: 845-758-0400 Fax: 845-758-2633 Email: curran@proceedings.com Web: www.proceedings.com

2018 Energy Management Congress Conference Proceedings June 20-21, 2018 Washington State Convention Center, Seattle, WA



TABLE OF CONTENTS

CHAPTER 1	From Rough Waters to Smooth Sailings: Using M&V to Launch an Innovative Program1 Jim Perich-Anderson, MPA, Senior Market Analyst, Energy Efficiency Evaluation, Puget Sound Energy
CHAPTER 2	Energy Efficiency M&V: Pitfalls, Pratfalls, and Practice12 Eva Urbatsch, P.E., Energy Efficiency Engineer, Aerotek for Bonneville Power Administration
CHAPTER 3	Hard Data from Soft Interventions: A Case Study of M&V for Behavior Change Energy Savings in Six Healthcare Facilities21
	Eric A. Mazzi, Ph.D., C.E.M., Principal, Mazzi Consulting Services
CHAPTER 4	The Cannabis Industry Challenge - Understanding the Magnitude & Impacts on the Power System39
	John Morris, Vice President, Market Development, D+R International
CHAPTER 5	The Green Machine: Saving Energy, Money and the Atmosphere Using CHP in Commercial Greenhouses - an Honest Win-Win-Win54
	David J. Van Holde, P.E., C.E.M., C.M.V.P., Director, DOE NW CHP TAP, Washington State University Energy Program
CHAPTER 6	Understanding Plant Dynamics and How to Save Energy in Grow Room Applications66
	Jim McKillip, Western Regional Manager, Desert Aire
CHAPTER 7	Indoor Cultivation- A Powerful, Extensible, Scalable, Flexible, and Low-cost Approach to Cloud-based Environmental Data Monitoring, Logging and Controls84
	Mark Slosberg, Principal & Owner, Hanging Valley Enterprises, LLC
CHAPTER 8	Utility Microgrids: Why Robust Control Solutions are the Key to Advanced Microgrid Functionality93 James Dodenhoff, Regional Business Development Director, IPERC
	2 stemon, regional Dusness Development Director, in Lite

CHAPTER 9	Energy Storage Benefits and Opportunities in C & I Markets102 Sriram Emani, Vice President of Operations, Younicos
CHAPTER 10	Programs and Incentives Accelerating Hawaii's 100% Clean Energy Future114 Brian A. Kealoha, C.E.M., C.D.S.M., C.S.D.P., C.L.E.P., Executive Director, Hawaii Energy
CHAPTER 11	Utah's All-of-the-Above Approach to Energy Incentives & Financing Programs128 Brooke Tucker, Senior Project Manager, Utah's Governor's Office of Energy Development
CHAPTER 12	California's Incentives Programs and Savings141 Tahseena Kahn, C.E.M., President, Energy Managers LLC
CHAPTER 13	Analytics & Efficiency in the Real World154 Chris Olmsted, Project Developer, ATS Automation
CHAPTER 14	Well Run Buildings Can Get Better by Retrocommissioning176 Bonnie Meyer, Rina T. Fa'amoe-Cross, and Laurel Mattrey, Resource Conservation Specialists, Seattle Public Schools
CHAPTER 15	Energy Management and Control System Expansion for Zone Control Saves More Than You Might Think194 John L. Salas, P.E., C.E.M., G.B.E., C.B.C.P., LEED AP, Managing Principal, Salas O'Brien
CHAPTER 16	Challenge Driven Solutions 206 William Lange, Director of Utility Marketing, WaterFurnace International
CHAPTER 17	Our Experience with RCx Software: Triumphs and Challenges213 Celeste L. Cizik, P.E., C.E.M., LEED AP, PMP, Existing Buildings Team Leader, Group14 Engineering
CHAPTER 18	The Role of IoT and Real Time Data in M&V218 Eric M. Oliver, P.E., C.E.M., LEED AP, Vice President, InScope Innovation
CHAPTER 19	Paving the Way for Easier Energy Audit Transfer with BuildingSync®227 Jim M. Kelsey, P.E., Principal, kW Engineering
CHAPTER 20	Innovative LED Solutions for Warehouses and Beyond243 Frank Shum, President, Filamento and Kenneth Seeton, Central Plant & Energy Manager, California State University, Dominguez Hills
CHAPTER 21	Effective Retrofit Lighting Controls Case Studies255 Shaun Darragh, LC, MIES, Senior Lighting Specialist, Lighting Design Lab

CHAPTER 22	Driving Washington's Ultra-Low Carbon & Energy Infrastructure Goals: Transforming Talk into Action; Goals into Achievements; and Doing Good Rather than just ''Feeling'' Good266
	David Naccarato, Senior Business Development Manager, UMC Energy & Environment
CHAPTER 23	Energy Efficiency at the Port of Seattle275 Gregory S. Whiting, Aviation Utility Manager and Terrance Darby, Sustainability & Energy Program Manager, Port of Seattle
CHAPTER 24	Beyond Tailpipe Emissions286 Kat Janowicz, MSME, MBA, C.E.M., LEED GA, President, 3COTECH, Inc
CHAPTER 25	Combining Data Visualization and Optimization Software in Support of Building Energy Improvements306 Remi Charron, Ph.D., P.Eng., Assistant Chair & Associate Professor, New York Institute of Technology-Vancouver
CHAPTER 26	Pivotal Role of CHP in a Commercial Near-Zero Net Energy Demonstration Project 321 Joe Shiau, P.E., C.E.M., Senior Market Advisor, Southern California Gas Company and Jason Wang, P.E., Mechanical Engineer, SoCalGas
CHAPTER 27	Maximizing Performance and Efficiency of Packaged HVAC Equipment330 Len D. Beyea, C.E.M., C.B.C.P., E.B.C.P., H.B.D.P., BEAP, LEEDAP, Director & Lead Consultant, The Resources Academy
CHAPTER 28	Building Operations Improvements352
	Brendon Mattis, Branch/Project Manager, Engineering Economics, Inc.
CHAPTER 29	Marymoor Park Maintenance Facility Net-Zero Retrofit363 David Broustis, Energy Manager, King County Department of Natural Resources & Parks
CHAPTER 30	Energy Security Framework at DoD 374 Tabitha Pierzchala, Regional Energy Program Manager, Navy Region Northwest
CHAPTER 31	Integrating Alternative Energy Sources & Demand Response379 Steve Nguyen, Vice President, Marketing & Product, BuildingIQ
CHAPTER 32	Defining the Evolution of Demand Response386 Coreen Henry, Product Developer, Portland General Electric and Christine Riker, LEED AP BD+C, Senior Project Manager, Energy Solutions
CHAPTER 33	Using Blockchain In Energy Management394 Shawn A. Chandler, Director, Navigant Consulting
CHAPTER 34	Offering Customers Choices in New Green Utility Products403 Shari Weir, Renewable Energy Program Manager, Seattle City Light

CHAPTER 35	Solar Choice Overview409 Tyler O'Farrell, Program Manager, Puget Sound Energy
CHAPTER 36	Energy Efficiency in Cold Storage Design & Refrigeration418 Phillip McNamara, P.E., C.E.M., Engineering Manager, Energy 350 and Geert-Jan Laudy, VP of Procurement & Engineering, New Cold
CHAPTER 37	Strengthening Energy Policy and Partnerships430 Rachel Brombaugh, Energy Policy and Partnerships Specialist, King County
CHAPTER 38	Continuous Improvement without Capital Investment436 Taegeun Kang, Ph.D., C.E.M., PMP, Senior Tech Specialist, ICF