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# Kristin Heinemeier, Ph.D., P.E.

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## EDUCATION

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### University of California, Berkeley

Doctor of Philosophy, Building Science (Architecture). <i>Methods of Evaluating Energy Performance in Buildings (advisor: Gail Brager).</i>	1988 - 1994
Bachelor of Science, Mechanical Engineering. <i>Minor in Energy and Buildings (advisor: Art Rosenfeld).</i> <i>Minor in Mechanical Systems (advisor: David Auslander).</i>	1982 - 1986

Massachusetts Institute of Technology	1979 - 1980
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## AWARDS AND PROFESSIONAL LICENSE

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### ASHRAE College of Fellows

Awarded the highest recognition of achievement in the field, for unusual distinction and substantial contributions in the arts and sciences of HVAC.	2016
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### Professional Mechanical Engineer.

Awarded California License #27320.	1990
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## PROFESSIONAL POSITIONS

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### Realized Energy Solutions

Principal, Sole Proprietor	2018 - pres
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### University of California, Davis (UCD)

Principal Engineer: Energy Efficiency Center.	2015 - 2017
Principal Engineer: Western Cooling Efficiency Center.	2007 - 2015

### Portland Energy Conservation, Inc. (PECI)

Senior Engineer.	2004 - 2007
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### Texas A&M University (TAMU)

Technical Director: Brooks Energy and Sustainability Laboratory.	2001 - 2004
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### Honeywell International (HI)

Program Manager: Home and Building Controls.	1999 - 2001
Principal Research Engineer: Honeywell Technology Center.	1995 - 1998

### Lawrence Berkeley National Laboratory

Postdoctoral Fellow Engineer: Energy Analysis Program.	1994 - 1995
Graduate Student Research Associate: Energy Analysis Program.	1988 - 1994
Senior Research Associate: Energy Analysis Program.	1986 - 1988

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## WORK INTERESTS AND SKILLS

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### RESEARCH INTERESTS AND SAMPLE PROJECTS

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#### Thermostats and Thermal Comfort

I conducted a field study in Japan and in the US, and found some cultural differences in strategies for maintaining comfort. I am applying these findings to design of new thermostats and evaluating their effectiveness.

Field Experiments to Encourage Adoption of Alternative Cooling Strategies in Japan and the U.S.

Intelligent HVAC Controls for Low-Income Housing

#### Residential Engagement

I participated in development of unique policies, information tools, and engagement programs by working with organizations in my local communities. These activities access local resources and address local issues, which is likely to be an important factor in future efficiency efforts.

Development and Adoption of a Commercial Building Energy Conservation Ordinance (with the Berkeley Energy Commission)  
Small Municipality Energy Management Handbook (with San Antonio Metropolitan Partnership for the Environment)  
Community Home Energy Ambassador Program (Work with CoolDavis)

#### Commercial HVAC Performance in the Real World

Quality HVAC services are a new and challenging approach to energy efficiency. I have developed and proposed new indicators of market transformation in non-resource programs, suggested means of evaluating free-ridership and realization rates in ratepayer-funded programs, and championed writing and passage of a building code measure that required development of laboratory and field verification tests.

Market Transformation Indicators for Quality-Based HVAC Service Programs

Qualitative Research into Maintenance Practices

Fault Detection and Diagnostics: Moving the Market and Informing Standards in California

#### The HVAC Industry "Ecosystem"

I helped to form an industry alliance for energy efficiency, which engaged organizations across the HVAC industry. Providing this venue for stakeholder engagement enabled me to champion development of streamlined code compliance procedures, surveying contractors to shed light on the crisis of code non-compliance in California. I conducted laboratory testing that suggested that new methods for verification of proper installation are needed, and field observation that suggested a significant gap between contractor and customer expectations in HVAC service.

WHPA Compliance Committee Contractor Survey  
HVAC Industry Energy-Efficiency Roundtable

California HVAC Contractor & Technician Behavior Study

Identifying Barriers to Permitting and Compliance

California Community Colleges: Attracting Students to the Skilled HVACR Trades

Understanding Maintenance Behavior in Residential And Light Commercial End Users.

HVAC Technician Instrumentation Lab:  
Appropriate Tools to Improve HVAC Performance

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## SKILLS

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### Communicating Concepts in Novel Ways

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**"Take the Red Pill..."** Confronting HVAC performance in the real world is like taking the Red Pill in the Matrix movie. The stories we tell ourselves about HVAC performance (like building code stringency, technology adoption, and user uptake) are comforting, but we need to enter the real world to find real solutions to the real problems.

**"Commissioning as a Public Health Measure."** Building commissioning is not like installing a light bulb. The problem it is solving is probabilistic, making it difficult to project or even to verify its benefits. If we can see commissioning as an immunization program that may or may not be cost effective in a particular situation, but which is nevertheless prudent and controls risk, it may be easier to communicate it to potential adopters. Doing this requires studying the problem (risk of subpar performance) even more closely than the solution (means to improve performance).

**"I'm OK."** Different people experience thermal conditions differently. Beyond physiological factors, we need to accommodate differences in attitudes like "Compared to what?" Perhaps "Are you ok? Do I need to spend more energy to make you more comfortable?" is a more useful question than "Are you comfortable?" Answers to these different questions will provide different parameters for temperature controls and may enable much lower energy solutions heretofore considered unacceptable.

**"The 15 Minute Conversation at the Kitchen Table vs. the 10 Year Plan."** A large fraction of HVAC replacement decisions are made under duress: the old system has failed, and the contractor is sitting at across the kitchen table presenting a bid. What factors affect this conversation, and how can longer-term planning play a role in influencing the decisions?

**"The Report."** HVAC systems, technology and workers are typically not perceived by their customers as sophisticated, important, or worthy of investing in. Higher quality services will never be successful in the marketplace until a higher value is placed on them by customers. Tools, reports, analysis can create more of a sense of the value of a service being proposed.

### Bringing People Together in Unique Ways to Find Innovative Solutions

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**"Church Ladies' Dinner."** I convened a panel at the Behavior in Energy and Climate Change conference in 2015 entitled "Church Ladies and their Casseroles: Leveraging the Unique Structures of Faith Communities to Promote Climate Action." As a follow-on activity, I co-sponsored a dinner program at a nearby church at which invited speakers, leaders in the environmental movement and policy, discussed their experiences rationalizing their religious and secular efforts to reduce carbon emissions to an audience of about 40. Jello was served!

**"Using Roleplay to Illustrate the Vision for Information Tools in the HVAC Service Industry."** As an employee in the service products division of Honeywell, I was tasked with creating and facilitating a road-mapping session. Rather than launching into the activity with a set of power-point slides, I instead organized a roleplaying exercise, in which meeting attendees played different roles in the current service industry, and in an industry-of-the-future made possible with information tools. The vice-president of the division played "Trixie", the CEO's secretary whose job success hinged on keeping her boss comfortable. This effectively conveyed the real impacts of the business we were launching.

**"The Economizer Challenge"** (*future*) I convened a meeting of HVAC industry players to brainstorm on the idea of developing a program that challenged manufacturers, distributors, OEMS, distributors, contractors, building owners, utilities and other stakeholders to work together cooperatively to come up with an economizer design and deployment approach that avoided the persistent problems in current technology. It is hoped that this kind of mutual accountability and cooperation can result in solutions never achieved before.

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## UTILITY-RELATED ACTIVITIES

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### EMERGING TECHNOLOGIES

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#### Homes

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Field Instruments  
Evaporative Cooling  
Thermostats

#### Businesses

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Economizers  
Fault Detection and Diagnostics  
Commissioning and RetroCommissioning

### CODES AND STANDARDS

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#### Compliance Improvement

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Led WHPA Compliance Committee  
Compliance Improvement Advisory Group  
CEC Code Compliance Workshop

#### Codes and Standards Development

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Led ASHRAE Standard for FDD Testing  
Led Title 24 FDD Requirement for Economizers  
Title 24 CASE Studies: FDD, Radiant Cooling,  
Rooftop Ductwork, QDP

### QUALITATIVE RESEARCH

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#### Surveys

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Low Income Residents re Thermostat Use  
Contractors re Quality Maintenance Net to Gross  
Contractors re Code Compliance

#### Interviews

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Contractors and Trade Schools re Attracting  
Students  
Contractors re Establishing Trust  
C-Suites re Sustainability

#### Focus Groups

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Contractors and Trade Schools re Attracting  
Students  
Small Businesses re HVAC Maintenance  
Contractors and Engineers re Climate  
Appropriate  
HVAC  
Contractors re FDD Marketability

### ENERGY EFFICIENCY PROGRAMS

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#### Program Evaluation

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Measurement and Verification of Savings:  
Author ASHRAE GL 14, M&V Plans for  
USAF  
Impact Estimation: Gross, Net  
Market Transformation Indicators

#### Program Design

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Cost Effectiveness, Ex Ante Savings, Work Papers  
Program Implementation Plans

### SUPPORT FOR ASSOCIATIONS

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Co-founded Western HVAC Performance  
Alliance  
Managed California Commissioning  
Collaborative  
Building Commissioning Association

### COMMUNITY ENGAGEMENT

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#### City of Davis

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CoolDavis - Energy Ambassadors  
CoolDavis - Residential HVAC Retrofit  
Checklist of Actions Taken  
Canvassing Neighborhoods re Attic Program

#### San Antonio Metropolitan Area

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Metropolitan Energy Partners - Conservation  
Potential

#### City of Berkeley

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Led City of Berkeley Energy Commission  
Led Community Energy Services Corporation  
Led Commercial Energy Conservation Ordinance  
Traveling Energy Show

### UTILITY PLANNING

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#### Forecasting

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Developing Generic Load Shapes – Res &  
NonRes

### COMMUNICATION

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Roleplaying for Corporate Visioning  
Home Energy Magazine  
New and Existing Commissioning Guides

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## PROFESSIONAL ACTIVITIES

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### SERVICE

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#### Climate Safe Infrastructure Working Group

Member of state-wide working group to unite experts to bolster the inclusion of climate impacts in state design processes, established by AB 2800 (Quirk).	2018 - pres
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#### Compliance Improvement Advisory Group

Member of industry advisory group to help California IOUs design and implement their Compliance Improvement programs. Coauthor of five white papers.	2012 - 2016
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#### American Society of Heating Refrigerating and Air-Conditioning Engineers

Chair of Standard 207 Committee - Method of Test for FDD in RTUs Standard.	2011 - pres
Voting Member of Standard 180 Committee – Maintenance of Commercial Buildings.	2015 - pres
Chair of TC6.3 Research Subcommittee – Forced Air Systems.	2015 - 2016
Member of several Project Monitoring Subcommittees.	2012 - 2016
Voting Member of Guideline 32 Committee – High Performance Building Operations.	2011 - 2013
Chair of TC7.9 – Building Commissioning.	2006 - 2008
Vice-Chair of TC7.9 – Building Commissioning.	2004 - 2006
Secretary of TC7.9 – Building Commissioning.	2002 - 2004
Chair of TC7.9 Research Subcommittee – Building Commissioning.	1997 - 2002
Chair of TC7.6 Handbook Subcommittee – Building Energy Monitoring.	1996 – 1998
Voting Member of Guideline14 Committee –Guideline for Energy Savings Measurement.	1987 - 1990

#### Western HVAC Performance Alliance

Charter member of WHPA	2009
Co-Author: HVAC Action Plan	2011
Leadership in committees:	2009 - 2015
Staff: Executive, AFDD, Residential Quality Maintenance, Whole Bldg. Performance	
Chair: Code Compliance, Automated Fault Detection and Diagnostics	
Member: Charter, Commercial Quality Maintenance, DEER, Existing Buildings.	

#### Building Commissioning Association

President of Board of Directors and Southwest Chapter.	2004 – 2008
Chair of Professional Development Committee.	2004 - 2008

#### Women Energy Associates

Founder (Davis and San Antonio), Board Member (Bay Area).	1992 - 2015
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#### National Research Council

Member of panel reviewing the NIST Building and Fire Research Laboratory.	2002 - 2009
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#### International Energy Agency

Member of U.S. delegation to Annex 34, Fault Detection and Diagnostics.	1997 - 2000
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## COMMUNITY AND LOCAL GOVERNMENT LEADERSHIP

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### Davis California

CoolDavis (non-profit associated with the City). – Volunteer program planner, member of Energy Steering Committee.	2012 - pres
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### San Antonio Texas

Metropolitan Partnership for Energy - Member of working group to set up and manage this multi-institution region-wide energy planning organization.	2002 - 2003
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### Berkeley California

Berkeley California - City Energy Commission - Commissioner (appointed by Mayor Hancock) and Chairperson.	1989 - 1995
Berkeley California - Community Energy Services Corporation (non-profit associated with the City). – Board member and President of the Board of Directors.	1990 - 1995

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## CONFERENCE LEADERSHIP

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### Behavior in Energy and Climate Change Conference

Member of Program Committee	2014 – pres
Panel Chair	
<i>Municipal-Level Policy: The Importance of Engagement.</i>	2016
<i>Leveraging the Unique Structures of Faith Communities to Promote Climate Action.</i>	2015

### American Society of Heating, Refrigerating and Air Conditioning Engineers

Seminar Organizer and Chair	
<i>AHR Expo Session: New 2015 Regional Efficiency Standards &amp; the Effects on Different Areas of the HVAC Industry</i>	2015

### HVAC Industry Energy-Efficiency Roundtable

A leading member of organizing team for HVAC Energy Efficiency Roundtable	2009
Helped plan and facilitate the two-day event with 72 participants that was a precursor to WHPA.	

### American Council for an Energy Efficient Economy Summer Study on Efficiency in Buildings

Panel Leader	
<i>Information &amp; Electronic Technologies: Promises &amp; Pitfalls</i>	2004
<i>Trends in the Building Controls Industry</i>	1996
Roundtable Session Chair	
<i>Training the Zero Energy Workforce of the Future: Can Net Zero Energy Buildings be Delivered by the Same Industry that Brought Us Coincident Heating and Cooling and Duct Tape?</i>	2008
Informal Session Organizer	
<i>Cooling Strategies in Japan and the US.</i>	2014
<i>Uncertainties in Achieving Energy Savings from HVAC Maintenance Measures in the Lab and the Field.</i>	2012
<i>Joint IOU/CPUC HVAC Energy Efficiency Maintenance Study</i>	2010

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## National Conference on Building Commissioning

Member of Abstract Review Committee	2005 - 2007
Pre-Conference Workshop Organizer	2007
<i>Data Analysis and Diagnostic Tools for Commissioning: A Demonstration</i>	
Session Organizer	2007
<i>Top Issues in Design Review: An Interactive Session.</i>	

## PUBLICATIONS

### REFEREED

Heinemeier, K. "Transforming the Way We Measure Transformation: Indicators of A Transforming Market for Quality Maintenance." <i>Proceedings of the ACEEE Summer Study.</i>	in press
Heinemeier, K. "Free Cooling: At What Cost?" <i>Proceedings of the ACEEE Summer Study.</i>	2014
Outcault, S., C. Barriga, K. Heinemeier, J. Markley, and D. Berman. "Thermostats Can't Fix This: Case Studies on Advanced Thermostat Field Test." <i>Proceedings of the ACEEE Summer Study.</i>	2014
Heinemeier, K. "Contractors Walk on the Wild Side...Why?" <i>Proceedings of the ACEEE Summer Study.</i>	2012
Heinemeier, K., M.B. Hunt, M. Hoeschele, E. Weitzel, and B. Close. "Uncertainties in Achieving Energy Savings from HVAC Maintenance Measures in the Field." <i>ASHRAE Transactions.</i>	2012
Gillespie, K., K. Stum, K. Heinemeier, and G. Stranske. "Developing a Design Review Tool for Use in Design-Stage Commissioning." <i>Proceedings of the National Building Commissioning Conference.</i> Chicago, IL.	2007
Heinemeier, K., E. Moore, D. Sellers, and T. Haasl. "Training for Retrocommissioning: How Do You Teach Experience?" <i>Proceedings of the ACEEE Summer Study.</i>	2006
Heinemeier, K., H. Friedman, P. Welker. "Evaluating Retrocommissioning Programs: The Challenges of Measuring Savings in a Measurement-Based Program." <i>Proceedings of the International Energy Program Evaluation Conference.</i>	2005
Heinemeier, K., M. Martin, D. Schneider, Balaji S., A. Ledbetter, J. Shoop, W. Harvey, J. Martin, and F. Thomas. "Metrics for Reporting Benefits of Commissioning in New School Facilities." <i>Proceedings of the National Building Commissioning Conference.</i> Atlanta, GA.	2004
Heinemeier, K., M. Martin, D. Schneider, Balaji S., A. Ledbetter, J. Shoop, W. Harvey, J. Martin, and F. Thomas. "Commissioning of New Schools: A State Funded Study of the Costs and Benefits." <i>Proceedings of the ACEEE Summer Study.</i>	2004
Heinemeier, K., D. Dina, L. Doxsey, J. Fulton, K. Mireles, L. Powell, J. Quebe, B. Sinking, and L. Stone. "A Metropolitan Partnership for Energy." <i>Proceedings of the ACEEE Summer Study.</i>	2002
Hart, K.Q., C. Culp, and K. Heinemeier. "Measurement and Verification in the Air Force's Energy Savings Performance Contracting Program." <i>Proceedings of the ACEEE Summer Study.</i>	2002
Heinemeier, K. "Fault Detection and Diagnostics: Requirements for Marketability." <i>Proceedings of the ACEEE Summer Study.</i>	1998

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Heinemeier, K., H. Akbari, and S. Kromer. "Monitoring Savings in Energy Savings Performance Contracts using Energy Management Control Systems." <i>ASHRAE Transactions</i> , Vol. 102, Part 2.	1996
Heinemeier, K., H. Akbari, and S. Kromer. "Measuring Savings in Energy Savings Performance Contracts using In-Place Energy Management Systems." <i>Proceedings of the ACEEE Summer Study</i> .	1996
Heinemeier, K. and H. Akbari. "Proposed Guidelines for Using Energy Management and Control Systems for Performance Monitoring." <i>Proceedings of the ACEEE Summer Study</i> , Vol. 3, pp. 3.111-3.120.	1992
Heinemeier, K. and H. Akbari. "Evaluation of the Use of Energy Management and Control Systems for Remote Building Performance Monitoring." <i>Proceedings, ASME International Solar Energy Conference</i> , Vol. 1, pp. 309-317.	1992
Heinemeier, K., F.S. Bauman, G.E. Schiller, C.C. Benton and E.A. Arens. "The Implications of Task Conditioning for Comfort and Energy." <i>Proceedings of the ACEEE Summer Study</i> , Vol. 3.	1990
Akbari, H., I. Turiel, J.H. Eto, K. Heinemeier, B. Lebot, and L.I. Rainer. "A Review of Existing Commercial Energy Use Intensity and Load-Shape Studies." <i>Proceedings of the ACEEE Summer Study</i> , Vol. 3. LBL-29209.	1990
Eto, J.H., I. Turiel, H. Akbari, B. Lebot, and K. Heinemeier. "An Investigation of the Use of Prototypes for Commercial Sector EUI Analysis." <i>Proceedings of the ACEEE Summer Study</i> , Vol. 10.	1990
Heinemeier, K., G.E. Schiller, C.C. Benton. "Task Conditioning for the Workplace: Issues and Challenges." <i>ASHRAE Transactions</i> , Vol. 96, Part 2.	1990
Heinemeier, K. and A. Meier. "A Comparison of Field and Laboratory Measurements of Residential Refrigerator Energy Use." <i>Proceedings of the ACEEE Summer Study</i> .	1988
Akbari, H., K. Heinemeier, P. LeConiac, and D. Flora. "An Algorithm to Disaggregate Commercial Whole-Building Hourly Electrical Load into End Uses." <i>Proceedings of the ACEEE Summer Study</i> .	1988
Meier, A. and K. Heinemeier. "Energy Use of Residential Refrigerators: A Comparison of Laboratory and Field Use." <i>ASHRAE Transactions</i> , 94/2.	1988
Akbari, H., K. Heinemeier, D. Flora and P. LeConiac. "Analysis of Commercial Whole-Building 15-Minute-Interval Electric Load Data." <i>ASHRAE Transactions</i> , Vol. 94, Part 2.	1988
Heinemeier, K. and H. Akbari. "Capabilities of In-Place Energy Management Systems for Remote Monitoring of Building Energy Performance--Case Studies." <i>ASHRAE Transactions</i> , Vol. 93, Part 2. Also published in <i>Energy Measurement Applications</i> , an ASHRAE Technical Bulletin.	1987

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## **PROJECT REPORTS AND WHITE PAPERS**

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Heinemeier, K., J. Kutzleb, K. Crohn, T. Malnick, and E. Steiner. <i>California Community Colleges: Capturing the Value of HVACR Worker Certification</i> . Final Project Report to the California Community Colleges, Office of the Chancellor.	2016
Heinemeier, K., M. Saucke, K. Bannor, I. Valenzuela, G. Harmon, and M. Howe. <i>California Community Colleges: Attracting Students to the Skilled HVACR Trades</i> . Final Project Report to the California Community Colleges, Office of the Chancellor.	2016
Heinemeier, K. <i>Estimating Impacts of Upstream Mini-Split Program</i> . Final Project Report to DNV-GL.	2016
Heinemeier, K. <i>Qualitative Research into Maintenance Practices</i> . Final Project Report to DNV-GL.	2016

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Heinemeier, K. <i>Identifying Barriers to Permitting and Compliance</i> . Final Project Report to DNV-GL.	2016
Heinemeier, K., and M. Saucke. <i>Human Factors in the Adoption and Performance of Emerging Technologies: The Economizer</i> . Final Project Report to Southern California Edison Company.	2015
Burger, S., K. Heinemeier, T. Young, and R. King. <i>Is There Anything we can do to Simplify the Code Itself?</i> Compliance Improvement Advisory Group White Paper.	2015
Heinemeier, K. <i>Market Transformation Indicators for Quality-Based HVAC Service Programs</i> . Final Project Report to California Public Utilities Commission.	2015
Heinemeier, K. and J. Aalfs. <i>Fault Detection and Diagnostics: Engaging with Industry to Identify Market and End-User Dynamics that Impact Savings</i> . Final Project Report to Southern California Edison Company.	2015
Heinemeier, K., T. Pistochini, D. Enriquez, and T. Guimaraes-Bucalo. <i>HVAC Technician Instrumentation Lab: Appropriate Tools to Improve HVAC Performance</i> . Final Project Report to the California Energy Commission.	2015
Outcalt, S., K. Heinemeier, M. Pritoni, J. Kutzleb, and Q. Wang. <i>Can AC Use be Reduced? Field Experiments to Encourage Adoption of Alternative Cooling Strategies in Japan and the U.S.</i> Final Project Report to Tokyo Gas Company.	2015
Wiseman, B., M. Bachand, K. Heinemeier, T. Young, and R. King. <i>What Can be Done to Reduce the Transactional Cost of Energy Code Compliance?</i> Compliance Improvement Advisory Group White Paper.	2015
Burger, S., K. Heinemeier, and B. Selby. <i>Helping Consumers Realize the Value of Compliance</i> . Compliance Improvement Advisory Group White Paper.	2013
Barriga, C., KH. Heinemeier, L. Flynn, and D. Biscotti. <i>Understanding Maintenance Behavior in Residential And Light Commercial End Users</i> . A Report to Southern California Edison.	2012
Benningfield, L., M. Bachand, and K. Heinemeier. <i>Code Simplification via use of Dynamic Forms</i> . Compliance Improvement Advisory Group White Paper.	2012
Burger, S., M. Bachand, K. Heinemeier, S. Darcy, and N. Stone. <i>Preparing Industry for New Standards</i> . Compliance Improvement Advisory Group White Paper.	2012
Heinemeier, K., T. Stillwater, C. Barriga, M. Pritoni, D. Biscotti, and L. Flynn. <i>Usability of In-Home Energy Displays</i> . A Report to Southern California Edison.	2012
Steiner, E., E. Gertsman, D. Whittsett, K. Heinemeier, C. Barriga, R. Mowris and R. Eshom. <i>California HVAC Contractor &amp; Technician Behavior Study</i> . A Report to Southern California Edison, Pacific Gas & Electric, Sempra Utilities, and the California Public Utilities Commission. CADMAC.	2012
Heinemeier, K., M. Cherniack, and J. Bec. <i>Fault Detection and Diagnostics: Moving the Market and Informing Standards in California</i> . – A Report to CEC.	2011
Hunt, M., K. Heinemeier, M. Hoeschele, E. Weitzel. <i>HVAC Energy Efficiency Maintenance Study</i> . A Report to Southern California Edison, Pacific Gas & Electric, Sempra Utilities, and the California Public Utilities Commission. CADMAC.	2010
Heinemeier, K. and T. Pistochini. <i>Water Management for Indirect-Direct Evaporative Air Conditioning</i> – A Report to Southern California Edison.	2010
Heinemeier, K. <i>HVAC Energy Efficiency Roundtable – Summary Report</i> . A Report to Southern California Edison.	2009
Heinemeier, K. <i>Best Practices for Evaporative Water-Based Cooling Systems: Scoping Study</i> . A Report to California Energy Commission.	2008
Heinemeier, K., M. Frank, and H. Friedman. <i>Review of the Use of Performance Metrics in Functional Performance Tests</i> . Working Paper to the International Energy Agency Annex 47: Cost-Effective Commissioning for Existing and Low Energy Buildings.	2007

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PECI. (Heinemeier, coauthor). <i>Monitoring-Based Commissioning (MBCx) Best Practices: A Review of the 2004-2005 Partnership Program at 25 Universities: Qualitative Investigation</i> . Report to the University of California / California State University / Investor Owned Utility (UC/CSU/IOU) Energy Efficiency Partnership Prog.	2007
Sellers, D. and K. Heinemeier. <i>A Field Perspective: Centrifugal Pump Application and Optimization</i> . Design Brief for the Energy Design Resources Program, Pacific Gas and Electric Company.	2007
CCC. (Heinemeier, managing coauthor). <i>Roadmap for Achieving the Commissioning Goals of California's Green Building Executive Order</i> . Report to the Green Building Action Team Commissioning and Retrocommissioning Work Group.	2007
Haasl, T. and K. Heinemeier. <i>California Commissioning Guide: Existing Buildings</i> . California Commissioning Collaborative.	2006
Haasl, T. and K. Heinemeier. <i>California Commissioning Guide: New Buildings</i> . California Commissioning Collaborative.	2006
Heinemeier, K. <i>Small Municipality Energy Management Handbook</i> . Prepared for the Metropolitan Partnership for Energy.	2005
Liu, M., D. E. Claridge, N. Bensouda, K. Heinemeier, Seung Uk Lee, and G. Wei. <i>Manual of Procedures for Calibrating Simulations of Building Systems</i> . Prepared for the California Energy Commission, HPCBS # E5P23T2b. October.	2003
Gerlach, E., M. Cline, S. Pena, D. Schneider, K. Heinemeier, and A. Ledbetter. <i>Developing a Renewable Energy Based Economy for South Texas - A Blueprint for Development</i> . Prepared for Solar San Antonio, Inc., under a contract to the U.S. Economic Development Administration. February.	2003
Heinemeier, K., R.M. Richardson, and K. Krishnan. <i>User Feedback on Fault Detection and Diagnostics</i> . IEA Annex 34 Working Paper, Fontainebleau.	1999
Heinemeier, K. <i>Fault Detection and Diagnostics: Requirements for Marketability</i> . IEA Annex 34 Working Paper, Boulder Colorado.	1997
Heinemeier, K., B. Damania, W. Foslien, S. Guerlain, G. Hadden, S. Menon, S. Metz, R.M. Richardson, M. Woessner, D. Wrest, and B. Zingler. <i>Remote Fault Detection and Diagnostics for the Service Business—A Scoping Study</i> . A Report to Honeywell Home and Building Controls Service Center of Excellence, December.	1998
Richardson, R.M., K. Heinemeier, and K. Krishnan. <i>Whole Building Diagnostician Market Reaction Report</i> . Prepared for Pacific Northwest National Laboratory, November.	1998
Sebald, A., E.L. Lee, H. Misuriello, M.A. Piette, C. Shockman, K. Heinemeier, and D. Seborg. <i>"CIEE Project on Diagnostics for Building Commissioning and Operation."</i>	1996
Koomey, J.G., F.X. Johnson, J. Schuman, E. Franconi, S. Greenberg, J. Lutz, B. Griffith, D. Arasteh, C. Atkinson, K. Heinemeier, Y.J. Huang, L. Price, G. Rosenquist, F. Rubinstein, S. Selkowitz, H. Taha, and I. Turiel. <i>"Buildings Sector Demand-Side Efficiency Technologies Summaries."</i> LBL-33887. March.	1994
Akbari, H., J. Eto, S. Konopacki, A. Afzal, and K. Heinemeier. <i>"Integrated Estimation of Commercial Sector End-Use Load Shapes and Energy Use Intensities in PG&amp;E Service Area."</i> Report to the Pacific Gas & Electric Company, the California Energy Commission, and the California Institute for Energy Efficiency. LBL-34263. December.	1993
Piette, M.A., B. Nordman, O. deBuen, R.C. Diamond, J.P. Harris, K. Heinemeier, and K.B. Janda. <i>"Energy Edge Impact Evaluation. Vol I. Final Report."</i> Report to the Bonneville Power Administration. LBL-33708.	1993
Heinemeier, K., and H. Akbari. <i>"Energy Management and Control Systems and Their Use for Performance Monitoring in the LoanSTAR Program."</i> LBL-33114. Report to the Texas Governor's Energy Management Center, and to the Department of Energy. June.	1993

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Akbari, H., K. Heinemeier, and M. Goralka. " <i>Energy Management Systems for Real-Time Pricing and End-Use Monitoring.</i> " Report to Pacific Gas and Electric Co., LBL-26689.	1989
Heinemeier, K., H. Akbari and E. Arens. " <i>An Assessment of Monitoring Capabilities of Energy Management Systems to Obtain Detailed Building Energy Data,</i> " LBL-24258. Report to University-wide Energy Research Group. December.	1987
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## **DISSERTATION AND BOOK CHAPTERS**

Heinemeier, K. " <i>The Use of Energy Management and Control Systems to Monitor the Energy Performance of Commercial Buildings.</i> " Doctoral Dissertation, University of California, Department of Architecture. LBL-36119. December.	1994
Heinemeier, K. and J. Ahmed. "'Fault Detection and Diagnostics for Rooftop Units: Standards are Key to Making it in the Market.'" Chapter in Book on FDD, B. Capehart, Ed.	2014

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## **MAGAZINE AND NEWSLETTER ARTICLES**

Heinemeier, K. "Retrofit Legislation at the Urban Level." <i>Center for Building Science Newsletter</i> . Winter.	1993
Heinemeier, K. "Retrofit Legislation at the City Level." <i>International Association for Energy-Efficient Lighting Newsletter</i> . No. 4 Vol. 2, September.	1993
Heinemeier, K. "Knob-and-Tube Wiring Hang-Ups." <i>Home Energy Magazine</i> , Vol. 8 No. 3, May/June.	1991
Heinemeier, K. "Energy Education Starts Early in Berkeley." <i>Home Energy Magazine</i> , Vol. 7 No. 4, July/August.	1990
Heinemeier, K. "Smart Homes: Just Around the Corner?" <i>Home Energy Magazine</i> , Vol. 7 No. 1, January/February.	1990

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Heinemeier, K. "Your Mileage May Vary." <i>Home Energy Magazine</i> , Vol. 5 No. 5, November/December.	1988
Heinemeier, K. "Is Smart Always Wise?" <i>Energy Auditor and Retrofitter Magazine</i> , Vol. 3 No. 6, November/December.	1986

## PRESENTATIONS

### CONFERENCE PRESENTATIONS

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<i>If It Ain't Broke: Identifying the Value That an RTU FDD Tool Brings.</i> ASHRAE Seminar.	2015
<i>Church Ladies and their Casseroles.</i> Behavior in Energy and Climate Change Conference.	2015
<i>Standards for Fault Detection and Diagnostics in Packaged Commercial Air Conditioning Systems.</i> ASHRAE Seminar.	2014
<i>Is Your Economizer Just Blowing A Lot of Hot Air?</i> ETCC Summit.	2014
<i>Standards for Evaluating RTU FDD Systems.</i> Purdue FDD Workshop.	2014
<i>Efforts to Detect Faults in Economizers.</i> ASHRAE Seminar.	2013
<i>Understanding Behavioral and Social Impacts on HVAC Energy Efficiency: Beyond the End User.</i> Behavior in Energy and Climate Change Conference.	2013
<i>Moving Fault Detection and Diagnostics Forward with Policy and Market Transformation.</i> ASHRAE Seminar.	2012
<i>Technicians in the Wild: An Observation Study of HVAC Technicians Practices.</i> Behavior in Energy and Climate Change Conference.	2012
<i>Lessons My Mother Taught Me About HVAC Maintenance.</i> Behavior in Energy and Climate Change Conference.	2012
<i>Fault Detection and Diagnostics for Rooftop Units: Standards are Key to Making it in the Market.</i> ETCC Summit.	2012
<i>Fault Detection and Diagnostics for Packaged Rooftop Air Conditioning Units.</i> High Performance Buildings Conference.	2012
<i>Commissioning and Maintenance: Two Sides of the Same Coin?</i> National Conference on Building Commissioning.	2012
<i>Fault Detection.</i> National Energy Efficiency Technology Summit.	2012
<i>The Future of Building Commissioning: Get Ready!</i> Green Construction Summit.	2006
<i>Building Commissioning in Schools.</i> High Performance Schools Workshop.	2005
<i>Commissioning as a Risk Management Strategy.</i> National Conference on Building Commissioning.	2005
<i>Tech Transfer of Commissioning and Retrofit Quality Assurance in Texas Municipal and K-12 Buildings.</i> ASERTTI Meeting.	2003
<i>The Use of EMCSs in Building Monitoring: Experience from Energy. Edge and LoanSTAR Programs.</i> National Conference on Building Commissioning.	1993
<i>Refrigerator Energy Use: Label Versus Actual.</i> Second Annual Conference on End-Use Load Information and Its Role in DSM.	1990
<i>The Potential of Energy Management and Control Systems for Real-Time Electricity Pricing Programs.</i> Symposium on Improving Building Systems on Hot and Humid Climates.	1990

### CONFERENCE POSTER PRESENTATIONS

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<i>Sharpening the Tip of the Spear: Engaging Effective Workers in the HVAC Trades.</i> Behavior in Energy and Climate Change Conference.	2016
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<i>Realized Efficiency Solutions: Closing the Gap by Seeing the Real World.</i> Behavior in Energy and Climate Change Conference.	2015
<i>Compliance: How do Contractors Assess Risk in Doing Unpermitted Work? (and Why?).</i> Behavior in Energy and Climate Change Conference.	2010

## **INVITED PRESENTATIONS**

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<i>Market Transformation Through Standardization of Quality in HVAC Maintenance.</i> Climate Safe Infrastructure Working Group Webinar Series.	2018
<i>What HVAC Technicians Need to Know to Realize Efficiency.</i> Building Energy for a Sustainable Tomorrow Conference.	2016
<i>Welcome to the Real World! The Stories we Tell Ourselves about Managing our HVAC Energy Use.</i> San Francisco Sustainability Circle.	2016
<i>WCEC Research on Behavior and Code Compliance.</i> CEC Code Compliance Team.	2015
<i>Understanding Behavior to Maximize Energy Savings.</i> WCEC Webinar Series.	2014
<i>Beating the Code with HVAC System Efficiency.</i> University of California Office of the President.	2014
<i>Quality Issues &amp; FDD Roadmapping.</i> Build America FDD Expert Forum.	2013
<i>Fault Detection and Diagnostics for RTUs.</i> International Green Construction Code Committee.	2013
<i>Achieving Optimized HVAC Systems through Quality Maintenance by Optimizing Contractor Business Model.</i> OR <i>Saving the World through HVAC Maintenance: Why and Why Not.</i> ACCA Service Managers' Forum.	2013
<i>Cooling the West: The Western Cooling Efficiency Center.</i> Rocky Mountain Institute.	2012
<i>The Fine Line Between RCx and Maintenance.</i> California Commissioning Collaborative.	2012
<i>Up on the Rooftop: Fault Detection and Diagnostics.</i> ESOURCE.	2011
<i>FDD for Packaged HVAC.</i> Pacific Energy Center Training.	2011
<i>Water Quality and Treatment Options for Direct and Indirect Evaporative Cooling Applications.</i> Retail Alliance.	2007
<i>Building Commissioning for Improved Performance.</i> Lecture in <i>UTSA HVAC&amp;R Design Issues Lecture Series.</i> UTSA Lecture Series.	2004
<i>Certified Green Buildings: Why and How?</i> Lecture in <i>UTSA HVAC&amp;R Design Issues Lecture Series.</i> UTSA Lecture Series.	2004
<i>Building Commissioning for Improved Performance.</i> ASHRAE Alamo Chapter.	2004
<i>Benchmarking to Improve Building Performance.</i> Texas Energy Partnership.	2004
<i>Building Commissioning for Improved Performance.</i> Texas NEBB Chapter.	2004
<i>The Role of the Engineer in Sustainability.</i> Trinity University.	2004
<i>The Leadership in Energy &amp; Environmental Design (LEED) Certification Program for Green Buildings.</i> ASHRAE Alamo Chapter.	2003
<i>Impact of Renewable and Sustainable Energy on the Economy of South Texas.</i> Fuel Cell Initiative Advisory Committee.	2002
<i>The Brooks Energy and Sustainability Laboratory.</i> AEE Austin/San Antonio Chapter.	2002
<i>The Brooks Energy and Sustainability Laboratory.</i> AIA San Antonio Chapter.	2002
<i>The Brooks Energy and Sustainability Laboratory.</i> St. Philips College.	2002
<i>The Brooks Energy and Sustainability Laboratory.</i> Trinity University.	2001
<i>User and Market Factors that Influence Diagnostic Tool Development.</i> Workshop on Diagnostics for Commercial Buildings: From Research to Practice.	1999