

MAKING MODERN LIVING POSSIBLE

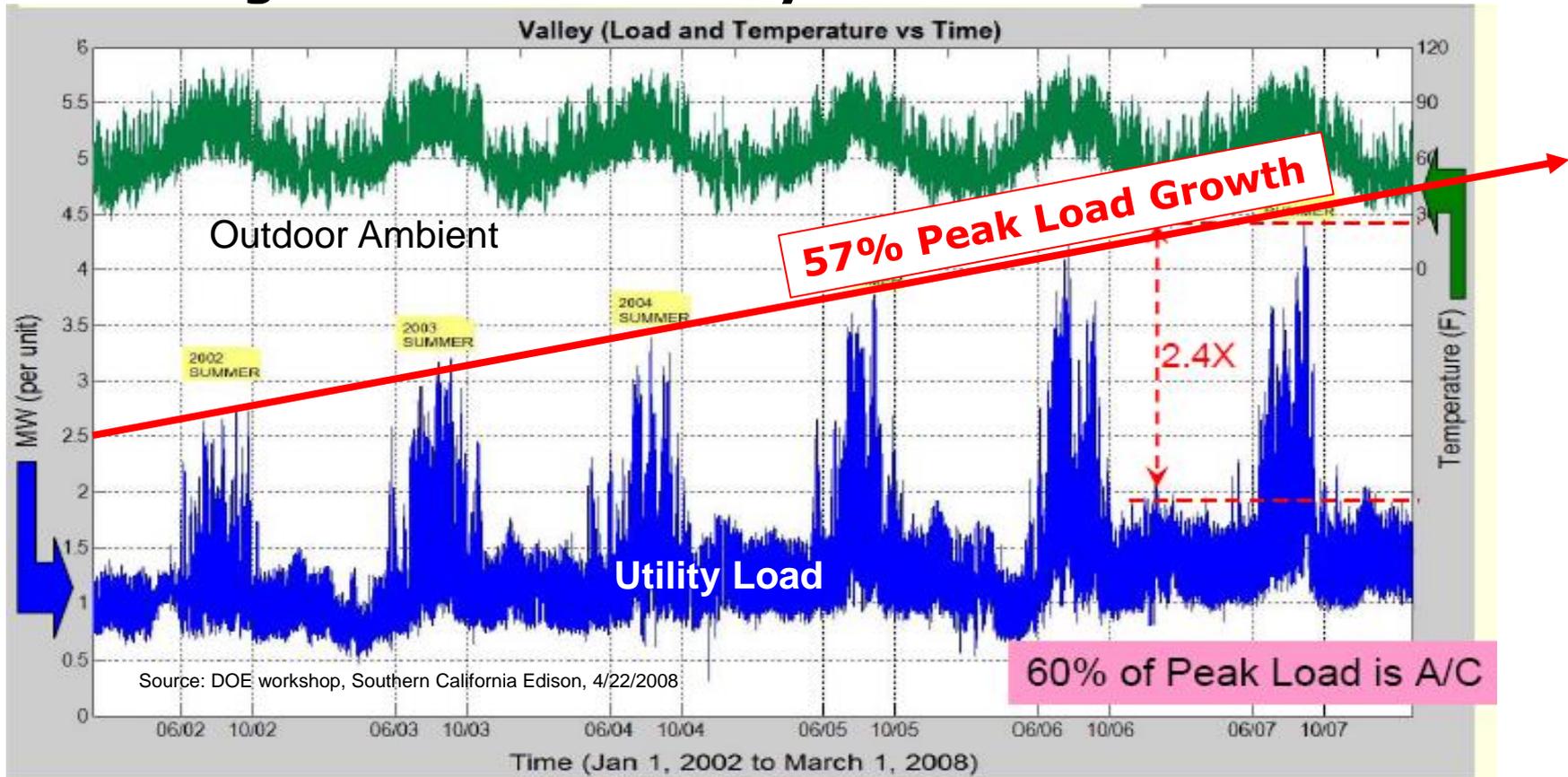


Demand Response Performance and Communication Strategy: AHRI and CEE



DOE Building Technologies Office Conference
NREL, Golden, Colorado, May 1, 2014

A Growing Crisis: Peak Utility Load

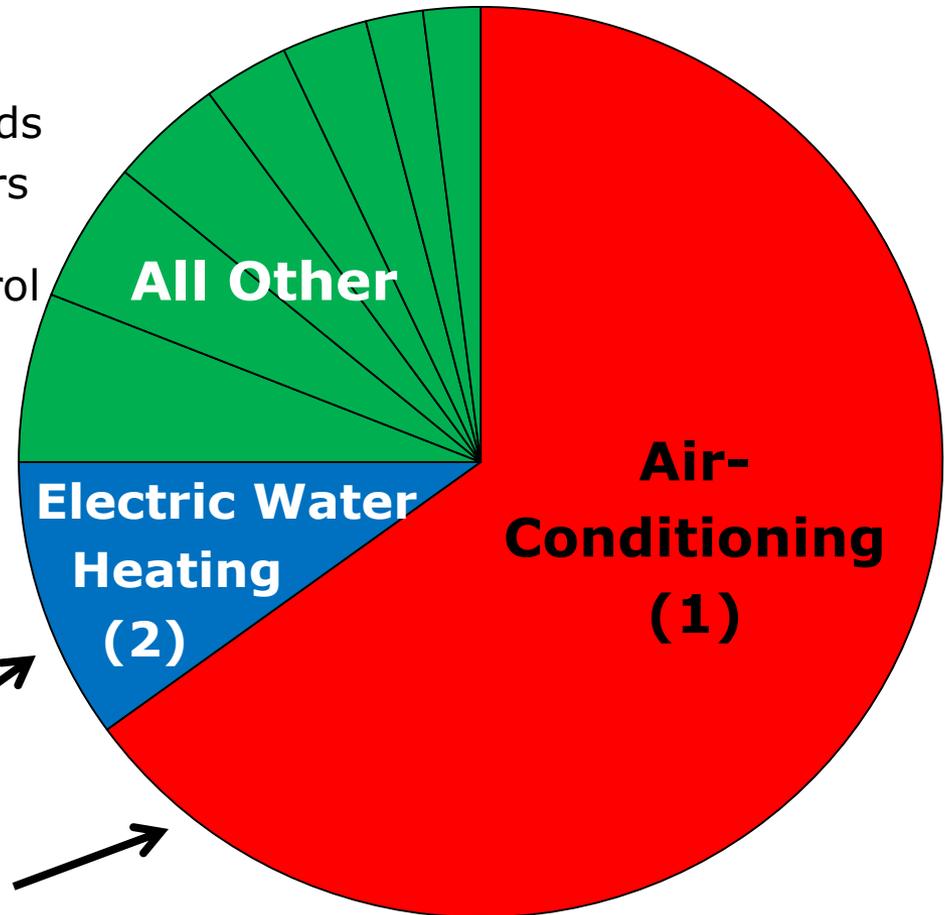


Although many utilities seek HVAC equipment with high efficiency at peak load conditions, that is a very costly solution that customers won't buy. The best solution is not efficiency at occasional peak load conditions; it's about managing the peak load effectively, through enhanced DR capabilities.

Typical Contributors to Utility Summer Peak Load

(not to scale)

Appliances, lighting and plug loads are small fragmented contributors to peak that are challenging to standardize, communicate, control and verify responses.



Main targets for enhanced demand response performance & communication project

Broad Spectrum of Systems in Buildings



High unit volume

- Single family homes
- Small commercial
- Discrete systems
- Unitary a/c
- Water heaters

No building EMS

Demand response

- A few kW per bldg.
- Very high unit volume
- Standardized utility programs
- PUC regulated

New a/c capabilities now emerging!!!

Demand response

- Many kW per bldg.
- Low unit volume
- DR aggregators
- Negotiated contracts

Controls capabilities readily available

Low unit volume

- Large multistory com'l buildings
- Complex systems
- Chillers
- Heat recovery

Sophisticated EMS

Broad Spectrum of Systems in Buildings



**AHRI and CEE
collaboration
in this space**



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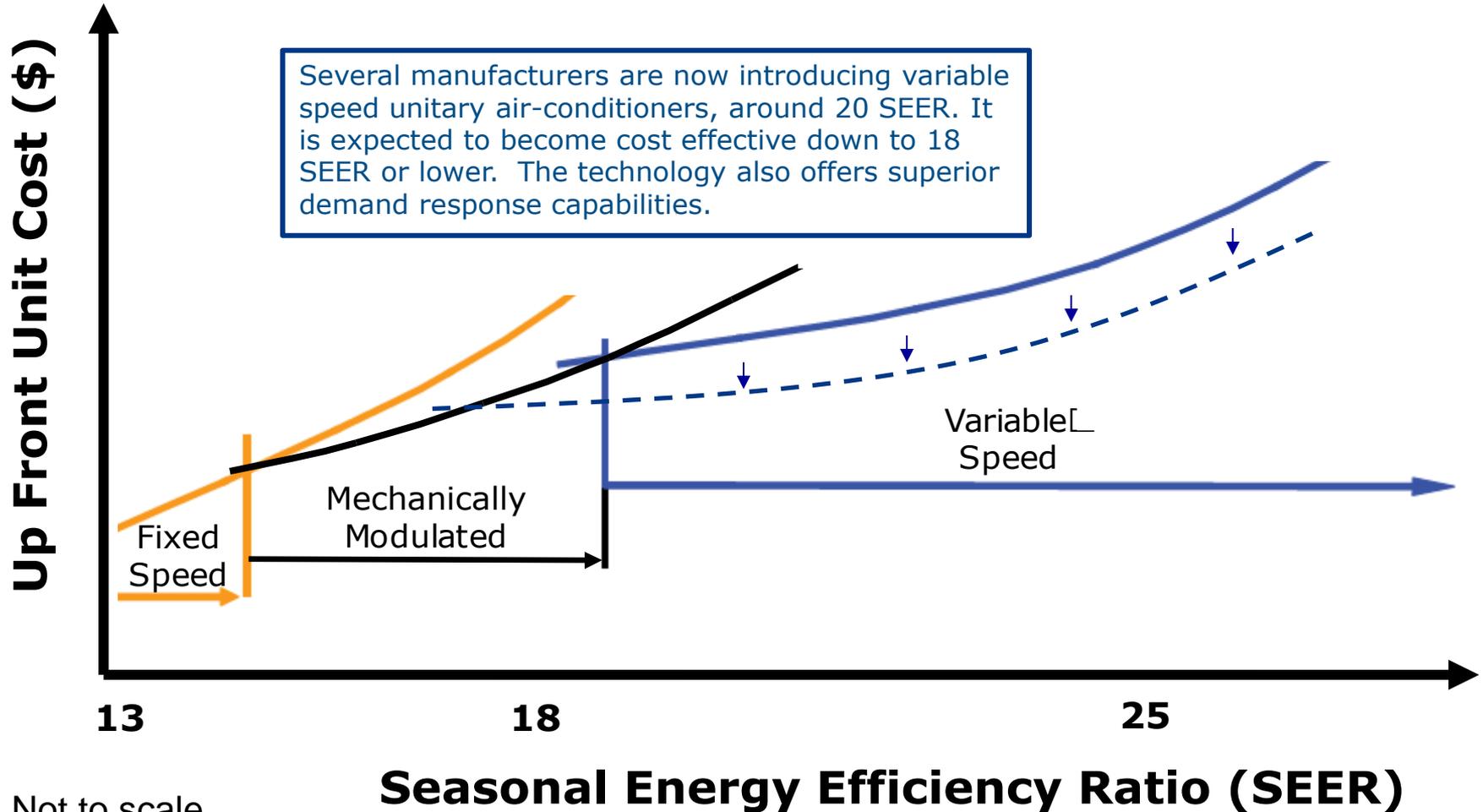
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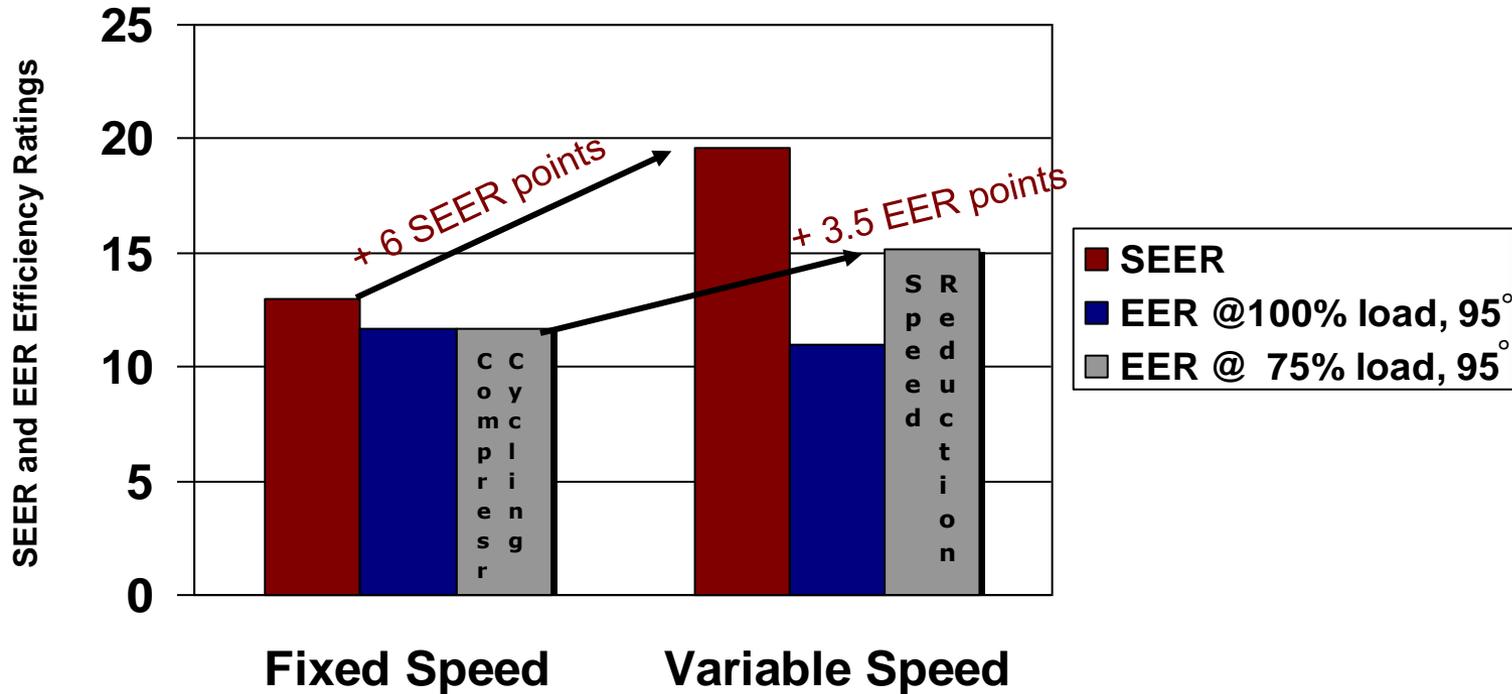
Cost Efficient Technologies (conceptual cost relationships)



Not to scale.

How Variable Speed A/C Could Benefit Utilities

Simulated Performance



Results of Load Control at Full Load Conditions:

Alternative:

Output reduction:	25%	25%	~14%
Power reduction:	~25%	~43%	25%

About AHRI

- **Is one of the nation's largest trade associations**
 - Representing over 300 HVACR and water heating manufacturers across 39 product sections
- **Administers rigorous certification programs**
 - 40 Certification Programs
- **Establishes international standards**
 - Nearly 100 industry standards and guidelines
- **Engages in the shaping of public policies**
- **Represents the industry domestically & globally**
- **Administers a comprehensive industry statistics program**



we make life better™

AHRI Smart/Connected Equipment Committee

- Participated in discussions with AHAM, USGBC, PNNL, EPA, EPRI, CEE, NIST, OpenADR Alliance, ZigBee Alliance, ClimateTalk Alliance and utilities on approaches to “smart” technologies
- Findings and activities:
 - Published AHRI white paper on “smart” systems in November 2013
 - Recommend direct communication with utilities (no additional devices)
 - Reviewed a strawman specification on variable capacity unitary systems that was developed by EPRI and Danfoss
 - OpenADR 2.0 and SEP 2 attractive for communication
 - Discussion with CEE and utilities suggests that modular approach for legacy systems may be feasible

Smart Systems Definition

- **AHRI believes that smart systems should be capable of**
 - Receiving, interpreting and acting on external signal(s)
 - Adjusting operation according to preset minimum performance standards depending on external signal's requirements
 - Communicating product's relevant status back to utility
 - Having settings that are easy for consumers to activate
 - Providing audio/visual alerts and information to consumers
- **We foresee a scenario where smart systems could be shipped with capabilities that would be activated upon consumers entering an agreement with utilities or third party providers**
- **Consumers should have the option to override equipment modes**

CEE Members Working Together

Program Administrators

AEP—Ohio
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 Alliant Energy—Wisconsin
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 Ameren Missouri
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 Cascade Natural Gas
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 Light Company
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 Kansas City Power and
 Light
 LG&E and KU Energy LLC
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 Hampshire
 Long Island Power
 Authority
 Los Angeles Department of
 Water & Power
 MidAmerican Energy
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 Commerce
 Mississippi Power
 Montana-Dakota Utilities
 National Grid
 Natural Resources Canada

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 New England Gas
 Company
 New Hampshire Electric
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 Public Utilities
 New Jersey Natural Gas
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 Labrador Hydro
 Newfoundland Power
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 Gas
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 Utah
 Rocky Mountain Power—
 Wyoming
 Sacramento Municipal
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 Salt River Project
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 SaskPower
 Seattle City Light
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 Company
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 Vermont Department of
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 Vermont Gas Systems, Inc.
 Wisconsin Focus on
 Energy
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Efficiency Organizations National Laboratories

Alliance to Save Energy
 American Council for an
 Energy-Efficient Economy
 California Energy Commission
 California Institute for Energy
 and Environment
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 Sustainable Energy Systems
 Lawrence Berkeley National
 Laboratory
 Massachusetts Department of
 Energy Resources
 Midwest Energy Efficiency
 Alliance
 National Renewable Energy
 Laboratory
 Natural Resources Defense
 Council
 New Buildings Institute
 Northeast Energy Efficiency
 Partnerships
 Northwest Energy Efficiency
 Alliance
 Oak Ridge National Laboratory
 Pacific Northwest National
 Laboratory
 Southwest Energy Efficiency
 Project

Federal Advisors

Natural Resources Canada
 US DOE
 US EPA

CEE members develop market initiatives and explorations with impact in U.S. and Canada



Residential

Whole House

HVAC

Gas Space Heating

Appliances

Gas Water Heating

Lighting

Consumer
Electronics



Commercial

Building Performance

Unitary Air-conditioning
and Heat Pumps

Gas Boiler Systems

Clothes Washers

Kitchens

Gas Water Heating

Lighting Systems

Data Centers
and Servers



Industrial

Strategic Energy Management

Premium Efficiency Motors

Motor Systems

Distribution Transformers

Municipal Water and
Wastewater

Work plans: cee1.org/committee-work

Initiative documents: cee1.org/content/cee-program-resources

Industry Partnerships Are Key to Effective DSM Programs

Directory of Energy Efficient HVAC Equipment



Central Air-Conditioner and Heat Pump Efficiency 101
Find a Rebate or Incentive Program
Why Choose ENERGY STAR?
How and Why of Certified
How to Use the Directory
About CEE and AHRI

ENERGY STAR

- Find Split or Packaged Air Conditioners
- Find Split or Packaged Heat Pumps
- Find Variable Speed Mini-Split and Multi-Split Air Conditioners
- Find Variable Speed Mini-Split and Multi-Split Heat Pumps

The CEE/AHRI Verified Directory identifies a list of products (less than 65 MBtu/h) that the manufacturers represent as meeting energy performance tiers established by the [Consortium for Energy Efficiency \(CEE\)](#) as a part of the [Residential Air Conditioner and Heat Pump Initiative](#) and the High Efficiency Commercial Air Conditioning Initiative. These initiatives make use of [tiers](#) to differentiate equipment on the basis of energy performance with a [higher tier](#) representing a higher level of claimed performance.

Please note that the Directory lists all the products that meet the performance levels specified in the ENERGY STAR Central Air Conditioner and Air-Source Heat Pump specification. However, only those products that are listed by an ENERGY STAR partner are officially recognized as ENERGY STAR qualified. For a list of ENERGY STAR Partners, visit: www.energystar.gov/products

AHRI

CEE
Consortium for Energy Efficiency

For Consumers
Find out how you can improve your comfort while saving energy and environment.
[More](#)

For Specifiers/Contractors
Learn about proper sizing and installation and how to find the right equipment for each application.
[More](#)

For Efficiency Program Administrators
Learn about new strategies to promote energy efficiency in the field.
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ACCA
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ACCA Standard

STANDARD NUMBER: ANSI/ACCA 5 QI-2007

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Arlington, VA 22206
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www.acca.org

HVAC Quality Installation Specification

Residential and Commercial Heating, Ventilating, and Air Conditioning (HVAC) Applications

The Air Conditioning Contractors of America Educational Institute (ACCA-EI) Standards Task Team (STT) develops standards as an American National Standards Institute (ANSI) accredited standards developer (ASD). ACCA develops voluntary standards as outlined in the ACCA Essential Requirements and the ANSI Essential Requirements. ACCA standards are developed by diverse groups of industry volunteers in a climate of openness, consensus building, and lack of dominance (e.g., committee/group/team balance). Essential requirements, standard activities and documentation can be found in the standards portion of the ACCA website at www.acca.org. Questions, suggestions, and proposed revisions to this standard can be addressed to the attention of the Standards Task Team, ACCA, 2800 Shirlington Road, Suite 300, Arlington, VA 22206.

ACCA Standards are updated on a five-year cycle. The date following the standard number is the year of approval release by the ACCA-EI Standards Task Team. The latest copy may be purchased from the ACCA online store at www.acca.org or ordered from the ACCA bookstore via toll-free telephone at 888.200.2220.
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Status of Meetings and Next Steps

November:

- AHRI Committee reviewed draft DR performance spec for utility discussions
- R. Wilkins reported status to AHRI Board of Directors; increased OEM interest and support

December:

- Keynote presentation to leading utility meeting convened by EPRI
- Conference call with leading utilities convened by CEE

January - April, 2014:

- EPRI and CEE working group meetings with utilities and manufacturers
- Joint AHRI – CEE member working group meeting
- April 17 workshop with AHRI, CEE, EPRI, leading utilities and manufacturers
 - Refined draft specification for DR performance and signal response upon receipt of utility signals
 - Developed draft specification for communication protocol layers
 - Now subject to review, edit and approval

Thank you!