



U.S. DEPARTMENT OF  
**ENERGY** | Energy Efficiency &  
Renewable Energy

# Energy Efficiency - A U.S. Resource

May 16, 2012

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Office of Energy Efficiency and  
Renewable Energy

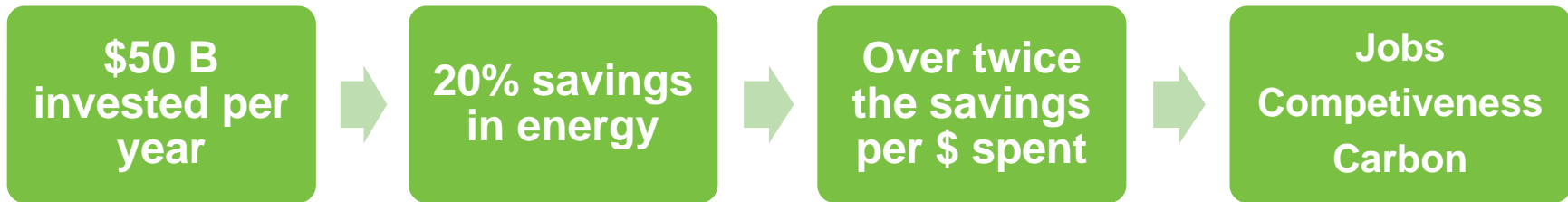
# Importance of Energy Efficiency

Part of “all-the-above” strategy

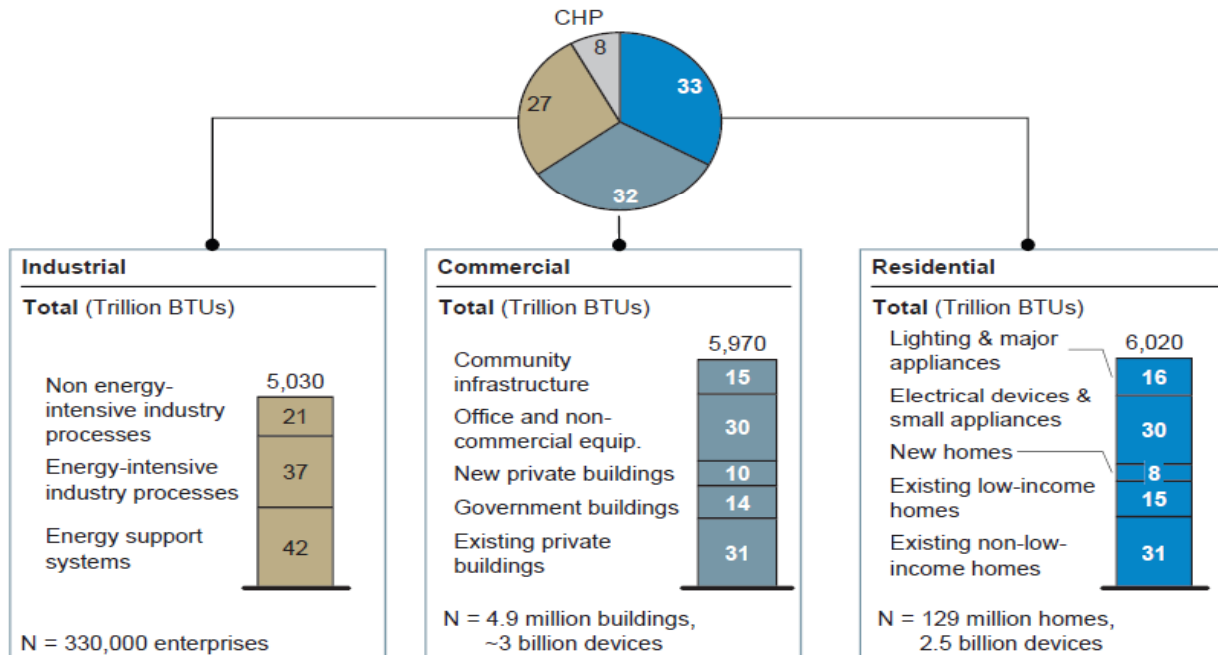
Achieves key objectives:

- Local job creation / retention
- Homeowner and Business/Industrial Savings
  - Lower bills
  - Avoided infrastructure over longer-term
- Environment / public health benefits
- Industrial competitiveness

# EE Opportunities in Homes, Buildings, and Industry



Percent, 100% = 18,410 trillion BTUs of primary energy



Source: EIA AEO 2008, McKinsey analysis

# Priorities

- Appliance/equipment standards
  - Building codes: Adoption and implementation
  - Improvements to existing buildings
  - Government buildings/policies
  - State and local policies
  - Access to financing
  - New technology innovation
- Leadership
  - Best practices
  - Information
  - Measurement
  - Consistency

# Progress

- Recovery Act
  - **\$12 B** in energy efficiency investments (low income, public buildings)
  - **700 K** low income homes weatherized -- ahead of target
  - **\$550 M** in loan funds across 35 states
  - **2,300** local governments engaged in projects
- Appliance/equipment programs
  - Standards for over 30 products since 2009 offering savings of almost **\$400 B** thru 2030;
  - New certification procedures; new public database; compliance program
  - ENERGY STAR
- Building codes
  - **Almost 60% of** states have adopted or made significant steps to adopt latest building codes from **16** in 2009
- State energy savings targets
  - About 50% of states
- Ratepayer funded investment
  - Grown to **\$6.6 B / yr** in 2010, more than double a few years ago

# DOE Efforts to Address EE Challenges

*Using convening power, recognition for excellence, technical expertise, technical assistance to develop consistent approaches, best practices, objective information*

## Replicable Models

- Consumer
- Financial Firms
- Program Administrators
- Contractors



Better Buildings Challenge  
Better Buildings Neighborhoods  
Finance Best practices (ESPCs, RLFs)  
Building Codes

## Better Information / Tools

- To Engage Consumers
- Skilled/Trained Workforce
- Credible evaluation methods



Building Energy Asset / Upgrade Tools  
(MPG ratings)  
Industrial CHP Outreach - CEACs



Workforce guidelines, training, credentials



Uniform Methods Project

## State/Local Policies



SEE Action

## Advanced technologies



Partnerships  
Design Guides

# Leading Organizations Showcasing Replicable Business Models

## Better Buildings, Better Plants Challenge

### Goals:

- 20% savings in commercial and industrial buildings by 2020
- Replicable, demonstrated models across different organization types / ownership types / building types

### Challenge:

- Leadership opportunity
- Challenge partners commit to:
  - Set public energy savings goals
  - Announce innovative strategies
  - **Share implementation strategies and results**
- Financial allies commit to provide financing
- Program administrators commit energy use data and multimeasure programs
- DOE supports and recognizes partners



### Program launched Dec 2:

- 60+ Partners and Allies to date

### Commitments Made:

- 1.6 Billion sq ft commercial space
- \$2 Billion in financing through allies
- 300 manufacturing facilities
- Federal facility goal: \$2 Billion in energy investment

Full list of partners and allies at

<http://www4.eere.energy.gov/challenge/>

# Replicable Business Models

## Better Buildings, Better Plants Challenge

Partners / Allies	Decision Frameworks	Barrier Breaking Strategies	Services/ Best Practices	Supporting Resources
Commercial real estate Retail Food service Hospitality Healthcare Government Communities Industry Financial Utilities	Savings targets Energy management Continuous improvement (SEP)	Set-aside funds Metering strategies Executive compensation Facility energy champions Green Leasing	Performance contracting RCx Energy services High efficiency retrofits Lab savings program Utility programs with data access	Training materials Professional certifications Assessment tools Building efficiency scoring tools Design tools Measurement protocols



# Working with State and Local Government Leaders

- Challenge partners announced at the program launch:
  - Cities: Atlanta, Denver, DC, Houston, Los Angeles, Sacramento, Seattle
  - States: Minnesota, Iowa
- Actively working with State and local leaders to participate in the Challenge
- National Summit for States and Local communities this summer (June 26-27 in Denver)
  - Highlight innovative strategies and implementation models to increase energy efficiency
  - Profile BBC partners in the public sector and efforts underway
  - Recognize new partners (Cities and States)
  - Peer to peer exchanges; info on financing solutions

# Replicable Business Models

## Better Buildings Neighborhood Program

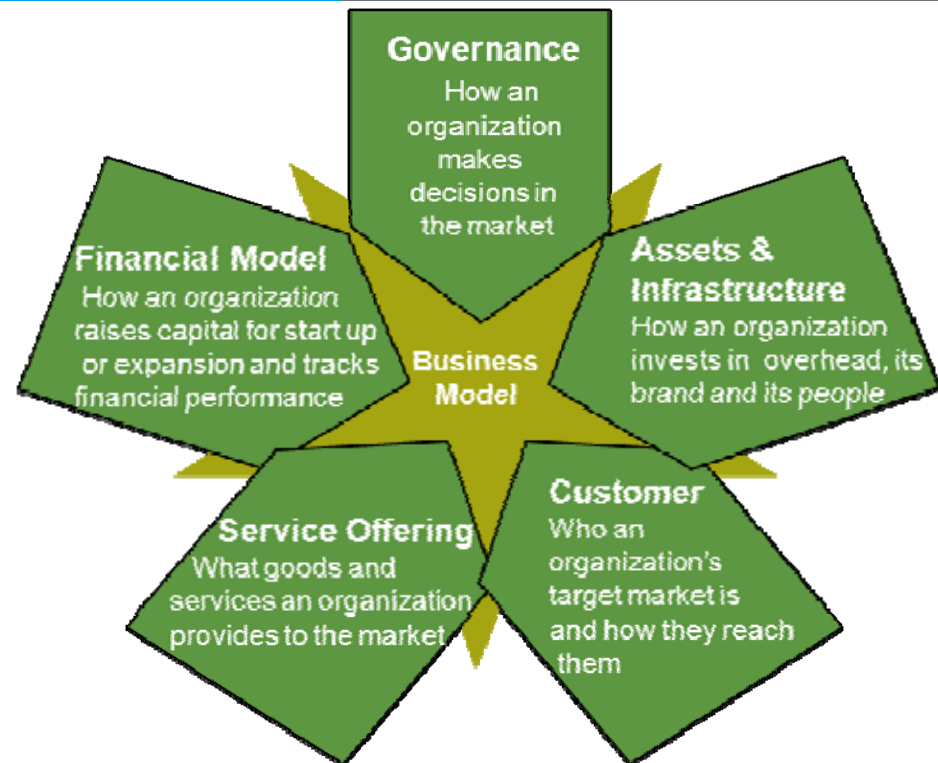


### Overview

- 32 States
- 41 3-year grants of \$1.4 to \$40 million each

### Goals

- **Develop sustainable energy efficiency upgrade programs**
- Reduce the cost of retrofit program delivery by 20% or more
- Achieve 15-30% energy savings from energy efficiency upgrades
- Upgrade >100,000 buildings (residential and commercial)
- Leverage \$1-3 B in additional resources
- Engage 10-30k contractors in upgrade work
- Save consumers approximately \$65 million per year on energy bills



### Next Steps

- Spring 2012: Release Final Business Models Guide
- July 9-11, 2012: Lessons Learned Workshop – Arlington, VA

[www.betterbuildings.energy.gov/neighborhoods](http://www.betterbuildings.energy.gov/neighborhoods)

# Growing Access to Financing

## Goal: Lower cost of capital for energy efficiency customers

ARRA funding - \$550 million in 50 revolving loan funds (35+ states)

### DOE providing TA:

- Transitioning RLFs to investment authorities
- Design public private partnerships
- Attract institutional investors
- Standardize financing products and develop secondary markets

### Examples

- **On-Bill Finance** (utility bill/utility capital): Utility lends capital, originates and services all loans.
- **On-Bill Invoice:** (private capital, bonding) Utility invoices, provides no capital and may not originate loan
- **3rd Party Bill** (utility, private capital): Third party originates and services loans.
- **Investment Authority/State Agency** (bonding, QECB, ARRA, state, rate payer capital): Originates and services loans directly or through 3<sup>rd</sup> Party Bill

Credit enhancements can be applied to any of the above examples (rate payer, ARRA, state, QECB)

# State and Local Policies: Building Energy Codes

- Goals:**
- 50% Better Codes for Increased Energy Savings
  - 70% Initiative for Increased Adoption (40 states by 2015)
  - 90% Compliance by 2017

## Research & Development Activities

*Support and guidance for the next model code*

### Commercial Code Development

- Submit code proposals towards 50% goal
- Provide technical analysis to support model code development

### Residential Code Development

- Develop code change proposals to update the IECC to embody the 50% improved code
- Published Residential Cost-Effectiveness Methodology to evaluate the economic impacts of codes

### Rulemakings

- Issue 2012 IECC Final Determination
- Preliminary Determination for 2012 IECC, Final for ASHRAE 90.1 2010 published in Oct. 2011
- NOPR for Manufactured Housing

## Deployment Support

*Adoption and compliance with codes*

### Adoption - Technical Assistance to States:

- State specific adoption and compliance plans
- Analysis of energy savings from new codes
- Analysis of first cost impacts and cost-effectiveness
- Comparative analysis of future code options
- Development of Resource Guides

### Compliance-

- Custom training materials for state codes
- Training on the national model codes and state codes
- State-specific energy codes in [REScheck](#)
- State-specific energy codes in [COMcheck](#)

# Industrial Efficiency / Combined Heat and Power

## Benefits of CHP

- High efficiency; up to (75-80% efficient vs. 45% for separate)
- Cost savings to user
- Emissions reductions
- Improved grid reliability; distributed in location

## Policy Issues

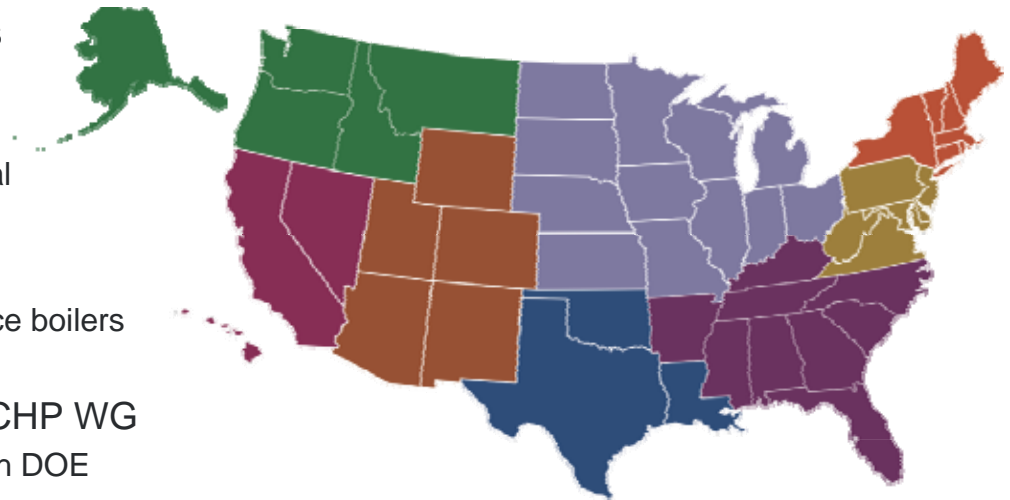
State policy barriers require cooperation between: regulators, utilities, environmental stakeholders, and end-users

## Federal Resources

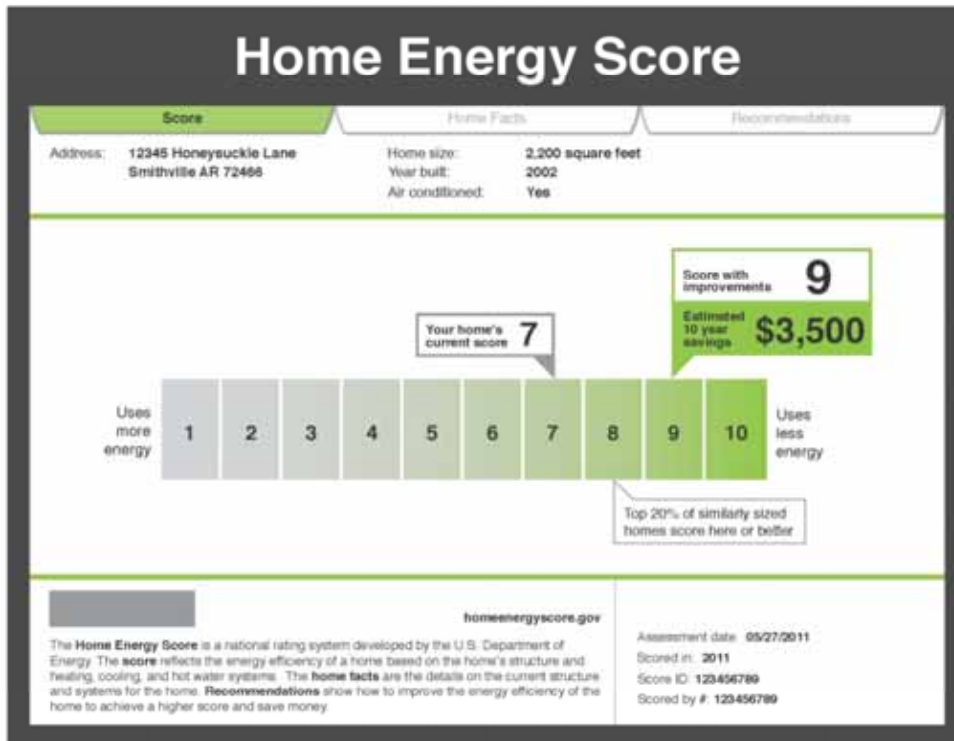
- 9 Regional Clean Energy Application Centers
  - Help evaluate state policies and impact on CHP
  - Share best practices
  - Identify manufacturing facilities with CHP potential
- EPAs pending Boiler MACT rule compliance:
  - DOE Technical Assistance for 14,000 major source boilers
- SEE Action Industrial Energy Efficiency and CHP WG
  - Upcoming regional workshops in coordination with DOE
  - Attendees will include State regulators, utilities, industry

40 gigawatts of new, cost-effective CHP by 2020 would yield:

- 1 quad savings
- 150 mmt CO2 savings
- 75% of McKinsey CHP economic potential
- \$10 billion/yr savings for energy users relative to typical use of energy



# Better Information: Home Energy Score



- Voluntary MPG rating for homes / recommendations for improvement
- Low cost service by partners
  - 15 minutes if in concert with other assessment
  - Less than 1 hour if stand-alone
- Improvements from pilot feedback:
  - Simplified homeowner materials
  - Improved scoring tool
  - Revised assessor training and testing
- Spring/Summer 2012 – Phase 2
  - Utilities
  - Contractors

# Better Information: Commercial Building Asset Rating

## Building Life Cycle

Design



Build



Ongoing Assessment

### Goals:

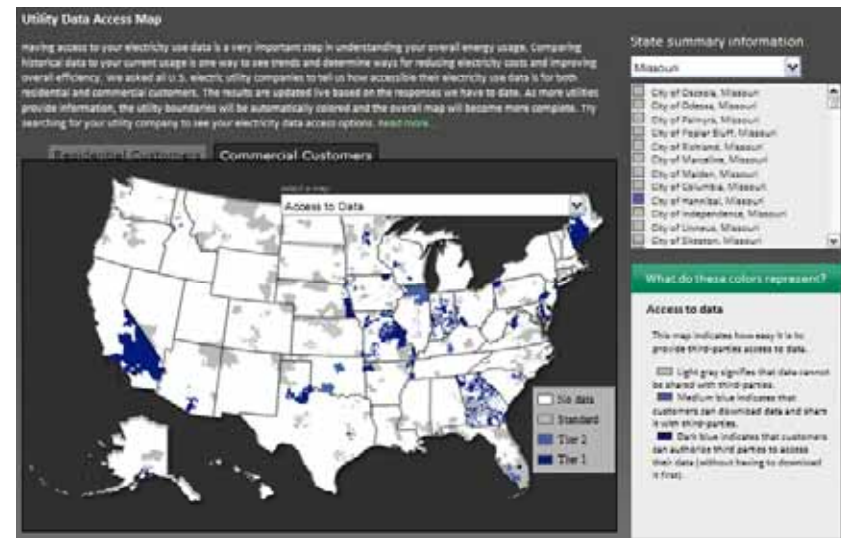
- Low cost, credible method for voluntary commercial building asset rating / opportunities for improvement
- Drive demand for efficiency programs
- Improve targeting of future ee programs

### Schedule:

- RFI – initial scoping document – received public comment in September
- Stakeholder workshop Dec 8, 2011
- Pilot in Spring 2012, Second Phase Pilot Fall 2012
- More information:  
<http://www.commercialbuildings.energy.gov/assetrating.html>

# Better Information on Utility Bills

- **Green Button**
  - Standardized data access
  - Commitments from ~ 20 utilities representing ~30 million households
- **Data applications challenge**
- **Data Access Best Practices**
  - Available April 2012
  - 20% utilities responding





# EE Workforce Development Activities

**Goal: Support a skilled private sector workforce capable of completing high-quality energy efficiency work and deliver savings**

## **My Energy Gateway (Launched May 8)**

- Developed by AESP with grant support from DOE
- Information Clearinghouse for education/career in energy: Degrees/certifications, career options, scholarships
- For high school counselors/students, community colleges, returning veterans, displaced workers

## **Residential: Guidelines for Home Energy Professionals**

- **Work Specifications (for quality installations)**
  - Single Family: Final public comment period closed May 15; publication Summer 2012
  - Multifamily Standard Work Specifications – Public comment open now
- **Training—Guidelines and Accreditation**
  - Guidelines for effective training (Job Task Analyses) available now
  - IREC training program accreditation open to applicants
  - WAP core curriculum and NTER system available now
- **Certification for Professionals**
  - Certification pilot exams available now for 4 new DOE and NREL-supported certifications
- **Implementation**
  - Implementation options for program administrators -- Fall 2012

## **RFI on Residential "HVAC to Home Performance" – Open until June 1**

- Seeks comment on how to best support HVACR contractors in becoming residential whole-house EE services.

# Workforce Development – Commercial/Industrial

## Commercial/Industrial

- **Training**
  - Commercial Building Workforce Core Competencies (Job/Task Analyses)
    - End of May 2012
    - DOE-supported, industry-developed documents identifying knowledge, skills, and abilities required to perform key tasks in six commercial building-related EE occupations (with FEMP and GSA)
  - 13 ARRA grants to training programs for curriculum development – ongoing
  - PNNL—NIST Re-tuning training extension pilot – underway
- **Certification for Professionals**
  - Supporting private-sector certifications for Federal Building Personnel Training Act (with GSA – 2013)
- **Implementation (ongoing)**
  - Superior Energy Performance (Industrial and Commercial Buildings)
  - Utility, State and Local Government programs
  - Better Buildings Challenge

# Better Measurement

## Uniform EM&V Methods Project

### **Vision: Bring Uniformity and Transparency to Energy Savings Calculations for Energy Efficiency Projects and Programs**

- Currently, different calculation methods, lack of clarity cause confusion
  - 17 guidance documents (i.e. Technical Reference Manuals) with different savings estimation methods cover 21 states
  - Savings estimates vary by as much as a factor of two to more than 10
- Uniform methods will
  - Strengthen credibility of savings calculations through greater consistency and transparency
  - Simplify comparison of savings across similar programs in different jurisdictions
  - Reduce EM&V development costs
  - Increase acceptance of reported energy savings by financial and regulatory communities

### **Goal: Uniform methods for calculating program-level savings for up to 20 measures. Seven underway:**

- Commercial Lighting
- Commercial Unitary HVAC
- Commercial Lighting Controls
- Residential Lighting
- Residential Furnaces and Boilers
- Whole House Retrofit
- Refrigerator Recycling

# Better Measurement Uniform EM&V Methods Project

## Participants

### State Officials

- Miles Keogh, National Association of Regulatory Utility Commissioners (NARUC)
- Amy Royden-Bloom, National Association of Clean Air Agencies (NACAA)
- Kevin Gunn, Missouri Public Service Commission
- Nancy Seidman, Commonwealth of Massachusetts
- Dub Taylor, State of Texas
- Diana Lin, Association of State Energy Officials (NASEO)
- Malcolm Woolf, State of Maryland

### Utilities

- Val Jensen, Commonwealth Edison
- Mary Ann Ralls, National Rural Electric Cooperative Association (NRECA)
- Chuck Rea, MidAmerican Energy Company
- Gene Rodrigues, Southern California Edison (SCE)
- Emmett Romine, Detroit Edison (or Bill Newbold Jr.)

### Non-Profit Organizations

- Tom Eckman, Regional Technical Forum (RTF)
- Steve Kromer, Efficiency Valuation Organization (EVO)/ SKEE
- Marty Kushler, American Council for an Energy-Efficient Economy (ACEEE)
- Julie Michals, Northeast Energy Efficiency Partnerships (NEEP)
- Steve Schiller, on behalf of Lawrence Berkeley National Laboratory

### Observers

- Linda Ecker, AEP Ohio
- Carla Frisch, Department of Energy
- Michael Li, Department of Energy
- Phyllis Reha, Minnesota, Public Utility Commission
- Steve Rosenstock, Edison Electric Institute
- Lisa Wood, Institute for Electric Efficiency

### Efficiency Service Providers/ESCO

- Donald Gilligan, National Association of Energy Service Companies (NAESCO)

## Timeline

- Technical reviews of the first set of 7 protocols in spring and summer 2012
  - Major stakeholders in U.S. energy efficiency programs are invited to participate.
- First set of 7 protocols publish late 2012
  - Recommendations for cross-cutting issues such as sample and survey design are addressed.
- Second set of 10 protocols publish in 2013

# State and Local Policies – SEE Action



**SEE Action**  
STATE & LOCAL ENERGY EFFICIENCY ACTION NETWORK

- Network of 200+, led by state and local policymakers, bringing EE to scale
- Provides best practices and recommended approaches on key EE policy areas based on state/local experience. Resources include:
  - Industrial Energy Efficiency and Combined Heat and Power (CHP) Model Policies and Programs Guide
  - Benchmarking/Disclosure and Auditing/Retro-Commissioning Model Policies for Commercial and Public Buildings
  - Regulators’ Guide to Addressing Issues Arising from 3<sup>rd</sup> Party Data Access for EE
  - Analyzing and Managing Bill Impacts of Energy Efficiency Programs
  - EM&V for Behavior-Based Efficiency Programs
  - A toolkit for regulators, policymakers and financial institutions on best practices for EE financing structures
- DOE Technical Assistance
  - Access to assistance from National labs, Regional Efficiency Organizations, technical experts

For more information: [www.seeaction.energy.gov](http://www.seeaction.energy.gov)

# Advanced Technologies

## Advanced specifications

- Example High Performance Roof-top Unit Challenge
- 50 to 60% savings over ASHRAE
- DOE verifying performance

## Technology screening web portal (under development)

## Technology evaluation coordination

- With federal partners (DOD, GSA)

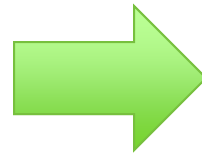
## Advanced Energy Design Guides

- Designed to help architects, engineers, and contractors design and build buildings, helping to save energy and cut facility operational costs
- 4 Guides for 50% Energy Savings in:
  - Small/Medium Office Buildings
  - K-12 Schools
  - Medium Retail Buildings
  - Large Hospitals (released early May)

# Looking forward

Energy efficiency is top priority energy resource  
Savings, jobs, competitiveness, economy, environment

- Leverage ARRA
- Address Barriers
- Grow Partnerships



**Growing energy  
efficiency  
industry**