

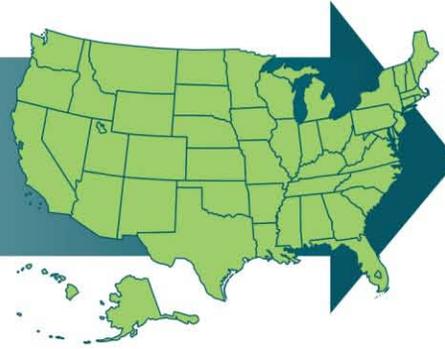


**SEE Action**

STATE ENERGY EFFICIENCY ACTION NETWORK

# Existing Commercial Buildings Working Group Blueprint

May 5, 2011



# SEE Action

STATE ENERGY EFFICIENCY ACTION NETWORK

The Existing Commercial Buildings Working Group of the State Energy Efficiency Action Network is committed to taking action to increase investment in cost-effective energy efficiency. This Blueprint was developed under the guidance of and with input from the Working Group. The document does not necessarily represent an endorsement by the organizations of Existing Commercial Buildings Working Group members.

The Existing Commercial Buildings Working Group Blueprint is a product of the State Energy Efficiency Action Network and does not reflect the views, policies, or otherwise of the federal government.

If this document is referenced, it should be cited as: State Energy Efficiency Action Network (2011). Existing Commercial Buildings Blueprint. [www.seeaction.energy.gov](http://www.seeaction.energy.gov)

# Outline

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  - Barriers
- Priority Solutions
- Mapping Solutions to Key Stakeholders
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# STATE ENERGY EFFICIENCY ACTION NETWORK INTRODUCTION



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# Today's Challenges

- **Challenges**

- Energy: Rising price of electricity, dependence on imported oil, cost of compliance with environmental regulations
- Environmental: Need to reduce emissions, protect sensitive water bodies
- Economic: Need to create jobs, reduce price of energy

- **Energy Efficiency – a critical piece of the solution**

- Energy: Diversifies energy mix, lowest-cost resource reduces demand
- Environmental: Zero emissions
- Economic: Creates jobs (implement efficiency programs)



# Where We Are Today

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- Increasing levels of investment in energy efficiency, but not sufficient to achieve all cost-effective efficiency
- Wide range of state policies
- Now is the time to capitalize on the investments in energy efficiency from the Recovery Act and ensure the benefits from these efforts are sustained
- Many well-documented barriers preventing the capture of efficiency benefits—policy, regulatory, customer, market, programmatic



# State Energy Efficiency Action Network

- State Energy Efficiency Action Network (SEE Action) is a federal-state-local effort to assist state and local governments in:
  - Advancing efficiency policies and programs
  - Removing barriers and disincentives to realizing energy savings through efficiency
  - Growing state-level investments in cost-effective efficiency
- Goal: To help the nation achieve all cost-effective energy efficiency options by 2020 by assisting state and local governments in their implementation of energy efficiency policies and programs
- Executive Group
  - Provides visionary leadership, strategic direction, and prioritization
  - Approximately 30 members representing state policy makers, business leaders, utilities, non-governmental organizations, associations, etc.
  - Facilitated and co-chaired by the U.S. Department of Energy (DOE) and the Environmental Protection Association (EPA)



# Working Groups



- Eight issue-oriented Working Groups to drive investment in efficiency
- Represent areas of the economy and infrastructure that can increase energy efficiency
- Chaired by state and local leaders
- Advance consistent approaches, best practices, considerations and recommendations
- Develop Blueprints to chart the course for achieving near- and long-term aggressive goals
- Use Blueprints to guide implementation efforts so stakeholders can work together



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# WORKING GROUP INTRODUCTION



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# Working Group Members

- Two co-chairs
- 24 Members
  - State and local government and coordinating organizations
  - Utilities
  - Commercial real estate firms

<b>Co-Chairs</b>	
Jim Gallagher	New York Independent System Operator
Janet Streff	Minnesota Department of Commerce
<b>State &amp; Local Government; Coordinating Organizations</b>	
Jennifer Amann	American Council for an Energy-Efficient Economy
Glen Anderson	National Council of State Legislatures
Tom Barone	NYSERDA
Valerie Brown	National Association of Counties
Sean Denniston	New Buildings Institute
Doug Gatlin	US Green Building Council
Dale Hahs	Energy Services Coalition
Jeff Harris	Alliance to Save Energy
Martha Hewett	Center for Energy and Environment
Miles Keogh	National Association of Regulatory Utility Commissioners
Art von Lehe	ICLEI: Local Governments for Sustainability
Cliff Majersik	Institute for Market Transformation
Kevin McCarty	US Conference of Mayors
Eric Oliver	Association of Energy Engineers
Carolyn Sarno	Northeast Energy Efficiency Partnership (NEEP)
Al Skodowski	Building Owners and Managers Association
Ed Wisniewski	Consortium for Energy Efficiency
Tammy Zborel	National League of Cities
<b>Utilities</b>	
Marissa Barrera	Southern California Edison
Jared Lawrence	Duke Energy
David Pospisil	ConEd
<b>Other</b>	
John Gilbert	Rudin Management
Dan Probst	Jones Lang LaSalle
Alecia Ward	The Weidt Group



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  - Phil Farese, National Renewable Energy Laboratory



# Approach to Goals and Scope

## Big Picture Questions

Where do we want to be?

Where are we now?

How do we get there?

## Blueprint Components

1. Set broad goals
2. Define scope and key terms (i.e., what level of “retrofit”)
3. Outline what meeting the goals looks like (key factors, level of activity)

4. Assess current baseline of activity
5. Review market barriers we face
6. Review how current programs and policies are/are not overcoming barriers; identify gaps

7. Identify work and recommendations to address gaps and meet goals and roles for key organizations
8. Show how we will measure progress



# Goals

## Goals:

- Reduce energy use 20% or more in 3 billion square feet (ft<sup>2</sup>) of commercial space annually by 2015 through whole-building approaches
- Within one year, help 10 state and 30 local governments adopt one or more of the ten Solutions described in this Blueprint
- SEE Action Goal: Capture all cost-effective energy efficiency by 2020

## Background:

- ~1 billion ft<sup>2</sup> annually: rough estimate of current rate of deep retrofits (Pacific Northwest National Laboratory (PNNL) and National Renewable Energy Laboratory (NREL))
- Meeting 3 billion ft<sup>2</sup> of deep retrofits annually goal by 2015 (5 billion ft<sup>2</sup> annually by 2020) would save ~28% of the total estimated energy efficiency potential in existing commercial buildings by 2020
- 3 billion ft<sup>2</sup> annually goal calls for a sustainable retrofit industry and strikes a balance between rapidly capturing existing energy efficiency opportunities, the limits to industry scale-up, and sustained effort over 10 years



# Meeting the Goal: Key Elements

- Break sector into key market segments
  - Small/large
  - Owner-occupied/leased
  - Public/private
- Key elements to examine for each segment
  - Investment levels and mechanisms: current and goal-consistent levels
    - Private
    - State and local financing vehicles
    - Ratepayer-funded energy efficiency programs
    - Energy Service Performance Contracting (ESCO) approaches
  - Workforce needs: current and goal-consistent levels
    - Extent of workforce (by type)
    - Workforce training capacity
  - Programs and policies
    - Types of programs/policies
    - State/local/other roles
  - Demand creation
  - Tools and resources

*This Blueprint provides an analytical framework*

Goals for progress	2010 Baseline	2011	2012	2013	2014	2015
Billion square feet per year retrofit with 20% performance improvement	1.0	1.4	1.8	2.2	2.6	3.0
Annual investment on whole-building energy efficiency	2.3	3.2	4.2	5.1	6.0	6.9
Cumulative square feet Retrofit (beginning 1/1/2011)	1.0	1.4	3.2	5.4	8.0	11.0
Annual energy saved, primary quads	0.03	0.04	0.08	0.14	0.21	0.29



# Scope

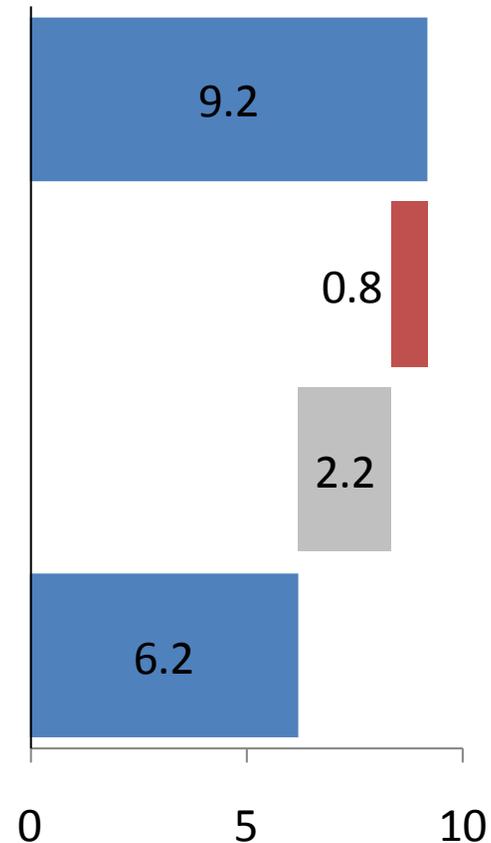
- Commercial sector
  - Public and private
  - Non-federal
- Whole building improvements (not new construction or simple end-of-life equipment replacement), including:
  - Deep retrofits
  - Operational improvements
  - Retro-commissioning
  - Whole-building performance, systems integration, and controls



# Impact of Goals and Scope

<b>Where We Are Today:</b>	Existing commercial and government buildings would use 9.2 quads of primary energy in 2020 (with “frozen” technology)
<b>Working Group Goals:</b>	Increase commercial building deep retrofit market from ~1 billion ft <sup>2</sup> /year in 2010 to 3 billion ft <sup>2</sup> /year in 2015 to 5 billion ft <sup>2</sup> /year in 2020
<b>Scope:</b>	Reaching goals would capture 28% of the potential energy efficiency in existing commercial and government buildings, leaving 2.2 quads to address through other activities
	<b>Resulting 2020 energy use if all potential is addressed</b>

Energy, quadrillion primary Btu



Note: Excludes office equipment, miscellaneous electric loads, and community infrastructure.  
Potential estimate based on McKinsey 2009.



# Definitions

- **Commercial Building\***

- Any private or public building for which at least 50% is *NOT*
  - **Residential** (a dwelling for one or more households)
  - **Manufacturing/industrial** (used for processing or procurement of goods, merchandise raw materials or food)
  - **Agricultural** (used for the production, processing, sale, storage, or housing of agricultural products, including livestock)
- Includes, but not limited to: stores, offices, schools, churches, gymnasiums, libraries, museums, hospitals, clinics, warehouses, and jails

- **Commercial Building Energy Efficiency Improvement**

- Focus on whole-building policies and programs (beyond single-system retrofits)
- Capital investment specifically intended to improve energy performance
- Deep retrofits: savings of 20 % or more
- Low- and no-cost measures to improve energy performance undertaken as part of retro-commissioning, building tune-up, and improved operations and maintenance activities

\*Using Commercial Buildings Energy Consumption Survey (CBECS) definition.



# Baseline

## Current Market Activity

- ~79 billion ft<sup>2</sup> of existing commercial and non-federal government space holds significant opportunities for cost-effective improvements (CBECS)
- Current commercial building deep retrofits are estimated to reach ~1 billion ft<sup>2</sup>/year (PNNL)
- \$5-\$6 billion/ year total public and private investment in commercial building energy retrofits; likely no more than half of this is spent on deep retrofits/retro-commissioning (McGraw Hill, Lawrence Berkeley National Laboratory (LBNL), PNNL, Consortium of Energy Efficiency (CEE))
- Workforce of ~17,000 supports commercial retrofits (LBNL, PNNL)
- Recovery Act adding substantial new capacity: public buildings, financing, workforce
- More granular market data may be important in design of individual programs

## Key Programs and Policies in Place

- Few jurisdictions have extensive whole-building programs/policies in place for existing buildings; ratepayer programs are beginning to grow
- The retro-commissioning industry is still in its infancy
- ESCOs serve primarily municipal, universities, schools, and hospitals market, with little activity in private commercial market

## Available Resources

- A variety of programs and policies on which to build; there is a need to highlight leading examples for each market segment
- Growing programs to train the workforce

Note: Additional information on the baseline is available in the Appendix.



# Barriers

- **Structural:** Agency problems, e.g. landlord/tenant, organizational disconnects; ownership transfer, e.g. tenant turnover, resale valuation of energy efficiency investment
- **Behavioral:** Perception of risk; lack of key information; custom/habit; discounting of energy savings
- **Availability:** Technology, workforce, capital

Note: Additional information on the baseline is available in the Appendix.



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# PRIORITY SOLUTIONS



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# Process of Identifying Solutions and Actions to Overcome Key Barriers

- Review best-practice policies and programs (representative examples):
  - National Action Plan for Energy Efficiency best-practice information
  - *Unlocking Energy Efficiency in the U.S. Economy*, McKinsey
  - *The New York City Greener, Greater Buildings Plan*
  - *California Zero Net Energy Action Plan: Commercial Building Sector 2010-2012*
  - *Energy Efficiency Services Sector: Workforce Education and Training Needs*, LBNL
  - *Energy Efficiency Paying the Way: New Financing Strategies Remove First-Cost Hurdles*, CalCEF Innovations
  - ICF's review of recent state, local, utility policy and program innovation
- Develop core policy/program solutions with recommended actions from key stakeholders
- Incorporate working group feedback in repeated revisions to produce final solution set



# Priority Solutions and Actions to Achieve the Goal

## Mid-term Goal

By 2015, reduce energy use by at least 20% in 3 billion square feet of commercial space each year through whole-building retrofits and/or operational improvements

## Four Pillars

**Drive Demand for Energy Efficiency**

**Enable Efficient Operations and Investment**

**Build the Workforce**

**Move the Market**

## Priority Solutions Areas

**1. Benchmarking**

Improve information through benchmarking/disclosure

**2. Retro-commissioning (RCx)**

RCx and retrofit requirements

**3. Ratepayer-funded Programs**

Target whole-building programs

**4. Public-private Partnerships**

Energy challenges, recognition programs, etc.

**5. Organizational Energy Management Programs**

Adopt comprehensive energy management programs

**6. Green Leasing**

Integrate efficiency and green practices in leasing practices

**7. Financing Innovation**

Credit enhancement, revolving loans, etc.

**8.1. Education & Training**

Build training capacity

**8.2. Materials**

Develop standardized training materials

**8.3. Certification**

Standardize around meaningful and nationally-recognized professional certifications

**9. Procurement Reform**

Bulk purchasing, specifications, life cycle costing, and streamlined Energy Savings Performance Contracts (ESPC)

**10. Emerging Technology Demonstration**

Through public-private partnerships, competitions, etc.



# Policy and Program Solutions

## Empower The Private Sector

### Drive Demand for Energy Efficiency

1. Benchmarking
2. Retro-commissioning (RCx)
3. Ratepayer-funded Programs
4. Public-private Partnerships

### Enable Efficient Operations and Investment

5. Org. Energy Management Programs
6. Green Leasing
7. Financing Innovation

### Build the Workforce

8. Workforce Development

## Lead in Public Buildings

### Drive Demand for Energy Efficiency

1. Benchmarking
2. Retro-commissioning (RCx)
3. Ratepayer-funded Programs

### Enable Efficient Operations and Investment

4. Org. Energy Management Programs
5. Green Leasing
6. Financing Innovation

### Move the Market

9. Procurement Reform
10. Emerging Tech Demonstration

Note: Solutions in **blue font** can be implemented in public and private commercial buildings.



# Drive Demand for Energy Efficiency

## Solution 1: Benchmarking

Policies and programs that require/promote energy use benchmarking and public disclosure of results. Can be implemented at the point-of-transaction or at a recurring interval (e.g., annually) and should ideally be tied to organization-wide goals and a commitment to continuous improvement. Tie benchmarking to audits.

**Example: California Assembly Bill 1103; Washington, DC Clean and Affordable Energy Act of 2008; New York City Greener, Greater Buildings Plan; San Francisco Existing Commercial Buildings Energy Performance Ordinance**

- State and local governments should consider requirements for benchmarking / public disclosure publicly-owned and privately-owned buildings above a certain size
- DOE, EPA, national, and regional organizations should consider developing and updating details on jurisdictions with such policies
- Real estate and building owner/manager organizations should consider adopting benchmarking policies and programs, educate members, and provide technical assistance
- Utilities (IOUs, munis and co-ops) and utility commissions should consider providing customers their usage data, preferably on an automated basis, in forms compatible with established benchmarking software



# Drive Demand for Energy Efficiency

## Solution 2: Retro-commissioning

Policies and programs that require/promote energy assessments, fine-tuning of building energy systems, and whole-building energy efficiency upgrades. Can be implemented at the point-of-transaction or at a recurring interval (e.g., annually) and should ideally be tied to organization-wide goals and a commitment to continuous improvement.

### Example: New York City Greener, Greater Buildings Plan

- State and local governments should consider requirements for publicly-owned and privately-owned buildings above a certain size
- DOE, EPA, national, and regional organizations should consider developing and updating details on jurisdictions with such policies
- Real estate and building owner and manager organizations should help educate members and provide technical assistance
- Utilities (IOUs, munis and co-ops) and utility commissions should consider providing customer data, preferably on an automated basis, in forms compatible with established benchmarking software



# Drive Demand for Energy Efficiency

## Solution 3: Ratepayer-funded Programs

Ratepayer-funded programs that promote whole-building energy performance and continuous improvement similar to EPA's Building Performance with ENERGY STAR model.

**Examples: Pacific Gas & Electric More Than A Million Program; Duke Energy Strategic Energy Management Plan, and DOE Save Energy Now programs**

- Program administrators\* should consider implementing programs designed to transform the market through multi-measure projects, compatibility with ESPC business model, and comprehensive energy management rather than/in addition to individual measure incentive programs
- DOE, EPA, national, and regional organizations should consider developing information and case studies
- National organizations, states, and utility commissions should consider collaborating on these program models to support their applicability from a program theory and from a cost-effectiveness perspective
- States and utility commissions should consider supporting cost recovery mechanisms and incentives to support continued and expanded energy efficiency and demand response/smart grid programs

\*Including investor-owned utilities (IOU), municipalities (munis), co-ops, states, and others.



# Drive Demand for Energy Efficiency

## Solution 4: Public-private Partnerships

Building energy use reduction challenges/competitions and recognition programs to spur benchmarking and technological and behavioral energy reduction projects. Emphasis on engaging private sector and increasing consumer awareness.

**Examples: EPA National Building Competition; ICLEI- Local Governments for Sustainability and City of Chicago Green Office Challenge; Building Owners and Managers Association (BOMA) Kilowatt Crackdown**

- State and local governments should consider hosting such initiatives
- DOE, EPA, national, and regional organizations should consider developing and updating details on jurisdictions with such programs and hosting such initiatives
- Real estate and building owner and manager organizations should help educate members and provide technical assistance and consider hosting such initiatives
- Utilities (IOUs, munis and co-ops) and utility commissions should consider providing customers their usage data, preferably on an automated basis, in forms compatible with established benchmarking software.



# Enable Efficient Operations and Investment

## Solution 5: Organizational Energy Management Programs

Organization-wide energy management programs that promote whole-building energy performance improvement based on the emerging ISO 50001 standard and others.

**Examples: Hawaii Lead by Example Initiative; Rhode Island Asset Protection Plan requirements; North Carolina Utility Savings Initiative**

- State and local governments should consider adopting such programs and supporting their adoption in the private sector
- DOE should consider developing materials and technical assistance on such programs; EPA should continue to offer ENERGY STAR resources to support organization-wide energy management programs
- Program administrators\* should consider offering such programs to customers, and working with state and local governments to support their programs
- Industry associations should consider promoting and providing information and technical support for such programs

\*Including IOUs, munis, co-ops, states, and others.



# Enable Efficient Operations and Investment

## Solution 6: Green Leasing

Reforming commercial lease practices so that lease terms encourage tenants and owners to reduce energy use/costs and incorporate other sustainability principles.

**Examples: BOMA Green Lease Guide; California Sustainability Alliance Green Lease Toolkit; Pennsylvania High Performance Green Building Lease Criteria; Portland Creating a High Performance Workspace G/Rated Tenant Improvement Guide**

- State and local governments should consider adopting green leasing practices for their leased space
- State and local governments should encourage green leasing in their private building markets through education of building industry stakeholders, provision of incentives (e.g., streamlined permitting) and recognition (e.g., window decal, awards) to building owners, and should consider the impact of Financial Accounting Standards Board 13 changes
- DOE, EPA, national, and regional organizations should consider developing materials and technical assistance on such programs



# Enable Efficient Operations and Investment

## Solution 7: Financing Innovation

Policies and programs that require/promote innovative financing of energy efficiency projects through credit enhancement (e.g., loan loss reserves, loan guarantees); revolving loans; guaranteed or insured performance savings, etc.

**Examples: Texas LoanSTAR Revolving Loan Program; San Diego Gas & Electric On-bill Financing Program; Metrus Energy Efficiency Services Agreement Model; Transcend Equity Managed Energy Service Agreement Model; Energi Energy Savings Warranty Program**

- State and local governments should consider establishing or providing funding to establish reserve or revolving loan funds
- Federal and state governments should consider providing loan guarantee programs energy efficiency with tax benefits comparable to those for renewable energy
- DOE, EPA, national, and regional organizations should consider developing materials and technical assistance on such funds
- Utilities should consider upgrading utility IT and billing systems to facilitate on-bill financing options



# Build the Workforce

## Solution 8: Workforce Development

Policies and programs that require/promote education, training, standardized materials development, and certification for energy efficiency services professionals, building inspectors, architects, engineers, etc.

**Examples: Rhode Island school facility operator certification; New York City energy auditor/RCx contractor certification, New York State Energy Research and Development Authority Green Jobs Green New York training program; City of Austin energy auditor training program**

- State and local governments should consider working with program administrators\* and applicable stakeholders to implement workforce development programs and leverage existing programs (e.g., DOE Building Technologies Program-5 grants)
- State and local governments with auditing/RCx requirements should tie those requirements to national professional certification standards
- DOE, EPA, national, and regional organizations should consider developing and updating information on green workforce programs
- National organizations should define energy efficiency career ladders, key occupations involved in maximizing the efficiency of commercial buildings, and preferred certification programs

\*Including IOUs, munis, co-ops, states, and others.



# Move the Market

## Solution 9: Procurement Reform

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Policies and practices that require/promote procurement reform through life-cycle costing, bulk purchasing/cooperative purchasing, and energy performance specifications (e.g., ENERGY STAR, Electronic Product Environmental Assessment Tool).

### Example: King County, Washington Environmental Purchasing Policy

- State and local governments should consider adopting such policies and practices
- DOE, EPA, national, and regional organizations should consider developing materials and technical assistance



# Move the Market

## Solution 10: Emerging Technology Demonstration

Policies and programs that require/promote demonstration of emerging energy-efficient technologies and practices.

### Example: Austin Energy/Clean Energy Incubator Clean Energy Test-bed Collaboration

- State and local governments should consider adopting such policies and practices
- DOE, EPA, national, and regional organizations should consider developing materials and technical assistance
- Program administrators\* should consider partnering with state and local governments and related stakeholders to test emerging technologies
- Technology incubators, research centers, and related organizations should consider partnering with state and local governments and program administrators to test emerging technologies

\*Including IOUs, munis, co-ops, states, and others.



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# MAPPING SOLUTIONS TO KEY STAKEHOLDERS



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# Drive Demand for Energy Efficiency

		Stakeholder				
		Local Gov't.	State Gov't.	Program Administrators* and Utility Commissions	National, Regional NGOs	Industry Groups
<b>Solution</b>	<b>Drive Demand for Energy Efficiency</b>					
	<b>Solution 1: Benchmarking</b>	Adopt benchmarking policies for public/private buildings	Adopt benchmarking policies for public/private buildings	Provide customer usage data	Develop/update case studies	Create voluntary programs; Educate members; Provide technical assistance
	<b>Solution 2: Retro-commissioning</b>	Adopt RCx policies for public/private buildings	Adopt RCx policies for public/private buildings	Provide customer usage data	Develop/update case studies	Create voluntary programs; Educate members; Provide technical assistance
	<b>Solution 3: Ratepayer-funded Programs</b>		Collaborate with other stakeholders on program design/ development;  Support cost recovery mechanisms and incentives	Implement whole-building , multi-measure programs;  Utility commissions should support cost recovery mechanisms and incentives;  Link EE and DR programs to take advantage of cross-marketing, co-delivery, and other complementarities	Develop/update case studies;  Collaborate with other stakeholders on program design/ development	Collaborate with other stakeholders on program design/development;  Partner with utilities to educate and recruit members for program participation
<b>Solution 4: Public-private Partnerships</b>	Host energy challenges	Host energy challenges	Provide customer usage data	Develop/update case studies;  Host energy challenges	Educate members; Provide technical assistance;  Host energy challenges	



# Enable Efficient Operations and Financing

		Stakeholder				
		Local Gov't.	State Gov't.	Program Administrators* and Utility Commissions	National, Regional NGOs	Industry Groups
Solutions	<b>Solution 5: Energy Management Programs</b>	Adopt organization-wide energy management programs	Adopt organization-wide energy management programs	Support state/local energy management programs	Develop materials; Provide technical assistance	Promote participation; Develop materials; Provide technical assistance
	<b>Solution 6: Green Leasing</b>	Adopt green leasing practices; Educate building industry stakeholders; Provide incentives; Provide recognition	Adopt green leasing practices; Educate building industry stakeholders; Provide incentives; Provide recognition		Develop materials; Provide technical assistance	Develop materials; Provide technical assistance
	<b>Solution 7: Financing Innovation</b>	Establish reserve or revolving loan funds; Establish loan guarantee programs;	Establish or provide funding to establish reserve or revolving loan funds; Establish loan guarantee programs; Adopt requirements for utilities to facilitate (not necessarily provide) financing	Adopt targeted financing programs to complement incentive programs	Provide implementation support to state and local governments; Develop materials; Provide technical assistance	Convene stakeholders to identify key financing needs and create programs that meet these needs.

\*Including IOUs, munis, co-ops, states, and others.



# Move the Market

		Stakeholder				
		Local Gov't.	State Gov't.	Program Administrators* and Utility Commissions	National, Regional NGOs	Industry Groups
<b>Solutions</b>	<b>Solution 9: Procurement Reform</b>	Adopt procurement reform policies	Adopt procurement reform policies		Develop materials; Provide technical assistance	
	<b>Solution 10: Emerging Technology Demonstration</b>	Provide test-bed environment for emerging technologies; Document and share results and performance data	Provide test-bed environment for emerging technologies; Document and share results and performance data	Partner with state and local governments and related stakeholders to test emerging technologies; Document and share results and performance data	Develop materials; Provide technical assistance	Partner with state and local governments and utilities to test emerging technologies

\*Including IOUs, munis, co-ops, states, and others.



# DOE and EPA Role

- SEE Action is focused on guidance and resources for non-federal entities, success will require all parties working to complement each-other. Generally, the federal role will include:
  - Convening stakeholders to identify needs
  - Collaborating with stakeholders on program design/development
  - Provide technical assistance
  - Ensuring that programs document and share results and performance data
  - Developing tools and programs (e.g. benchmarking tools)
  - Developing/updating case studies



# Identifying Resources to Support Solutions Benchmarking

Needed Resources	Audience	Existing Resources	Additional Resources Needed
Model ordinance/law	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Industry groups</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">California Assembly Bill (AB) 1103</a></li> <li><a href="#">Washington, DC Clean and Affordable Energy Act of 2008</a></li> <li><a href="#">NYC Greener, Greater Buildings Plan</a></li> <li><a href="#">San Francisco Existing Commercial Buildings Energy Performance Ordinance</a></li> </ul>	<ul style="list-style-type: none"> <li>Develop standardized state benchmarking law template (underway – EPA)</li> <li>Develop standardized local benchmarking ordinance template (underway – EPA)</li> </ul>
Fact sheets	<ul style="list-style-type: none"> <li>State and local governments</li> <li>Utilities &amp; PUCs</li> <li>Property owners/ managers</li> <li>Industry groups</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">EPA Portfolio Manager Fact Sheet</a></li> <li><a href="#">California Benchmarking Fact Sheet</a></li> <li><a href="#">PG&amp;E Benchmarking Fact Sheet</a></li> </ul>	<ul style="list-style-type: none"> <li>Tailor for key audiences</li> <li>Highlight solutions to barriers (e.g., data privacy, data access)</li> </ul>
Standardized guidelines	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Utilities &amp; PUCs</li> <li>Property owners/ managers</li> <li>Industry groups</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">EPA Guidelines for Energy Management</a></li> </ul>	<ul style="list-style-type: none"> <li>Stress linkage between benchmarking and continuous improvement</li> <li>Standardize approaches for consumer protection, data request, and data transfer</li> <li>Develop compliance guidelines, training program (underway – DOE)</li> </ul>
Training presentations/materials	<ul style="list-style-type: none"> <li>State and local governments</li> <li>Utilities &amp; PUCs</li> <li>Property owners/ managers</li> <li>Industry groups</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">EPA Step-by-Step Guide to Benchmarking Using Portfolio Manager</a></li> </ul>	<ul style="list-style-type: none"> <li>Tailor for key audiences</li> </ul>
Utility billing and IT systems that support automated data transfer	<ul style="list-style-type: none"> <li>Utilities</li> <li>Public utility commissions</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Automated Benchmarking for Utilities</a></li> <li><a href="#">BOMA Policy Statement on Energy Use Data Acquisition</a></li> <li><a href="#">Utility Best Practices Guidance for Providing Business Customers with Energy Use and Cost Data</a></li> <li>Standard for Energy Usage Information (PAP 10)</li> </ul>	<ul style="list-style-type: none"> <li>Highlight value of utility data to owners</li> </ul>
Funding sources	<ul style="list-style-type: none"> <li>Private lending community (banks)</li> <li>State and local governments</li> <li>Utilities &amp; PUCs</li> <li>Property owners/ managers</li> <li>Industry groups</li> </ul>	<ul style="list-style-type: none"> <li>NCY Energy Efficiency Corporation</li> </ul>	<ul style="list-style-type: none"> <li>Provide guidance on how to obtain funding for utilities to provide automated data transfer infrastructure</li> <li>Provide guidance on how to obtain funding for entities to conduct benchmarking</li> </ul>



# Identifying Resources to Support Solutions Retro-commissioning

Needed Resources	Audience	Existing Resources	Additional Resources Needed
Model ordinance/law	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">NYC Greener, Greater Buildings Plan</a></li> </ul>	<ul style="list-style-type: none"> <li>Develop standardized state RCx law template</li> <li>Develop standardized local RCx ordinance template</li> </ul>
Fact sheets	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Utilities</li> <li>Public utility commissions</li> <li>Property owners/ managers</li> <li>Industry groups</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">California RCx Fact Sheet</a></li> <li><a href="#">Mills 2009 Golden Opportunity Report</a></li> <li><a href="#">Individual RCx case studies</a></li> </ul>	<ul style="list-style-type: none"> <li>Tailor for key audiences</li> <li>Highlight benefits of RCx</li> <li>Stress need for maintenance of energy and building systems to keep system operating optimally</li> </ul>
Standardized guidelines	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Utilities</li> <li>Public utility commissions</li> <li>Property owners/ managers</li> <li>Industry groups</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">EPA Guidelines for Energy Management</a></li> <li><a href="#">NYSERDA RCx Guidelines and Supporting Documentation</a></li> <li><a href="#">California RCx Guidelines</a></li> <li><a href="#">Oregon RCx Handbook</a></li> <li><a href="#">Florida Energy Audit Agreement</a></li> <li><a href="#">ASHRAE Standards</a></li> <li><a href="#">COMNET Modeling Guidelines and Procedures</a></li> </ul>	<ul style="list-style-type: none"> <li>Develop a standardized template or reach consensus on leading guidance</li> </ul>
Utility billing and IT systems that support automated data transfer	<ul style="list-style-type: none"> <li>Utilities</li> <li>Public utility commissions</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Automated Benchmarking for Utilities</a></li> </ul>	<ul style="list-style-type: none"> <li>Highlight need for cost recovery with PUCs</li> </ul>
Funding sources	<ul style="list-style-type: none"> <li>Banks</li> <li>State and local governments (and their associations)</li> <li>Utilities</li> <li>Public utility commissions</li> <li>Property owners/ managers</li> <li>Industry groups</li> </ul>	<ul style="list-style-type: none"> <li>TBD</li> </ul>	<ul style="list-style-type: none"> <li>Need to provide guidance on available resources to fund RCx studies and implement recommended upgrades post-RCx</li> </ul>

Highlighted items have been selected as “priority work areas.”



# Identifying Resources to Support Solutions Ratepayer-funded Programs

Needed Resources	Audience	Existing Resources	Additional Resources Needed
Model program case studies	<ul style="list-style-type: none"> <li>Utilities</li> <li>Public utility commissions</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">EPA Building Performance with ENERGY STAR Pilot Program</a></li> <li><a href="#">Pacific Gas &amp; Electric More Than a Million Program</a></li> <li>Duke Energy Energy Savings Master Plan Program</li> <li><a href="#">Duke Energy – Smart Energy Now Program</a></li> <li><a href="#">CEE Program Summary Database</a></li> </ul>	<ul style="list-style-type: none"> <li>Survey existing case study databases and link them together. Consider any important gaps in coverage among existing case study databases and develop plan to fill gaps by allowing program administrators and interested organizations to submit best practice case studies</li> <li>Document cost-effectiveness of program portfolio</li> </ul>
Fact sheets	<ul style="list-style-type: none"> <li>Public utility commissions</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Regulatory Assistance Project Energy Efficiency Policy Toolkit</a></li> </ul>	<ul style="list-style-type: none"> <li>Tailor to state government and public utility commissions to educate on need for utility DSM spending cost-recovery mechanisms and incentives</li> <li>Tailor to public utility commissions to educate on cost-effectiveness tests that support multi-measure programs and strategic energy management</li> </ul>
Program development guidance	<ul style="list-style-type: none"> <li>Utilities (electricity and gas, all ownership structures)</li> <li>Non-utility program administrators</li> <li>Public utility commissions</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Sponsors Guide to ENERGY STAR for Commercial Programs</a></li> </ul>	<ul style="list-style-type: none"> <li>Outreach to XX utilities about value of whole-building energy performance measurement and continuous improvement models such as BPwES</li> <li>Outreach to XX utilities about value of RCx programs</li> <li>Mine the BPwES pilots and future programs (assuming the program is rolled out nationwide) to identify packages of measures that get to the 20% savings target and find ways to drive larger markets for those measures.</li> </ul>
Model DSM plan filing language	<ul style="list-style-type: none"> <li>Utilities</li> <li>Public utility commissions</li> </ul>	<ul style="list-style-type: none"> <li>EPA is working on developing sample BPwES filing language</li> </ul>	<ul style="list-style-type: none"> <li>Create additional filing language for programs that promote whole-building, multi-measure approaches to optimize building energy performance</li> </ul>



# Identifying Resources to Support Solutions Public-private Partnerships

Needed Resources	Audience	Existing Resources	Additional Resources Needed
Model program case studies	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Property owners/ managers</li> <li>Industry groups</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">EPA National Building Competition</a></li> <li><a href="#">Chicago Green Office Challenge</a></li> <li>BOMA's Kilowatt Crackdown</li> </ul>	<ul style="list-style-type: none"> <li>Survey existing case study databases and link them together. Consider any important gaps in coverage among existing case study databases and develop plan to fill gaps by allowing program administrators and interested organizations to submit best practice case studies</li> </ul>
Fact sheets	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Property owners/ managers</li> <li>Industry groups</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">ENERGY STAR Benchmarking Competition Fact Sheet</a></li> <li><a href="#">Advanced Energy Design Guides</a></li> </ul>	<ul style="list-style-type: none"> <li>Tailor to target audiences</li> </ul>
Standardized label/certification for buildings/organizations that achieve energy savings goal	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Property owners/ managers</li> <li>Industry groups</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">ENERGY STAR for Buildings</a></li> <li><a href="#">LEED</a></li> <li><a href="#">Collaborative for High Performance Schools</a></li> </ul>	<ul style="list-style-type: none"> <li>Provide templates/models for national energy challenges along the lines of LEED, ENERGY STAR, and other labels (e.g., Austin Energy has a label businesses who purchase renewable energy can affix to their window)</li> <li>Focus recognition on organizations (rather than buildings) that set and achieve an energy reduction goal, develop an energy management plan, and/or implement specified whole-building improvements</li> </ul>
Sponsorship of national energy challenge(s)	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Property owners/ managers</li> <li>Industry groups</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">EPA National Building Competition</a></li> </ul>	<ul style="list-style-type: none"> <li>Conduct outreach to state and local governments about the value of energy challenges</li> <li>Consider having respective government association sponsor national energy challenges for their member local and state governments</li> </ul>
Funding sources	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Utilities</li> <li>Public utility commissions</li> <li>Property owners/ managers</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li>TBD</li> </ul>	<ul style="list-style-type: none"> <li>Consider seed money for national energy challenge(s)</li> </ul>

Highlighted items have been selected as “priority work areas.”



# Identifying Resources to Support Solutions Organizational Energy Management Programs

Needed Resources	Audience	Existing Resources	Additional Resources Needed
Model program case studies	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Utilities</li> <li>Public utility commissions</li> <li>Property owners/ managers</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">EPA Energy Efficiency in Local Government Facilities and Operations</a></li> <li><a href="#">Hawaii Lead by Example Initiative</a></li> <li><a href="#">North Carolina Utility Savings Initiative</a></li> <li>Pew Center's corporate case studies in: <a href="#">From Shop Floor to Top Floor: Best Business Practices in Energy Efficiency</a></li> </ul>	<ul style="list-style-type: none"> <li>Survey existing case study databases and link them together. Consider any important gaps in coverage among existing case study databases and develop plan to fill gaps by allowing program administrators and interested organizations to submit best practice case studies</li> </ul>
Standardized guidelines	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Utilities</li> <li>Public utility commissions</li> <li>Property owners/ managers</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">International Standards Organization (ISO) 50001 Standard</a></li> <li><a href="#">EPA Guidelines for Energy Management</a></li> <li><a href="#">BetterBricks High Performance Portfolio Framework</a></li> </ul>	<ul style="list-style-type: none"> <li>N/A – existing standards suffice</li> </ul>
Fact sheets	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Utilities</li> <li>Public utility commissions</li> <li>Property owners/ managers</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li>TBD</li> </ul>	<ul style="list-style-type: none"> <li>Conduct outreach about the value of organization-wide energy management programs and strategies for success</li> <li>Develop fact sheets tailored to target audiences</li> </ul>
Utility billing and IT systems that support automated data transfer for benchmarking	<ul style="list-style-type: none"> <li>Utilities</li> <li>Public utility commissions</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Automated Benchmarking for Utilities</a></li> </ul>	<ul style="list-style-type: none"> <li>Highlight need for cost recovery with PUCs</li> </ul>
Standardized label/certification for buildings/organizations that achieve energy savings goal	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Property owners/ managers</li> <li>Industry groups</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">ENERGY STAR for Buildings</a></li> <li><a href="#">LEED</a></li> </ul>	<ul style="list-style-type: none"> <li>Provide templates/models for national energy challenges along the lines of LEED, ENERGY STAR, and other labels (e.g., Austin Energy has a label businesses who purchase renewable energy can affix to their window)</li> <li>Focus recognition on organizations (rather than buildings) that set and achieve an energy reduction goal, develop an energy management plan, and/or implement specified whole-building improvements</li> </ul>
Training presentations/materials	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Utilities</li> <li>Public utility commissions</li> <li>Property owners/ managers</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">EPA Step-by-Step Guide to Benchmarking Using Portfolio Manager</a></li> <li><a href="#">EPA Financing Energy Efficient Upgrades with ENERGY STAR</a></li> </ul>	<ul style="list-style-type: none"> <li>Tailor for key audiences</li> </ul>

Highlighted items have been selected as “priority work areas.”



# Identifying Resources to Support Solutions Green Leasing

Needed Resources	Audience	Existing Resources	Additional Resources Needed
Model green lease language	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Property owners/ managers</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">California Sustainability Alliance Green Leases Toolkit</a></li> <li><a href="#">Pennsylvania High Performance Green Building Lease Criteria</a></li> <li><a href="#">Portland Creating a High Performance Workspace G/Rated Tenant Improvement Guide</a> (see pp. 40-42)</li> <li><a href="#">EPA Green Rider Lease</a></li> </ul>	<ul style="list-style-type: none"> <li>Develop standardized template</li> </ul>
Model lease case studies	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Property owners/ managers</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li>Federal government Energy Star Building requirements</li> </ul>	<ul style="list-style-type: none"> <li>Survey existing case study databases and link them together. Consider any important gaps in coverage among existing case study databases and develop plan to fill gaps by allowing program administrators and interested organizations to submit best practice case studies</li> </ul>
Fact sheets	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Property owners/ managers</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li>TBD</li> </ul>	<ul style="list-style-type: none"> <li>Outreach to state and local governments about value of green leasing and tactics to incentivize</li> <li>Outreach to property owners/managers about value of green leasing</li> <li>Tailor for key audiences</li> </ul>
Standardized guidelines	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Property owners/ managers</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">BOMA Green Lease Guide</a></li> <li><a href="#">Portland Creating a High Performance Workspace G/Rated Tenant Improvement Guide</a></li> </ul>	<ul style="list-style-type: none"> <li>Tailor for key audiences</li> <li>Stress linkage between benchmarking and continuous improvement</li> </ul>

Highlighted items have been selected as “priority work areas.”



# Identifying Resources to Support Solutions Financing Innovation

Needed Resources	Audience	Existing Resources	Additional Resources Needed
Case studies	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Utilities</li> <li>Public utility commissions</li> <li>Property owners/ managers</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Texas LoanSTAR Revolving Loan Program</a></li> <li><a href="#">San Diego Gas &amp; Electric (SDG&amp;E) On-bill Financing program</a></li> <li><a href="#">Metrus Energy Efficiency Services Agreement model</a></li> <li><a href="#">Transcend Equity Managed Energy Services Agreement</a></li> </ul>	<ul style="list-style-type: none"> <li>Survey existing case study databases and link them together. Consider any important gaps in coverage among existing case study databases and develop plan to fill gaps by allowing program administrators and interested organizations to submit best practice case studies</li> <li>Include examples of the following: <ul style="list-style-type: none"> <li>Reserve/revolving loan funds</li> <li>Loan guarantee programs</li> <li>Energy efficiency tax incentives</li> <li>On-bill financing</li> <li>Energy performance contracting</li> </ul> </li> </ul>
Model financing agreements	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Utilities</li> <li>Public utility commissions</li> <li>Property owners/ managers</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">FEMP ESPC Outreach Toolkit</a></li> <li><a href="#">BOMA Energy Performance Contracting Model</a></li> <li><a href="#">ESC Statewide Program Best Practices and Tools</a></li> </ul>	<ul style="list-style-type: none"> <li>Compile model agreements to provide transparency of financing structure and to provide replication of models</li> </ul>
Utility billing and IT systems that support on-bill financing	<ul style="list-style-type: none"> <li>Utilities</li> <li>Public utility commissions</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">San Diego Gas &amp; Electric (SDG&amp;E) On-bill Financing program</a></li> </ul>	<ul style="list-style-type: none"> <li>Highlight need for cost recovery with PUCs</li> </ul>
Funding sources	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Utilities</li> <li>Public utility commissions</li> <li>Property owners/ managers</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li>TBD</li> </ul>	<ul style="list-style-type: none"> <li>Consider seed money for revolving funds, etc.</li> </ul>



# Identifying Resources to Support Solutions

## Workforce Development

Needed Resources	Audience	Existing Resources	Additional Resources Needed
Standardized curriculum	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">NYSERDA Center for Energy Efficiency and Building Science curriculum</a></li> </ul>	<ul style="list-style-type: none"> <li>Partner with national NGO or industry group to standardize curriculum for targeted skill sets that support commercial whole-building energy audits and improvements (under way – DOE)</li> </ul>
Standardized certifications	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Utilities</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">AEE Certified Energy Manager</a></li> <li><a href="#">AEE Certified Energy Auditor</a></li> <li><a href="#">AEE Certified Building Commissioning Professional</a></li> <li><a href="#">AEE Certified Building Energy Simulation Analyst</a></li> <li><a href="#">AEE Certified Lighting Efficiency Professional</a></li> <li><a href="#">AEE Certified Existing Building Commissioning Professional</a></li> <li><a href="#">AEE Certified High Performance Building Professional</a></li> <li><a href="#">ASHRAE High-Performance Building Design Professional</a></li> <li><a href="#">ASHRAE Commissioning Process Management Professional</a></li> <li><a href="#">BCxA Certified Commissioning Professional</a></li> <li><a href="#">Univ. of WI Accredited Commissioning Process Authority Professional</a></li> <li><a href="#">Builder Operator Certification</a></li> <li>ICC: Commercial Energy Plans Examiner</li> <li>ICC: Commercial Energy Inspector</li> <li>BPI: Multifamily</li> </ul>	<ul style="list-style-type: none"> <li>Reach national consensus on approved personnel certifications applicable to workers that support commercial whole-building energy audits and retrocommissioning (under way – DOE)</li> <li>Incorporate DOE-approved standard personnel certifications into laws and regulations in areas such as energy audits and retrocommissioning</li> </ul>
Standardized processes	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Utilities</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">EPA Guidelines for Energy Management</a></li> <li><a href="#">NYSERDA RCx Guidelines and Supporting Documentation</a></li> <li><a href="#">California RCx Guidelines</a></li> <li><a href="#">Oregon RCx Handbook</a></li> <li><a href="#">Florida Energy Audit Agreement</a></li> <li><a href="#">ASHRAE Standards</a></li> <li><a href="#">COMNET Modeling Guidelines and Procedures</a></li> </ul>	<ul style="list-style-type: none"> <li>Develop a standardized template or reach consensus on leading guidance</li> </ul>
Energy efficiency career ladders	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Commercial Energy Efficiency Pathway Model</a></li> <li><a href="#">MN Training Plan for Building Designers and Operators</a></li> </ul>	<ul style="list-style-type: none"> <li>Develop career ladder</li> <li>Incorporate necessary education to support each rung of career ladder</li> </ul>
Funding sources	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Utilities &amp; Public utility commissions</li> <li>Property owners/ managers</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li>TBD</li> </ul>	<ul style="list-style-type: none"> <li>Need to identify workforce development funding</li> </ul>



# Identifying Resources to Support Solutions Procurement Reform

Needed Resources	Audience	Existing Resources	Additional Resources Needed
Model green purchasing policies	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Responsible Purchasing Network Green Purchasing Policies</a></li> <li><a href="#">New York Energy-efficient Appliances Law</a></li> <li><a href="#">King County, WA Environmental Purchasing Policy</a></li> </ul>	<ul style="list-style-type: none"> <li>N/A – covered by RPN and others</li> <li>Model policy focusing on Lifecycle cost and bulk purchasing</li> </ul>
Model program case studies	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Massachusetts Environmentally Preferably Products Procurement Program (also see <a href="http://www.epa.gov/epp/pubs/case/mass.pdf">http://www.epa.gov/epp/pubs/case/mass.pdf</a>)</a></li> <li><a href="#">California Energy Commission Existing Green Procurement Initiatives</a></li> </ul>	<ul style="list-style-type: none"> <li>N/A – covered by RPN and others</li> </ul>
Standardized guidelines	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">CEE State &amp; Local Government Purchasing Initiative Guidebooks</a></li> <li><a href="#">Oregon Green Office Guide</a></li> <li><a href="#">Flex Your Power Commercial Product Guides</a></li> <li><a href="#">Responsible Purchasing Network Green Purchasing Guides</a></li> </ul>	<ul style="list-style-type: none"> <li>N/A – covered by RPN and others</li> </ul>
Model product specifications	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Federal Energy Management Program Purchasing Specifications</a></li> <li><a href="#">NYSERDA Energy-Efficient Equipment Standards for State Purchasing</a></li> <li><a href="#">EPA Contract Language, Specifications, and Policies</a></li> <li><a href="#">EPPNet</a></li> <li><a href="#">Green Seal</a></li> </ul>	<ul style="list-style-type: none"> <li>Consider creating publicly accessible database to which interested organizations can submit sample equipment standards</li> <li>Voluntary product standards/specifications covered by EPA, DOE, RPN, and others</li> </ul>
Model energy-efficient purchasing contract language	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Federal Energy Management Program Model Contract Language</a></li> </ul>	<ul style="list-style-type: none"> <li>N/A – covered by DOE and others</li> </ul>
Fact sheets	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Responsible Purchasing Network Cooperative Contracts Fact Sheet</a></li> <li><a href="#">Responsible Purchasing Network Green Purchasing Standards</a></li> </ul>	<ul style="list-style-type: none"> <li>Outreach to state and local governments about value of various procurement reforms</li> <li>N/A – covered by RPN and others</li> </ul>



# Identifying Resources to Support Solutions Emerging Tech Demonstration

Needed Resources	Audience	Existing Resources	Additional Resources Needed
Model case studies	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Utilities</li> <li>Public utility commissions</li> <li>Property owners/ managers</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Austin Energy / Clean Energy Incubator Clean Energy Test-bed Collaboration</a></li> <li><a href="#">Commercial Building Energy Alliance technology evaluations and case studies</a></li> </ul>	<ul style="list-style-type: none"> <li>Survey existing case study databases and link them together. Consider any important gaps in coverage among existing case study databases and develop plan to fill gaps by allowing program administrators and interested organizations to submit best practice case studies</li> <li>Outreach to local/state government about value of technology demonstration as part of purchasing policies and public-private partnerships</li> </ul>
Request for Technology Demonstration Website	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Utilities</li> <li>Public utility commissions</li> <li>Property owners/ managers</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">DOE combined heat and power (CHP) screening tools and technology reviews</a></li> <li><a href="#">ASERTTI</a></li> <li><a href="#">PIER</a></li> <li><a href="#">Food Service Technology Center</a></li> <li>Western Cooling Center</li> <li>EPRI</li> <li>GTI</li> <li>Customer Technology Application Center</li> </ul>	<ul style="list-style-type: none"> <li>Consider hosting a password-protected website to allow technology vendors to offer technologies for demonstration by state and local governments, utilities, and other interested parties. Encourage existing database providers to jointly propose a centralized clearinghouse.</li> </ul>
Funding sources	<ul style="list-style-type: none"> <li>State and local governments (and their associations)</li> <li>Utilities</li> <li>Public utility commissions</li> <li>Property owners/ managers</li> <li>Industry groups</li> <li>NGOs</li> </ul>	<ul style="list-style-type: none"> <li>TBD</li> </ul>	<ul style="list-style-type: none"> <li>Consider seed money for demo projects/programs</li> </ul>



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# WORK PLAN



**SEE Action**  
STATE ENERGY EFFICIENCY ACTION NETWORK

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# Priority Work Activities

## Create Resources

- (1) Develop benchmarking fact sheet highlighting solutions to barriers (e.g. data privacy, data access)
- (2) Develop standardized templates for state and local retrocommissioning laws
- (3, 4, 5, 6, 7, 9, 10) Survey existing case study databases and link them together. Consider any important gaps in coverage among existing case study databases and develop plan to fill gaps.
- (4) Provide templates/models for national energy challenges along the lines of LEED, ENERGY STAR, and other labels (e.g., Austin Energy has a label that businesses who purchase renewable energy can affix to their window)
- (4) Focus recognition on organizations (rather than buildings) that set and achieve an energy reduction goal, develop an energy management plan, and/or implement specified whole-building improvements
- (5) Develop fact sheet(s) on organizational energy management programs tailored to target audience(s)
- (6) Develop standardized green leasing template
- (7) Develop case studies of exemplary financing innovations including: reserve/revolving loan funds, loan guarantee programs, energy efficiency tax incentives, on-bill financing, energy performance contracting
- (9) Develop a model policy focusing on lifecycle cost and bulk purchasing

## Communicate Concepts

- (1) Outreach to PUCs about importance of PUC support for release of benchmarking data required for state/local laws and about need for cost recovery for billing and IT systems that support automated data transfer for benchmarking
- (2) Outreach to efficiency program administrators\* about the value of retrocommissioning programs
- (3) Outreach to efficiency program administrators about the value of whole-building energy performance measurement and continuous improvement models such as Building Performance with ENERGY STAR
- (4) Outreach to state and local governments about the value of energy challenges
- (5) Outreach to state and local governments and industry groups about the value of organization-wide energy management programs and strategies for successful implementation
- (6) Outreach to state and local governments about the value of green leasing and tactics to incentivize
- (9) Outreach to state and local governments about the value of various procurement reforms
- (10) Outreach to state and local governments about the value of emerging technology demonstration as part of purchasing policies and public-private partnerships

Numbers denote solutions supported by each activity

\*Including IOUs, munis, co-ops, states, and others.



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# Targeted Work Plan

## Drive Demand for Energy Efficiency

Sub-group	Resource to be Developed	Outreach Strategy/Goal	Key Issues to be Addressed	Target Stakeholder Group*						Schedule
				State	Local	Utilities	Regional EE Groups	Building Owners/mgrs	PUCs	
Solution #1: Benchmarking	<ul style="list-style-type: none"> <li>Stakeholder-specific fact sheets on benchmarking</li> </ul>	<ul style="list-style-type: none"> <li>Engage 10 interested PUCs about PUC role in supporting benchmarking laws</li> <li>Engage 10 new state and local govts about passing benchmarking /disclosure laws</li> </ul>	<ul style="list-style-type: none"> <li>Data privacy</li> <li>Automated benchmarking technology</li> <li>Use for internal energy planning vs. public disclosure</li> <li>Link with RCx and org. energy mgt.</li> </ul>	X	X	X	X	X	X	<ul style="list-style-type: none"> <li>5/13 – Draft fact sheets due</li> <li>6/15 – Final fact sheets due</li> <li>6/15 – ID PUCs to target</li> </ul>
Solution #2: Retro-commissioning	<ul style="list-style-type: none"> <li>Stakeholder-specific fact sheets on RCx</li> <li>Standardized state and local RCx law templates</li> </ul>	<ul style="list-style-type: none"> <li>Engage 10 new state and local govts about passing RCx requirements</li> <li>Engage building owners/managers about value of RCx</li> <li>Engage Utilities and PUCs about value of RCx programs</li> </ul>	<ul style="list-style-type: none"> <li>Link with benchmarking and org. energy mgt.</li> </ul>	X	X	X	X	X	X	<ul style="list-style-type: none"> <li>5/13 – Draft fact sheets due</li> <li>6/15 – Final fact sheets and templates due</li> <li>6/15 – ID govts. to target</li> </ul>
Solution #4: Public-private Partnerships	<ul style="list-style-type: none"> <li>Compile existing case studies</li> <li>Templates/models for national/regional/ local energy challenges</li> </ul>	<ul style="list-style-type: none"> <li>Engage 10 new state and local govts. about energy challenges</li> <li>Coordinate with national presidential challenge</li> </ul>	<ul style="list-style-type: none"> <li>Lessons learned from existing energy challenges</li> </ul>	X	X	X	X	X		<ul style="list-style-type: none"> <li>5/13 – Draft template due</li> <li>6/15 – Final template due</li> <li>6/15– ID govts. to target</li> </ul>



# Targeted Work Plan

## Enable Efficient Operations and Investment

Sub-group	Resource to be Developed	Outreach Strategy/Goal	Key Issues to be Addressed	Target Stakeholder Group*						Schedule
				State	Local	Utilities	Regional EE Groups	Building Owners/mgrs	PUCs	
Solution #5: Organizational Energy Management Systems	<ul style="list-style-type: none"> <li>Stakeholder-specific fact sheets on org. energy mgt.</li> </ul>	<ul style="list-style-type: none"> <li>Engage 10 new utilities about BPwES or similar organizational energy management programs</li> </ul>	<ul style="list-style-type: none"> <li>Need case studies and results from BPwES pilot and Superior Energy Performance</li> </ul>			<b>X</b>	X		X	<ul style="list-style-type: none"> <li>5/13 – Draft fact sheets due</li> <li>7/1 – Final fact sheets due</li> <li>6/15 – ID utilities to target</li> </ul>
Solution #6: Green Leasing	<ul style="list-style-type: none"> <li>Stakeholder-specific fact sheets on green leasing</li> <li>Standardized green leasing template</li> </ul>	<ul style="list-style-type: none"> <li>Engage 10 new state and local govts. about the value of green leasing and ways to encourage it</li> <li>Engage building owners/managers about value of green leasing</li> </ul>	<ul style="list-style-type: none"> <li>Split incentives</li> <li>Governments leading by example</li> </ul>	<b>X</b>	<b>X</b>		X	<b>X</b>		<ul style="list-style-type: none"> <li>5/13 – Draft fact sheets due</li> <li>5/15 – Final fact sheets due</li> <li>6/15 – ID govts. to target</li> </ul>
Solution #7: Financing Innovation	<ul style="list-style-type: none"> <li>5 case studies of exemplary financing programs</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>How to continue investment post-ARRA</li> </ul>	<b>X</b>	<b>X</b>	X	X	X		<ul style="list-style-type: none"> <li>7/1 – Draft case studies due</li> <li>8/15 – Final case studies due</li> <li>7/15 – ID govts. to target</li> </ul>

\* Primary targets indicated with large, bold X. Secondary targets indicated with non-bold X.



# Targeted Work Plan

## Move the Market

Sub-group	Resource to be Developed	Outreach Strategy/Goal	Key Issues to be Addressed	Target Stakeholder Group*						Schedule
				State	Local	Utilities	Regional EE Groups	Building Owners/mg	PUCs	
Solution #9: Procurement Reform	<ul style="list-style-type: none"> <li>Model policy focusing on lifecycle cost and bulk purchasing</li> </ul>	<ul style="list-style-type: none"> <li>Engage 10 state and local govts. on adopting a purchasing reform package</li> </ul>	<ul style="list-style-type: none"> <li>Lifecycle benefits/costs</li> <li>Bulk purchasing</li> </ul>	X	X			X		<ul style="list-style-type: none"> <li>5/13 – Draft policy due</li> <li>6/1 – Final policy due</li> <li>4/15 – ID govts. to target</li> </ul>
Solution #10: Emerging Technology Demonstration	<ul style="list-style-type: none"> <li>3 Case studies for successful emerging technology demonstration programs</li> </ul>	<ul style="list-style-type: none"> <li>Engage 10 state and local govts. about adopting new emerging technology demonstration programs</li> </ul>	<ul style="list-style-type: none"> <li>Value to state/local govts. of emerging technology demonstration: economic development, energy efficiency</li> <li>Tie-in with public-private partnerships</li> </ul>	X	X					<ul style="list-style-type: none"> <li>5/13 – Draft case studies due</li> <li>6/15 – Final case studies due</li> <li>6/15 – ID govts. to target</li> </ul>
Cross-solution (#3, 4, 5, 6, 7, 9, 10): Case Study Database Linking	<ul style="list-style-type: none"> <li>List of key databases and other sources of resources / case studies that should be included in a centralized clearinghouse</li> </ul>		<ul style="list-style-type: none"> <li>Mechanism for ensuring resource is kept up-to-date</li> <li>Use of key terms for searchability purposes</li> </ul>	X	X	X	X	X		<ul style="list-style-type: none"> <li>5/13 – Draft list of resources due</li> <li>6/15 – Beta release of website</li> <li>10/28 – Final release of website</li> </ul>

\* Primary targets indicated with large, bold X. Secondary targets indicated with non-bold X.



# Next Steps for Commercial Buildings Working Group

- Individual members volunteer to lead remaining activities
- Refine specific deliverables and due dates in work plan
- Develop draft resources by due dates in work plan
- State and local government associations develop process for sharing draft resources with membership for feedback
- Collaborate across activities where necessary
- Coordinate outreach and communication internally and with other working groups
- As materials are created or refined, use them as subject of outreach to target stakeholders
- Track progress in outreach and engagement
- As target stakeholders are engaged, provide connection to resources and tap other parties as necessary to support adoption and implementation of solutions



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# APPENDIX



**SEE Action**  
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# Working Groups Interactions/Gaps

	Residential Retrofit	Commercial Building Retrofit	Industrial Energy Efficiency	Financing	Utility Motivation	Customer Information & Behavior	EM&V	Building Codes
Building Codes	No WG focusing on beyond-code new construction	No WG focusing on beyond-code new construction			Utility credits / incentives for building codes?			
EM&V	EM&V WG not addressing issues for deep retrofits	EM&V WG not addressing issues for deep retrofits	EM&V WG not addressing issues for industrial EE			CIB and EM&V will host a session with members from both groups.		
Customer Information & Behavior		CIB WG not addressing behavior in commercial sector						
Utility Motivation			Utility WG will address utility throughput incentive / rate structure issues					
Financing	Financing WG will address residential financing	Financing WG not addressing commercial financing	Financing WG will <u>not</u> address industrial financing					
Industrial EE		Industrial WG will handle CHP						
Commercial Retrofit	Residential WG will address large multifamily buildings							
Residential Retrofit								

 Gap



# Baseline

## Overview of Building Square Footage and Cost-effective Savings

Commercial buildings, square footage: billions	Private buildings		Public buildings		Total
	Large	Small	Large	Small	
Buildings tenant occupied (%)	47%	53%	10%	5%	41%
Owner occupied	14	14	8	5	41
Tenant occupied	12	16	0.8	0.2	28
<b>TOTAL</b>	<b>26</b>	<b>31</b>	<b>8</b>	<b>5</b>	<b>70</b>

Assumptions: Commercial sector only; small/large cutoff is 50,000 ft<sup>2</sup>

References: CBECS, 2003

Commercial buildings, Cost-effective potential (quads)	Private buildings		Public buildings		Total
	Large	Small	Large	Small	
Buildings tenant occupied (%)	47%	53%	10%	5%	41%
Owner occupied	0.4	0.6	0.4	0.5	1.8
Tenant occupied	0.3	0.7	0.0	0.0	1.2
<b>TOTAL</b>	<b>0.7</b>	<b>1.3</b>	<b>0.4</b>	<b>0.6</b>	<b>3.0</b>

Assumptions: Not including office equipment, miscellaneous electric loads, and community infrastructure

References: McKinsey, 2009; large/small split from CBECS 2003

**SUMMARY: A NUMBER OF MARKET SEGMENTS ARE SIGNIFICANT**



# Baseline

## Current Investment in Commercial Buildings

- Half (~55%) of all renovation is in private buildings<sup>1</sup>
  - Unknown how translates into energy retrofits
  - Unknown portions in small/large and owner-occupied/leased buildings
- Predominant capital sources are ratepayer-funded programs and ESCOs:

Commercial buildings, Current Annual Spending: \$, billion, 2008	Public buildings	Private buildings	Total
	N/A		
<b>Private Sector</b>		\$2.46	\$2.46
<b>Public Sector</b>	\$0.76	N/A	\$0.76
<b>Program Administrators Only</b>	\$0.16	\$0.50	\$0.66
<b>Administered Program participants</b>	\$0.10	\$0.31	\$0.40
<b>ESCOs</b>	\$1.23	\$0.22	\$1.45
<b>TOTAL</b>	\$2.25	\$3.49	\$5.74

Assumptions: Participant expenditure = 38% of total DSM program expenditure incl. overhead.

References: Private sector and public sector from PNNL "All other" private investment and "Green Retrofits"; ratepayer-funded programs from CEE expenditures (not budget) from CEE "State of The Industry 2009" report; ESCO spending from PNNL – including. LBNL values for MUSH + C&I

Portion of current investment committed to deep retrofits and commissioning is estimated to be no more than half of total

<sup>1</sup> Source: Annual Capital Expenditure Survey (Census Bureau)



# Baseline

## Current Investment Needs

- Total capital needs between 2010 and 2020 to meet goal of 3 billion ft<sup>2</sup> in 2015 and 5 billion ft<sup>2</sup> in 2020:

Commercial buildings, all improvements costs: \$, billion		Private buildings		Public buildings		Total
		Large	Small	Large	Small	
<b>Buildings tenant occupied (%)</b>		47%	53%	10%	5%	41%
<b>Financing needed, \$, billion</b>	Owner occupied	\$11.3	\$17.4	\$6.7	\$9.8	\$45.2
	Tenant occupied	\$10.0	\$19.9	\$0.7	\$0.5	\$31.1
	Total	\$21.3	\$37.3	\$7.5	\$10.3	\$76.3

References: McKinsey 2009

- Annual capital needs:
  - \$7 billion/year at 3 billion ft<sup>2</sup>/year on whole-building retrofits
  - \$12 billion/year at 5 billion ft<sup>2</sup>/year on whole-building retrofits



# Baseline Current Workforce

- Commercial Energy efficiency services workforce size and type:

Current Commercial Workforce	2008 Employment
Government (federal and state)	470
Ratepayer-funded efficiency activity ESCOs and associated building and construction industry	9,622
Retrocommissioning	5,614
	186
<b>Total</b>	<b>15,892</b>

Job type	2008 FTE	%
Program Technical Services and Field Staff	44,509	48%
Program Management and Administration	10,710	6%
Program Training and Marketing	13,215	19%
Program Planning, Design, and Budgeting	7,511	4%
Program Support / Incentive Processing Management	12,118	6%
Program Evaluation and Market Assessment	14,308	12%
	11,828	5%
<b>Total</b>	<b>114,199</b>	<b>100%</b>

Sources: Mills 2009 - *A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions*; and Goldman 2010 - *Energy Efficiency Services Sector: Workforce Size and Expectations for Growth*.

- Workforce training capacity: *need to catalog programs and develop estimates*



# Baseline Workforce Needs

Additional workforce needed to meet goals: retrofitting 3 billion ft<sup>2</sup> per year of commercial buildings by 2015 and 5 billion ft<sup>2</sup> per year by 2020

Workforce needed to meet goals		
	2015	2020
Annual EE spending by \$ billion	7	12
Additional workforce needed	41k	68k

Sources: Mills 2009 - *A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions*; and Goldman 2010 - *Energy Efficiency Services Sector: Workforce Size and Expectations for Growth*.

Job Category	Portion of Additional Workforce	2015 FTE	2020 FTE
Program Technical Services and Field Staff	48%	19,461	32,436
Program Management and Administration	6%	2,342	3,903
Program Training and Marketing	19%	7,850	13,083
Program Planning, Design, and Budgeting	4%	1,648	2,746
Program Support / Incentive Processing Management	6%	2,378	3,964
Program Evaluation and Market Assessment	12%	4,700	7,833
<b>Total</b>	<b>100%</b>	<b>40,587</b>	<b>67,645</b>

Sources: Mills 2009 - *A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions*; and Goldman 2010 - *Energy Efficiency Services Sector: Workforce Size and Expectations for Growth*.



# Summary of Baseline (cont.)

- Have list of ratepayer-funded and state-run programs by state including:
  - 35 states with audit programs
  - 13 states have benchmarking program or benchmarking aspect to another program
  - 19 states have commissioning or retro-commissioning programs
  - Whole building retrofit programs: TBD

State	Audit Programs	Benchmarking Programs	Commissioning Programs
Alabama	x		
Alaska			
Arizona	x		x
Arkansas	x	x	
California	x	x	x
Colorado	x		x
Connecticut	x	x	x
Delaware			
Florida	x		x
Georgia	x		
Hawaii	x		
Idaho	x		
Illinois	x	x	x
Indiana			
Iowa	x	x	
Kansas	x		
Kentucky	x		
Louisiana	x		
Maine	x		
Maryland	x		
Massachusetts	x	x	x
Michigan	x	x	
Minnesota	x	x	x
Mississippi			
Missouri	x		x
Montana	x		x
Nebraska	x	x	
Nevada	x	x	
New Hampshire	x		x
New Jersey	x	x	x
New Mexico	x		
New York	x		x
North Carolina			
North Dakota			
Ohio			
Oklahoma			
Oregon	x		x
Pennsylvania			
Rhode Island	x		x
South Carolina			
South Dakota	x		
Tennessee			
Texas	x	x	x
Utah			x
Vermont			
Virginia			
Washington	x		x
West Virginia			
Wisconsin	x	x	x
Wyoming	x		



# Recovery Act

- Improvement of public and private buildings
  - \$300 million in improvement of local government buildings; \$425 million in incentive programs; and \$950 million in retrofits through Energy Efficiency and Conservation Block Grants
  - \$1.5 billion through State Energy Program programs (financing and retrofits)
- Workforce development efforts:

Purpose	Organization	City, State	DOE Funding	Total Project Value
<b>Building Equipment Technicians: 4 Selections</b>				
Development of a Model Energy Conservation Training Program	International Union of Operating Engineers	Washington, D.C.	\$748,744	\$748,744
Development of a Training Program for Commercial Building Technicians	Gas Technology Institute	Des Plaines, Illinois	\$448,405	\$473,405
Training Program Development for Commercial Building Equipment Technicians	Texas A&M University	College Station, Texas	\$749,037	\$749,037
Building Operator Certification (BOC) For Building Technicians	Northwest Energy Efficiency Council	Seattle, Washington	\$549,169	\$927,300
<b>Building Operators: 4 Selections</b>				
Net-Zero Energy Building Operator Training Program	University of North Carolina at Charlotte	Charlotte, North Carolina	\$589,843	\$589,843
Benchmark Green: Commercial Building Operator Certificate Program via Advanced Online Instruction	The Research Foundation of the City College of New York	New York, New York	\$422,528	\$472,528
UT/GTKS Training Program Development for Commercial Building Operators	University of Turabo	Gurabo, Puerto Rico	\$335,745	\$335,745
Development of a Total Energy, Environment and Asset Management (TE2AM) Curriculum	University of Wisconsin	Madison, Wisconsin	\$934,712	\$934,712
<b>Building Energy Commissioning Agents/Auditors: 5 Selections</b>				
Training Programs for Commercial Building Energy Commissioning Agents/Auditors	Association of Energy Engineers	Atlanta, Georgia	\$462,000	\$462,000
Veterans Commissioning Training Program for Commercial-Healthcare Facilities	University of Nebraska	Lincoln, Nebraska	\$405,741	\$405,741
Energy Commissioning Agent/Auditor Training in the New York Metro Region	New Jersey Institute of Technology	Newark, New Jersey	\$468,495	\$468,495
Curriculum for Commissioning Energy Efficient Buildings	Portland Energy Conservation, Inc.	Portland, Oregon	\$749,153	\$1,573,189
Master Curriculum Development for Energy Auditors, Commissioning Agents and Energy Engineers	Milwaukee Area Technical College	Milwaukee, Wisconsin	\$740,364	\$960,364



# Vision for the Future When Meeting Goals

## State of Efficiency Market

- Commercial whole-building retrofit market reaches 5 billion square feet per year with a 20% efficiency improvement

## Resources Needed

- \$12 billion per year in 2020 for whole-building retrofits
- Financing mechanisms across public and private buildings
- 68,000 more workers in 2020 than 2010 in key areas such as engineering, marketing, and management (~60% growth)
- Training and certification programs to support workforce development

## Measuring Progress

- Need to translate program metrics into energy savings to track progress toward long-term goals

### Goals for progress

	2010 Baseline	2011	2012	2013	2014	2015
Billion square feet per year retrofit with 20% performance improvement	1.0	1.4	1.8	2.2	2.6	3.0
Annual investment on whole-building energy efficiency	2.3	3.2	4.2	5.1	6.0	6.9
Cumulative square feet Retrofit (beginning 1/1/2011)	1.0	1.4	3.2	5.4	8.0	11.0
Annual energy saved, primary quads	0.03	0.04	0.08	0.14	0.21	0.29



# Barriers

	Private				Public			
	Owner-occupied		Leased		Owner-occupied		Leased	
	Large	Small	Large	Small	Large	Small	Large	Small
<b>Structural:</b>								
<b>Agency issues:</b>	Landlord-tenant				Landlord-tenant			
	internal organizational split incentives (i.e. capex and opex in different budgets)							
	owner uncertainty that increased efficiency will command a premium on lease				owner uncertainty that increased efficiency will command a premium on lease			
<b>Transaction barriers:</b>								
<b>Pricing distortions:</b>								
<b>Ownership transfer issues:</b>	Market re-sale value of energy efficient buildings does not currently justify the high investment. Requirement for a point-of-sale energy assessment remains uncommon and energy performance is not typically disclosed or considered in appraisals.							
	Frequent turnover in tenancy can create very short payback requirements for EE projects							
<b>Behavioral:</b>								
<b>Risk and uncertainty:</b>	Owners hesitant to enter a multiyear contract with an ESCO requiring continued payments to the ESCO if the building sits empty, reducing savings and making the contract cashflow-negative for owner.							
<b>Awareness and information:</b>	Lack of transparency makes it difficult for tenants to differentiate high-performance buildings from others; also makes it difficult for owners to understand performance of their own buildings							
<b>Custom and habit:</b>	Custom and habit in O&M activities, along with staff turnover and lack of institutional knowledge can contribute to building performance degradation over time.							
<b>Elevated hurdle rate:</b>	Deeper retrofits are hampered by the fact that the average payback period expected by commercial customers is 3.6 years.							
<b>Availability:</b>								
<b>Adverse bundling:</b>								
<b>Capital constraints:</b>	Capital constraints, concerns about balance sheet health, and lack of clear collateral contribute to a low rate of businesses completing energy efficiency retrofits with internal or bank financing.							
<b>Product availability:</b>	Limited skilled workforce may inhibit efficiency market ramp-up in the short term.							
<b>Installation and use:</b>	Limited staff time and lack of training contribute to degraded performance even in buildings with advanced technologies installed.							



# Potential Programs/Policies Mapped to Barriers

Description of means to address barriers (e.g., policies or market mechanisms to address, technical tools)	
<b>Structural:</b>	
<b>Agency issues:</b>	Benchmarking policy will increase the incentive for owners to pursue buildings efficiency by improving access to information for prospective tenants. Green leasing and public-private Partnerships will help overcome split incentives between landlords and tenants. Public-private partnerships, organization-wide energy management programs, and procurement reform will help overcome split incentives within owner organizations.
<b>Transaction barriers:</b>	
<b>Pricing distortions:</b>	
<b>Ownership transfer issues:</b>	Benchmarking policy will improve transferability of value of efficiency retrofits. Required retrofits at time-of-sale or time-of-lease would mitigate concern over capturing value of upgrades at time of sale.
<b>Behavioral:</b>	
<b>Risk and uncertainty:</b>	Financial innovations that mitigate risk for ESCOs in commercial sector will spur investment
<b>Awareness and information:</b>	Benchmarking will improve visibility and value of energy efficiency
<b>Custom and habit:</b>	Retro-commissioning will overcome efficiency degradation due to custom and habit
<b>Elevated hurdle rate:</b>	Organization-wide energy management programs and procurement reform will overcome the elevated hurdle rate faced internally by commercial real-estate owners
<b>Availability:</b>	
<b>Adverse bundling:</b>	
<b>Capital constraints:</b>	Financial innovation, Ratepayer-funded programs, retro-commissioning, and organization-wide energy management programs will overcome the capital constraints faced internally by commercial real-estate owners
<b>Product availability:</b>	Nationally recognized workforce training and certification will reduce confusion among customers, streamline regulation by states and cities, and facilitate growth in efficiency professions.
<b>Installation and use:</b>	Retrocommissioning will overcome poor building system operation due to limited staff time and lack of training. Benchmarking will help monitor performance over time.

