



U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy



Energy Efficiency: Challenges and Progress

State Energy Advisory Board Meeting

June 7, 2011

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Office of Energy Efficiency and
Renewable Energy

EE Priorities

• Federal Policies

- R&D
- Test procedures / Appliance Standards
- Support ENERGY STAR

• EE markets/services

- Residential Retrofits
- Commercial Retrofits
- Industrial Improvements

• State/local Policy

• Education/ Outreach

Spend ARRA funding quickly & effectively

Build EE infrastructure for longer term (post Recovery Act)

Take EE to scale & create a new EE economy

- Create Jobs
- Reduce GHGs
- Save Money
- Enhance Competitiveness
- New Clean Energy Economy

EE is fastest, cheapest, largest, way to save energy and build jobs

EE can save 20% of energy use -- \$200 Billion/yr – with 700,000 jobs

Administration Clean Energy Goals

Emissions Reduction / Clean Energy Deployment:

- Greenhouse Gas (GHG) emissions reduction -- 17% by 2020; 83% reduction by 2050
- Renewable energy generating capacity -- double by 2012¹ from 2008
- New clean energy standard: 80% of electricity from clean energy by 2035²
- Federal government: reduce GHG emissions by 28 percent by 2020 (*EO 13514*)

Transportation / Vehicles:

- Imported petroleum reductions -- one-third by 2025, from 11 million barrel per day
- 1 million electric vehicles on the road by 2015
- Advanced battery manufacturing capacity to support 500,000 plug-in hybrid electric vehicles a year by 2015
- Federal government: all new federal vehicles to be alternative fueled vehicles by 2015

Buildings:

- Residential: Retrofit 1.1 million housing units by the end of FY 2013 (DOE and HUD)
- Commercial: Improve commercial building efficiency by 20% by 2020
- Demonstrate sustainable business models for residential, commercial, and industrial efficiency

¹ excluding conventional hydropower

² including renewable energy sources like wind, solar, biomass, and hydropower; nuclear power; efficient natural gas; and clean coal

Achieving 20% Savings Goals – or More

Technology solutions

- refrigerators
- windows
- lighting

Systems-based solutions

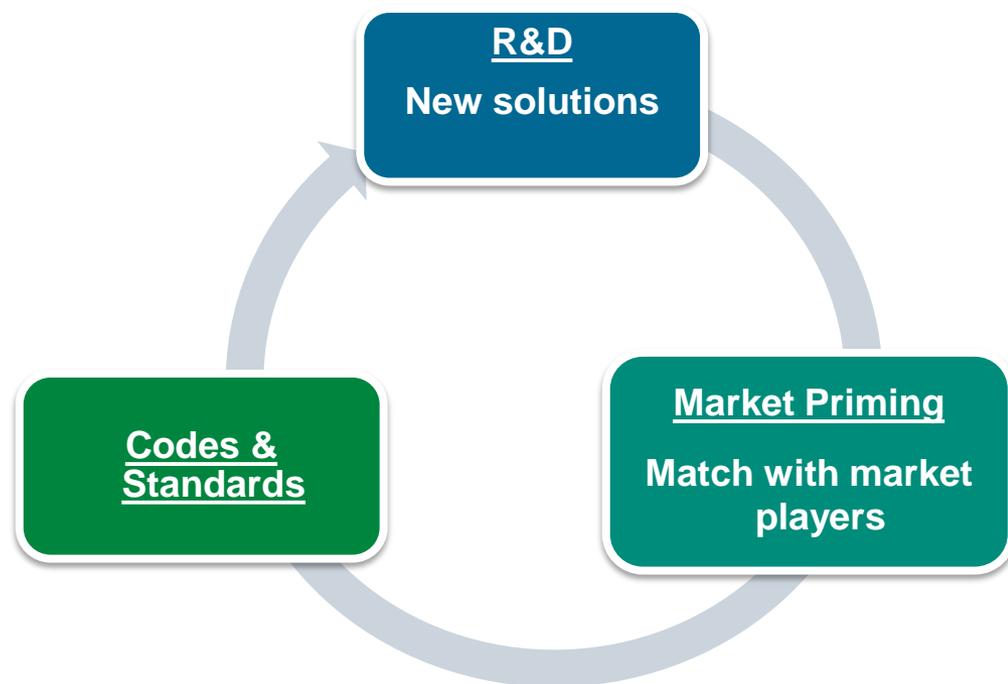
- integrate building envelope
- right sizing of equipment

Market-based solutions

- new construction
- retrofit ~ 2/3rd of the facilities to be here in 2050 that are with us today

Policy solutions

- Federal
- State and local



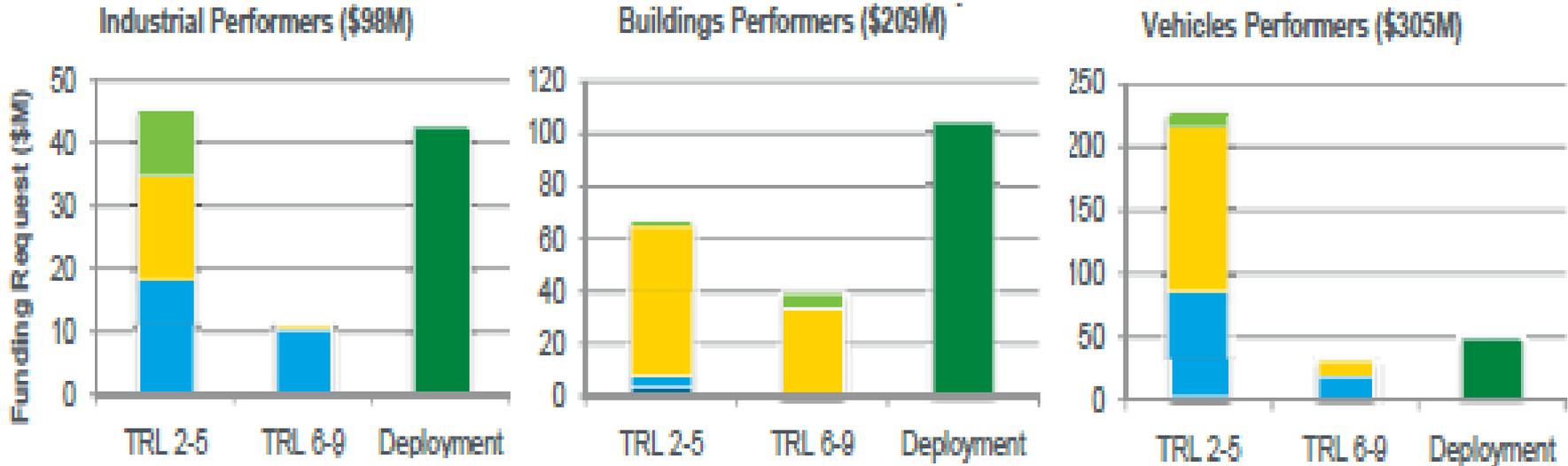
EE Programs – Funding (millions)

EE Program	ARRA	FY10	FY11 CR	FY12 Request
Building Technologies		219	210	471
FEMP		32	30	33
Industrial Technologies		94	108	320
Vehicle Technologies		304	300	588
Weatherization and Intergovernmental		270	231	394
<i>WAP</i>	5.2	210	173	320
<i>SEP</i>	3.1	50	50	64
<i>EECBG</i>	3.2			
Total		919	880	1,805

EE Funding by Technology Readiness Level (TRL)

EERE Program TRLs and Performers

University Labs Industry Other Not Categorized

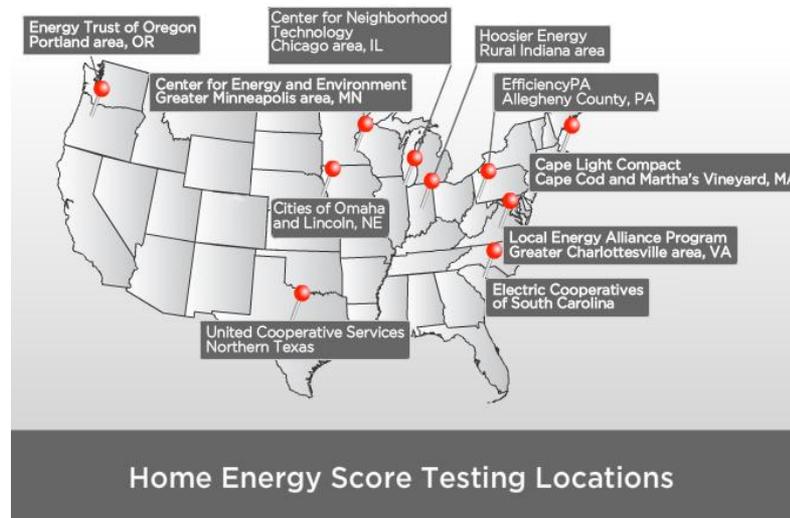
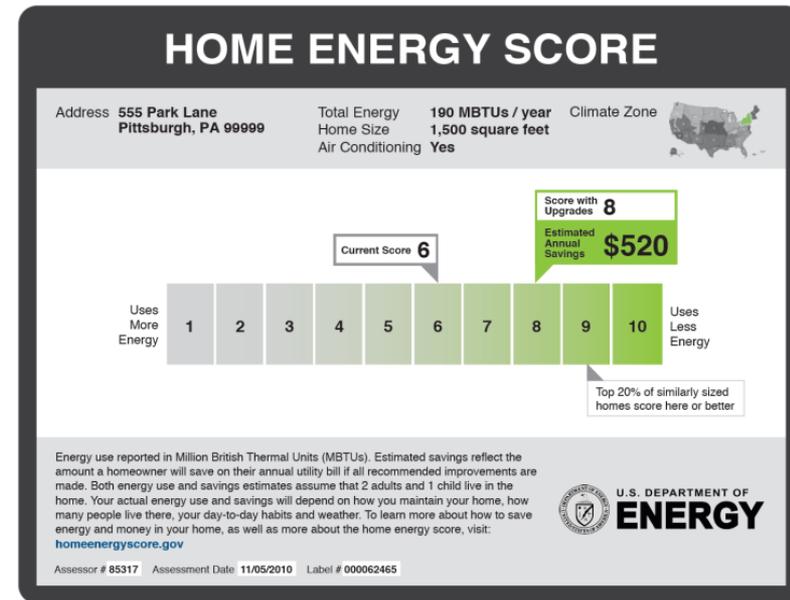


EE Challenges

- **Better Information for Consumers** → Home Scoring Program
- **More Engaged Consumers** → Building asset ratings
- **Improved Access to Financing** → ENERGY STAR growth
- **Better Information as Basis for Financing** → Best practices
- **Skilled/Trained Workforce** → New ee savings data
- **Strong, consistent state and local policies** → Resid workforce guidelines
- **New Business Models** → Com. workforce guidelines
- **Better evaluation methods** → ARRA best practices
- **Communicating Success** → SEE Action
- **Communicating Success** → Better Buildings
- **Communicating Success** → Voluntary EM&V Guidelines
- **Communicating Success** → New materials on successes / future goals
- **Communicating Success** → WAP/SEP/EECBG Evaluations

Better Homeowner Information: Home Energy Score

- Homeowner
 - MPG Rating for the Home
 - Low cost, easy, understandable, comparative score – 1 to 10
 - Asset-based
 - Recommendations for home improvements and estimate of savings
 - Being piloted this Spring: 10 pilots
 - Additional research: NYSERDA and others
- Delivery
 - Administered by partnering organization
 - Work in tandem with other Home improvement programs;
 - Not replacement for comprehensive energy audit
- Next steps
 - Pilot / refinement / national availability in Fall 2011



ENERGY STAR: Most Efficient

- Leverage ENERGY STAR; link to DOE R&D
- Connect high efficiency products with consumers that want to
 - Do right thing for the environment
 - Do the most they can
 - Buy the most efficient product available
 - Be an early adopter; trendsetter
- 2 Rounds of stakeholder comments
- Next steps
 - Criteria available this month
 - 2011 Pilot
 - Fall assessment
 - 2012 Full year program



Needs to be Useful Tool for

- Consumers
- Manufacturers
- Program Administrators
- Retailers

Workforce Standards, Education and Training

Premise: Demand is function of price and quality

Work standards --

- Help improve retrofit work quality and provide a foundation for quality assurance
- Increase workforce career mobility
- Assist trainers developing training materials
- Build confidence amongst consumers and the energy efficiency finance community

Job Task
Analyses

Knowledge,
Skills, Abilities

Standard Work
Specifications

Worker
Training

Training
Accreditation

Worker
certifications



Workforce Standards, Education and Training

- 1) Job Task Analyses -- final production underway; published in late June
- 2) Standard Work Specifications -- Second round of public comment late Summer
- 3) Worker Training -- Standardized Training Curriculum available online
- 4) Training Program Accreditation -- ready late June, announcement and outreach in the summer
- 5) Worker certification -- certification blueprints being finalized, new certifications ready by December 2011

BetterBuildings Residential: Creating A Long-Term Efficiency Market

Goals to Leverage Grants for the Market

- Develop sustainable energy efficiency improvement programs
- Reduce the cost of retrofit program delivery by 20% or more
- Achieve 15-30% energy savings from energy efficiency upgrades

Grantee Goals by Late 2013

- Retrofit 170,000 buildings (residential and commercial)
- Use the \$508 million grants to leverage \$3 billion in additional resources
- Create or retain approximately 30,000 jobs
- Save consumers approximately \$50 million annually on energy bills

Progress: Over 5,500 cumulative retrofits to date.

Innovative Marketing

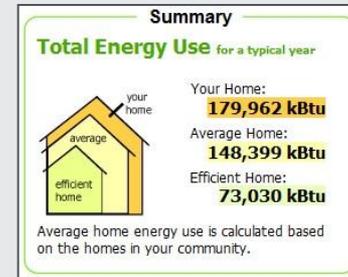
Los Angeles is tapping into a state-wide marketing campaign, including **high-quality videos**



Seattle is using an **online audit tool** to screen homeowners needing an EE upgrade



Charlottesville is using a new **handheld tool** and will be piloting the Home Energy Score



BetterBuildings Michigan is embracing the **BetterBuildings brand** and promoting it at the local level



Bainbridge has installed **energy dashboards** to display the islands energy load throughout the day to change behavior individual consumption



Rutland has created a **H.E.A.T Squad** of friendly neighborhood experts to engage the community about EE benefits

Innovative program delivery strategies

BetterBuildings is working to reduce retrofit delivery costs for providers and consumers

Bulk purchasing

- Camden, NJ
- Rutland, VT

Concierge services

- Boulder County, CO
- Connecticut

Pre-qualified contractor list

- Los Angeles County, CA
- Austin, TX

Packaging multiple jobs for contractor bidding

- Omaha, NE

Geographically-based contractor scheduling

- Cincinnati, OH

Targeted data from recipients and partners

Building Information	Retrofit Information
<ul style="list-style-type: none">• Energy types used• Energy audit data• Energy use data (pre and post retrofit)	<ul style="list-style-type: none">• Installed measures/equipment• Estimated energy savings• Contractor qualifications• Cost
Financial Information	Communication Strategies
<ul style="list-style-type: none">• Leveraged funds• Loan types and value• Underwriting criteria• Financial performance (e.g., payment history)	<ul style="list-style-type: none">• Communication type• Messaging approach (Primary and Secondary Messages)• Outreach tactic

The program is gathering quarterly information and will have preliminary data analysis the first year after grant recipient program launches (approximately December 2011)

(Commercial) Better Buildings: Overview

Goals

- **Achieve a 20 percent improvement in the energy efficiency of commercial buildings by 2020.**
- **Reduce companies' and business owners' energy bills by about \$40 billion per year.**
- **Save energy by reforming outdated incentives and challenging the private sector to act.**



President Obama at Penn State University
February 3, 2011

<http://www.whitehouse.gov/the-press-office/2011/02/03/president-obama-s-plan-win-future-making-american-businesses-more-energy>

Overview: Initiatives

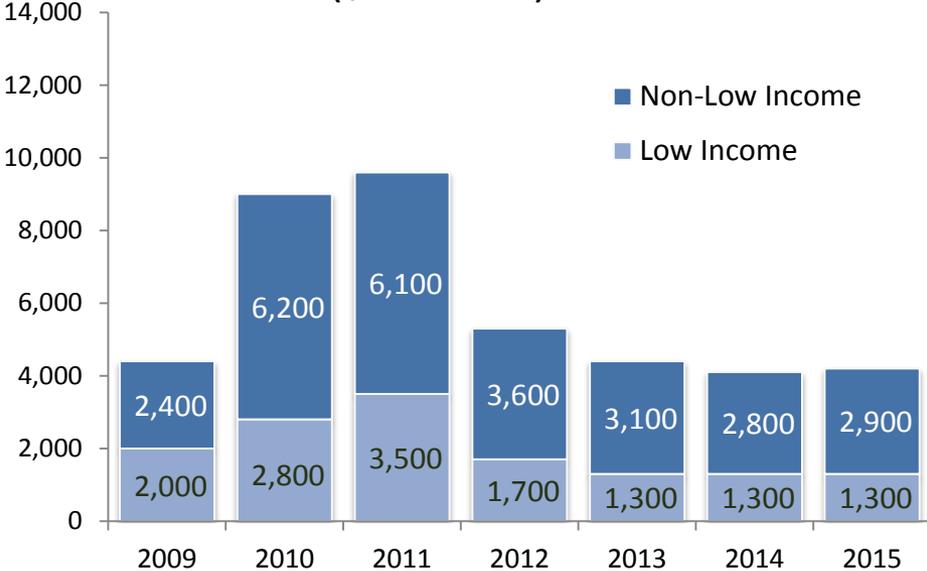
1. **Tax incentives.** Streamline the 179D commercial building tax deduction for tax year 2011 and restructure the tax incentive for tax year 2012.
2. **Financing.** Increase and accelerate financing opportunities for commercial and public building energy improvements through existing SBA loan program & proposed DOE loan guarantee program
3. **Grants.** Give competitive grants to state and local governments to streamline and update codes and regulations and to adopt policies and programs to attract private-sector investment in building retrofits.
4. **Challenge.** Challenge CEOs and university presidents to systematically upgrade their facilities for improved efficiency.
5. **Workforce.** Improve and expand workforce training and pilot a buildings extension service.

State and local policy

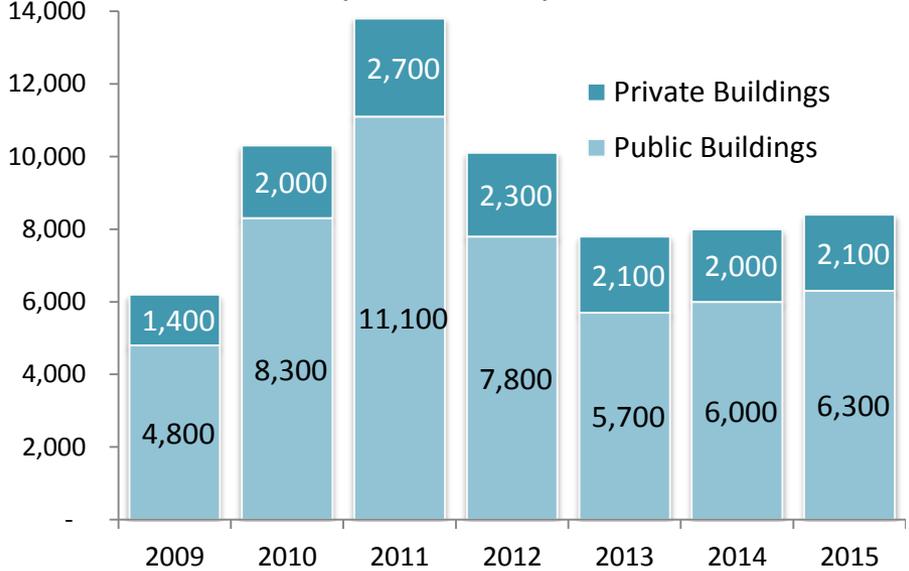
- State/Local Programs and policies critical to clean energy future
 - Lead by example
 - Clean energy policies
- ARRA Successes
 - Big down payment
 - Large jobs impacts
- Challenges
 - Sustain investment
 - Sustain jobs and savings
- Solutions
 - Key strategies
 - Work together for largest, quickest impact

Investments in Residential and Commercial Sectors

Residential Sector Investment (\$ Millions)



Commercial Sector Investment (\$ Millions)



Non-Low Income Programs

- Non-low income investments are primarily utility ratepayer programs, tax credits for EE home improvements and private investments stimulated by programs and tax incentives.
- Utility ratepayer program spending is projected to increase 6.1% annually from 2009 to 2015.

Low Income Programs

- Investments in low income homes are utility ratepayer programs and federally funded weatherization programs (DOE-WAP, LIHEAP), and in some cases supplemented by state funds.
- Federal funding increases 2% annually.

Private Sector Buildings

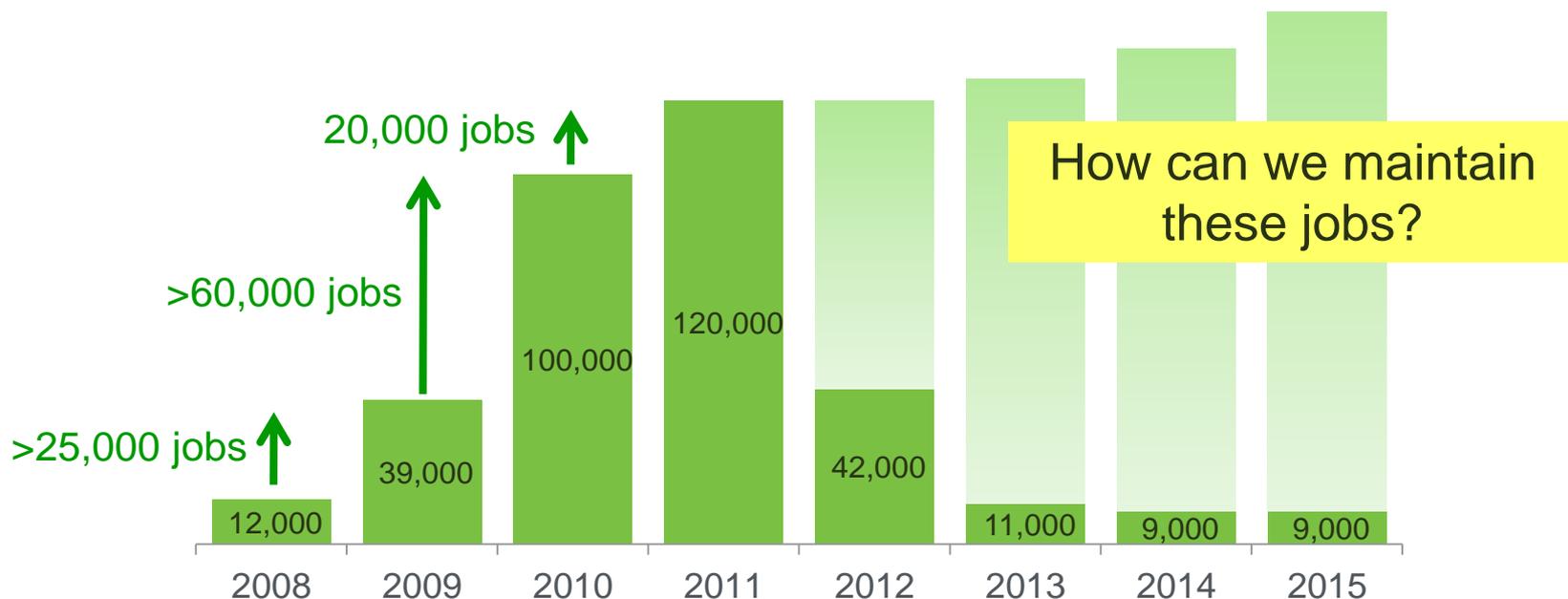
- Investments in private sector dominated by utility ratepayer program spending; projected to increase 6.1% /yr 2009 to 2015.
- Program participants estimated to provide ~40% cost share to utility ratepayer programs and federal programs (e.g. State Energy Program and ARRA grants to local governments.)

Public Sector Buildings

- Investments dominated by ESCO projects, increasing 5.4% annually from 2012-2015 (LBNL business as usual scenario).
- ARRA contributed nearly \$12 B from 2009 to 2010 through DOE, GSA and DOD public building programs

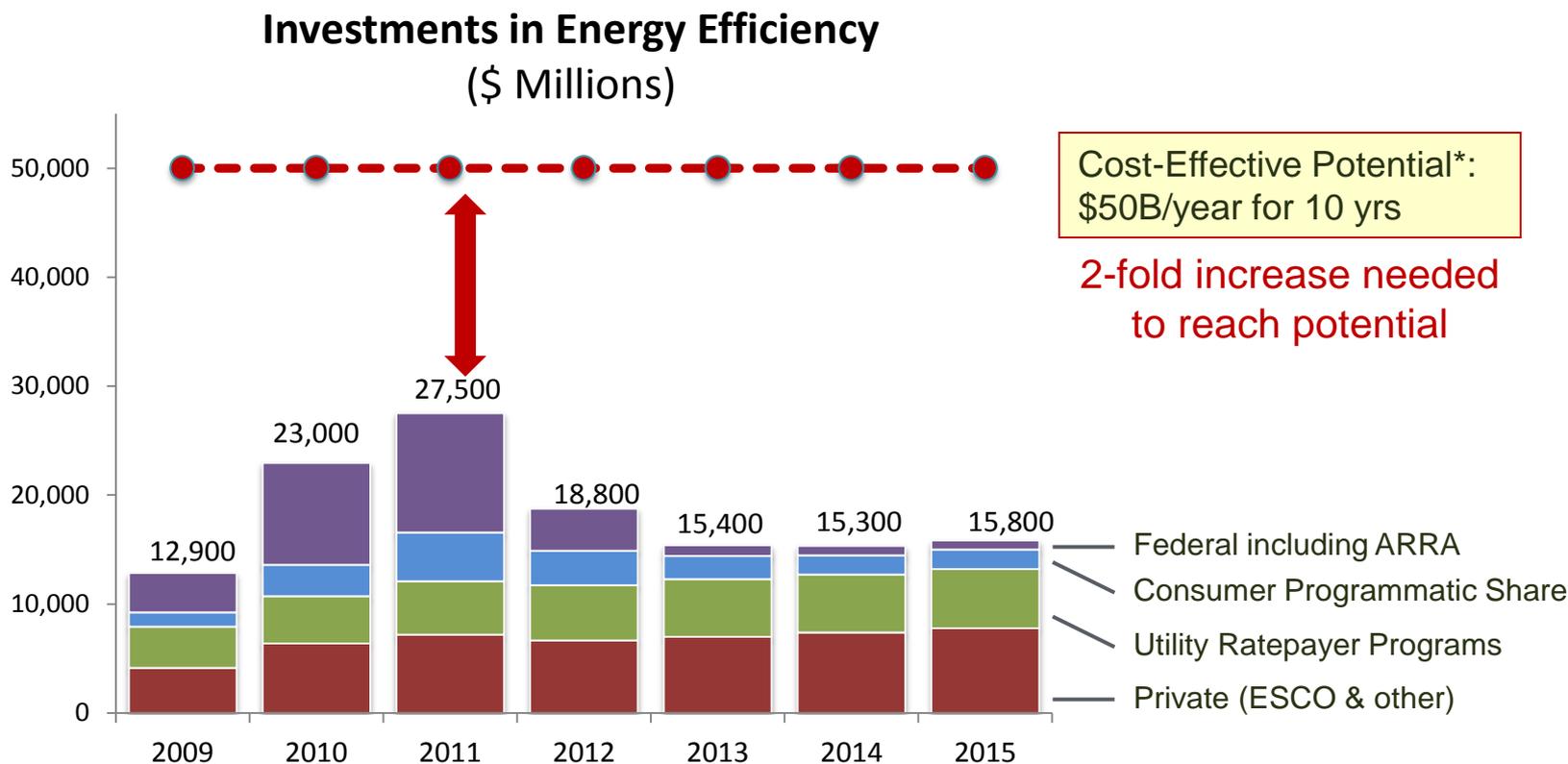
Jobs in the Clean Energy Industry

Job-Years Created or Retained by Direct ARRA and Annual DOE Spending on EE



The EE services sector has the potential to double in size under a moderate case scenario, from 380,000 individuals to over 700,000 by 2020 (LBNL)

Investments in Clean Energy: ARRA/EE in Perspective



- Federal funds are annual and ARRA awards across DOE, GSA, and DOD. 2011-15 payments are targets.
- Consumer investment estimated at 30% of total ratepayer program costs
- Utility ratepayer programs in 35 states represent for electrical and gas programs excluding load management. Projections are based on LBNL's mid-case scenario, increasing annually at 6.1%
- Private investments include ESCO projects, and spending due to tax incentives in residential, commercial and industrial sectors. Investments on EE processes by manufacturing and non-manufacturing companies are excluded.

* Cost-effective (all NPV-positive) economic potential includes residential, commercial and industrial sectors (with combined heat and power), but does not include program costs. Source: Unlocking Energy Efficiency in the U.S. Economy, McKinsey Global Energy and Materials, 2009.

Strategies to Maintain Workforce and Deliver Energy and Cost Savings

State Governments

Direct Strategies:

- Lead by Example Programs
- EE and RE Incentives
- Energy Saving Performance Contracts (ESPCs)

Enablers /Policy Framework:

- Building Codes
- Transportation Policies
- Aligned Utility Incentives
- EE Targets/Goals (e.g. EERS)
 - EE programs for residential, commercial and industrial sectors
- RE Targets/Goals (e.g. RPS)
- Financing (Revolving Loan Funds, credit enhancements)

Local Governments

Direct Strategies:

- Lead by Example Programs (including financing)
- Infrastructure Improvements (street and traffic lights)
- Green Power Procurement

Enablers /Policy Framework:

- Strategies for commercial buildings:
 - Energy audits and retrocommissioning
 - Energy and water benchmarking/rating and disclosure
 - Lighting upgrades and sub-metering
 - Financing
 - Workforce development
 - Expanding access to performance contracting
- Strategies for residential buildings:
 - Audits
 - Home rating
 - Required audits at time of sale
- Coordinated planning (across state/local agencies)
- Advanced codes (where applicable)
- Expedited permitting and siting of efficient distributed generation including renewables and combined heat and power

States Energy Efficiency Action Network (SEE Action)



DOE/EPA facilitate

- Working Groups
- Meetings
- Development of key deliverables
- Coordination platform

SEE Action: Next Steps

- Implementation discussions
 - WGs
 - Executive Groups
- Two phase release
 - Spring 2011 (phase 1) – ~ 4 Blueprints
 - Summer 2011 (phase 2) – ~ 4 Blueprints
- Ongoing implementation
 - Energy Policy Summit with ARRA grantees: May 2011
 - Development of key materials
 - Outreach goals to key states and local governments



SEE Action
STATE ENERGY EFFICIENCY ACTION NETWORK

Better Evaluation Methods: DOE Uniform Methods Project

Goal: Uniformity in how we calculate energy savings.

- Develop definitions within a clear set of end-use efficiency programs and measures for:
 - Program/measure applicability conditions,
 - Specific baseline definitions for specific measures and/or criteria for establishing such baseline definitions,
 - Approaches for verifying installations and determining first-year and life-cycle savings,
 - A level of certainty for the verification activities and savings determination, and
 - Reporting requirements.

WAP National Evaluation

- Two National Evaluations of WAP
 - “Retrospective” which covers PY 2007 & 2008,
 - “ARRA Period” which covers PY 2009, 2010, & 2011.
- Key areas of evaluation include:
 - National energy savings, cost savings, and cost-effectiveness;
 - Studies of Grantees, local agencies, clients, and weatherization workers;
 - Non- energy benefits (health improvements, utility bill arrearages, environmental pollution reductions);
 - Indoor air quality effects of weatherization (radon, formaldehyde, carbon monoxide);
 - Territories, large multifamily buildings, SERC, WIPP, deferrals, persistence, and under-performers.
- Timelines:
 - Retrospective: State & Agency survey results in July/ August 2011. Initial energy savings results for PY2007-8 and partial 2009 in August 2011. Detailed draft reports in for PY 2007-8 results in December 2011
 - ARRA: Pending OMB Approval, preliminary results Summer/Fall 2012

SEP Evaluation

- NASEO and the states briefed on status of the evaluation.
 - States volunteered to participate on the SEP evaluation network committee.
- March -- Draft evaluation plan.
- June -- Final evaluation plan reflecting DOE and review panel input.
- June – Finalize sampling procedure for the selection of activities to be studied finalized.
- July -- Individual program activities for analysis will be selected in early and the data collection will begin immediately thereafter.
- Draft evaluation report planned for review in August of 2012.

EECBG Evaluation

- Goal: determine the total magnitude of energy and cost savings, and other key outcomes, achieved in program areas that cumulatively account for approximately 80% of total Formula Grant expenditures in the 2009 – 2011 program years.
- The EECBG evaluation will be performed by an independent evaluation contractor selected through a competitive solicitation process and managed by Oak Ridge National Laboratory (ORNL).

Timeline:

- **April 2011** – Evaluation plan reviewed by an independent peer review panel and finalized. Request for proposal issued.
- **June 2011** - The ORNL evaluation team will be evaluating the received proposals over the next two weeks.
 - The evaluation team will meet in late June for selection
- It is expected that the study will be completed by the end of 2012

Taking EE to Scale

- Robust business models
 - Better Buildings – Residential, Commercial, and Industrial
- Quality work
 - Work standards, training, certifications
- Measurement and evaluation
 - New voluntary guidelines for EM&V
- Financing
 - Based on good data
- Multi-stakeholder engagement to capture full value of EE
 - State and local policy makers
 - Business
 - Public sector

- What role can STEAB play in advancing these goals?
- How can EERE assist STEAB in communicating successes?

Thank you!