

# Building the Clean Energy Economy

U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy



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August 13, 2010  
Growing Green Jobs  
Hosted by Rep. Tierney  
North Andover, MA

- Market transformation, policy context, local leadership
- Direct funding for technology development, deployment and local innovation
  - Formula Grants
  - Clean Cities
  - 48C Manufacturing Tax Credit
  - Recovery through Retrofit
  - Retrofit Ramp-UP
  - Wind
  - Solar
  - Hydro
  - Geothermal
  - Biomass
- Innovative policies
- Innovative financing

- Drivers from the White House
  - Make the U.S. a leader on climate change
  - Deploy the cheapest, cleanest, fastest energy source – energy efficiency
  - Pick up the fruit on the ground
- Focus
  - Built environment – homes/buildings use 71% electricity in U.S.
- Need
  - Deep market penetration
  - Comprehensive, deep retrofits in each home/building
  - Job creation and economic growth
  - Scale UP and replicate!



# Vice President Biden's Call for Recovery Through Retrofit

*In May 2009, Vice President Biden called on the Council of Environmental Quality to develop a proposal for Federal action to lay the groundwork for a self-sustaining home energy efficiency retrofit industry.*



<http://www.whitehouse.gov/administration/eop/ceq/initiatives/retrofit>

## Established an Interagency Task Force

- **Headed by Office of the Vice President and the Council on Environmental Quality**
- Department of Agriculture
- Department of Commerce
- Department of Education
- Department of Energy
- Department of Housing and Urban Development
- Department of Labor
- Department of Treasury
- Environmental Protection Agency
- Equal Employment Opportunity Commission
- General Services Administration
- Small Business Administration
- Executive Office of the President
  - Council of Economic Advisers
  - Domestic Policy Council
  - National Economic Council
  - Office of Management and Budget
  - Office of Public Engagement and Intergovernmental Affairs
  - Office of Science and Technology Policy

# Recovery through Retrofit Aims to Reduce Barriers to Allow Local Policies to Flourish

## BARRIERS



## SIX RECOMMENDATIONS

### Access to Information:

Consumers do not have access to straightforward and reliable information.

Develop Energy Performance Label for Homes (DOE)

Develop a National Home Energy Performance Measure (DOE)

### Access to Financing:

Homeowners face high upfront costs and are often unable to recoup the value of their investment.

Support Municipal Finance Programs (DOE)

Improve Energy Efficiency Mortgages (HUD)

Expand State Energy Revolving Loan Funds (DOE)

### Access to Skilled Workforce:

There is an insufficient amount of skilled workers to expand energy retrofit programs on a national level.

Establish National Workforce Certification and Training Standards (DOE/DOL/SBA)

- Lasting structural and behavioral changes in the marketplace (Consortium for Energy Efficiency)
- Continuous intervention in the market becomes unnecessary (Blumstein et al. 2000)
- 3-Part Solution:
  1. Financing models
    - Emphasize strategies that stretch amortization periods, buy down risk, and attach value to property, not owner
  2. Comprehensive programs
    - Triggers and incentives that bring more participants in
  3. Policy drivers at Federal-state-local levels
    - Need a seamless policy framework that builds on jurisdiction's strengths and responsibilities

- **Obstacles**
  - First cost barrier
  - Owner discounting future value of energy and \$ savings
  - Expensive to borrow money
- **Strategies**
  - Amortize loan over longer period
    - Property tax assessments
    - On-bill financing – utilities or municipalities
    - EE Mortgage products
  - Access to low or no cost money
    - Buy down interest rate
    - Reduce administrative and transaction costs through aggregation
    - Risk reduction – secure/guarantee loans

# More Participants – Comprehensive Programs

- Obstacles
  - Voluntary participation – restricted to “Early Adopters” 12-20%
  - High transaction costs
- Strategies
  - Permit or loan triggers audits and improvements
    - Time-of-Sale
    - Renovation permits
    - Property tax assessments
  - Aggregation
    - ESCOs
    - Forward Capacity Markets (ex: ISO New England)
    - Turn key efficiency services from big box/retailers – including financing
  - Expand existing programs
    - Weatherization, HPwES, community development

# America Must Lead Energy Technology Revolution

## DOE Traditionally Invests in Technology Innovation R & D



## Innovation Through Policy and Programs



## American Recovery and Reinvestment Act – the largest one time investment in Energy Efficiency

- **Weatherization Assistance Program (\$5.0B):** Assistance to low-income households for energy efficiency improvements.
- **Energy Efficiency and Conservation Block Grants (\$3.2B):** New formula grant program to states & territories, cities & counties and Indian tribes to reduce use of fossil fuels and improve energy efficiency. \$456M of the total program is available for competitively awarded grants.
- **Energy Efficiency Appliance Rebate Program (\$300M):** New program to issue rebates for EnergyStar appliances.
- **State Energy Program (\$3.1B):** Formula grant program to states for energy efficiency and renewable energy programs and activities.

Cost Savings from the State Energy Program



# Competitive Better Buildings Program In Progress

- \$450 million initiative to fund building retrofit programs that reach whole neighborhoods under EECBG
- 25 awards in range of \$5-\$60M
- Lowell, MA
- State of Maine



## Grantees implementing program models that:

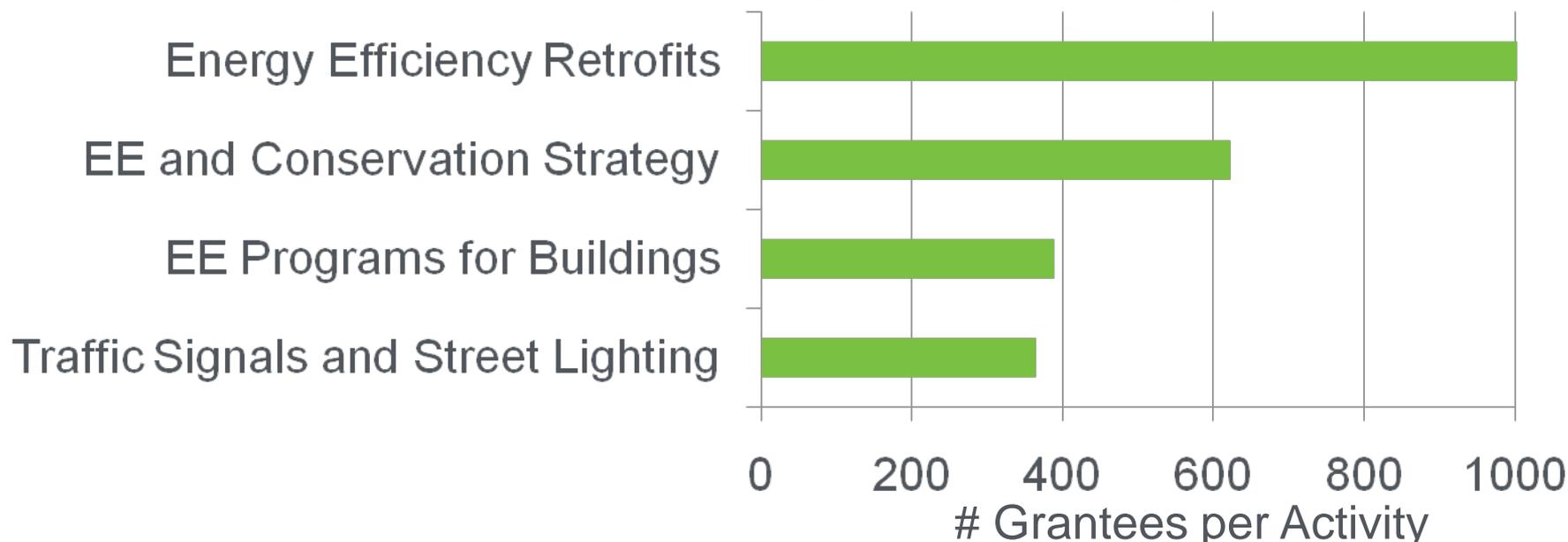
- Are neighborhood-focused on existing buildings
- Deliver verified energy savings
- Achieve a high ratio of leverage (5:1)
- Are sustainable beyond exhaustion of grant funds
- Are replicable and scalable
- Include the support of multiple partners

[http://www.eecbg.energy.gov/about/competitive\\_grants.html](http://www.eecbg.energy.gov/about/competitive_grants.html)

- New program bringing together DOE and over 2,300 local communities for the first time
  - Cities across the nation are leading the way
  - Empowering local communities to make strategic investments to meet the nation's long term clean energy and climate goals
- EECBG funds \$3.2 billion for 14 activity types
  - \$2.3/\$2.7 MM of formula grants awarded (2093/2359 grantees)
  - \$390 MM Retrofit Ramp-up Program for innovative models of whole-neighborhood retrofits
  - \$64 MM additional competitive awards
- DOE and Mayors working together to make the program a success

# EECBG Applicants Developed a Diverse Set of Proposals

## Top 4 EECBG Activity Type Frequency



## Examples of Additional Activities

- Energy Audits
- Building Codes and Inspections
- Renewable Energy Technologies on Government Buildings
- Energy Distribution Technologies
- Development and Implementation of Transportation Programs

# Growing Renewable Energy Announced Projects

**Geothermal:** \$400M for demonstration projects, Enhanced Geothermal Systems (EGS) research and development, innovative exploration techniques, and a National Geothermal Data System, Resource Assessment and Classification System.

**Solar:** \$117.6 million to increase transformative PV research, address non-technical barriers to solar energy and improve the reliability of concentrating solar power.

**Wind:** \$25 million to accelerate the Massachusetts Wind Turbine Blade Test Facility, and \$93M for turbine performance and reliability testing, R&D on critical wind energy challenges, and advanced material technology development.

**Hydro:** \$32 million to modernize existing hydropower facilities by increasing efficiency and reducing environmental impact.

**Biomass:** \$786.5 million to accelerate R&D for multiple advanced biofuel pathways and to provide additional support for commercial-scale biorefinery demonstrations.

**Fuel Cells:** \$41.9 million for the immediate deployment of fuel cell systems for early markets, such as emergency backup power and material handling applications.

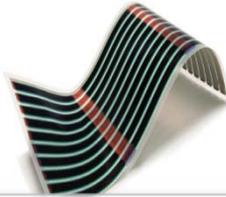


# Solar Energy

FY 2011 Budget Request: \$302.4 M (+22% FY2010)



Crystalline Silicon

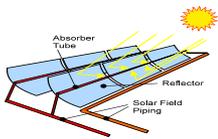


Thin Films



CPV

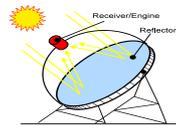
Photovoltaics (PV) – Direct Conversion of Light to Electricity



Trough



Tower



Dish

Concentrating Solar Power Technologies

Market Status:

In 2008, total installed solar photovoltaic (PV) capacity reached 1,100 MW with 30 percent CAGR for the past 6 years

In 2007, the first large-scale concentrating solar power (CSP) plant in 15 years came online in Nevada

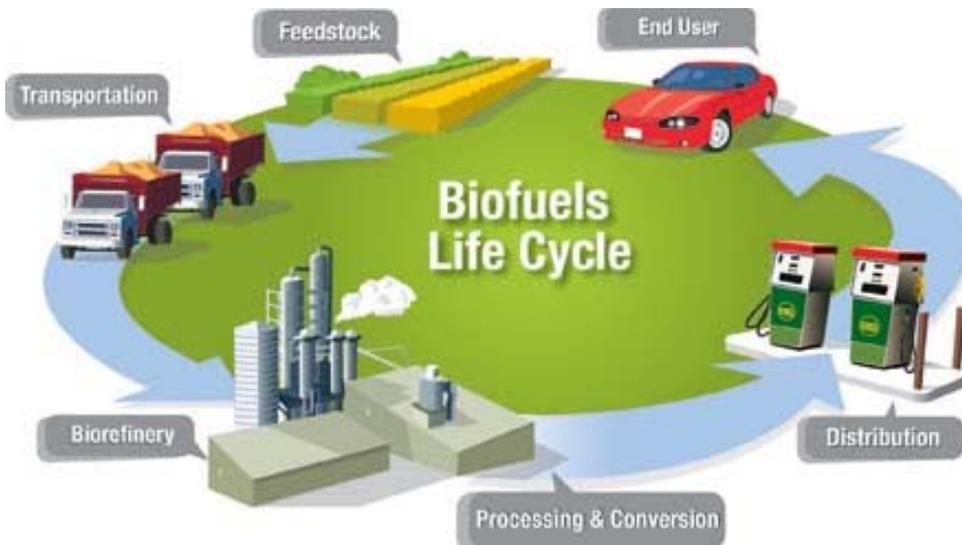
**Solar Program RD&D Goals and Focus:**

- Achieve grid parity with PV and other solar technologies by 2015 through advanced R&D over the entire supply chain.
- Expand funding of the Concentrated Solar Power program through launch of energy storage research and demonstration
- Funding solar research across the entire value chain
- Transforming solar markets through initiatives that break down market barriers and promote the adoption of solar power



# Biomass Energy for Transportation

FY 2011 Budget Request: \$220 M (0% FY2010)



## Market Status:

- In 2008, the U.S. produced 9 billion gallons of ethanol or 6 percent of light duty fuel needs
- For the past 4 years the U.S. has led the world in ethanol production
- ~7 million flexible fuel vehicles on the road
- Cellulosic biofuels pilot/demo plants planned for 2010-2012

## Biomass Program RD&D Goals and Focus:

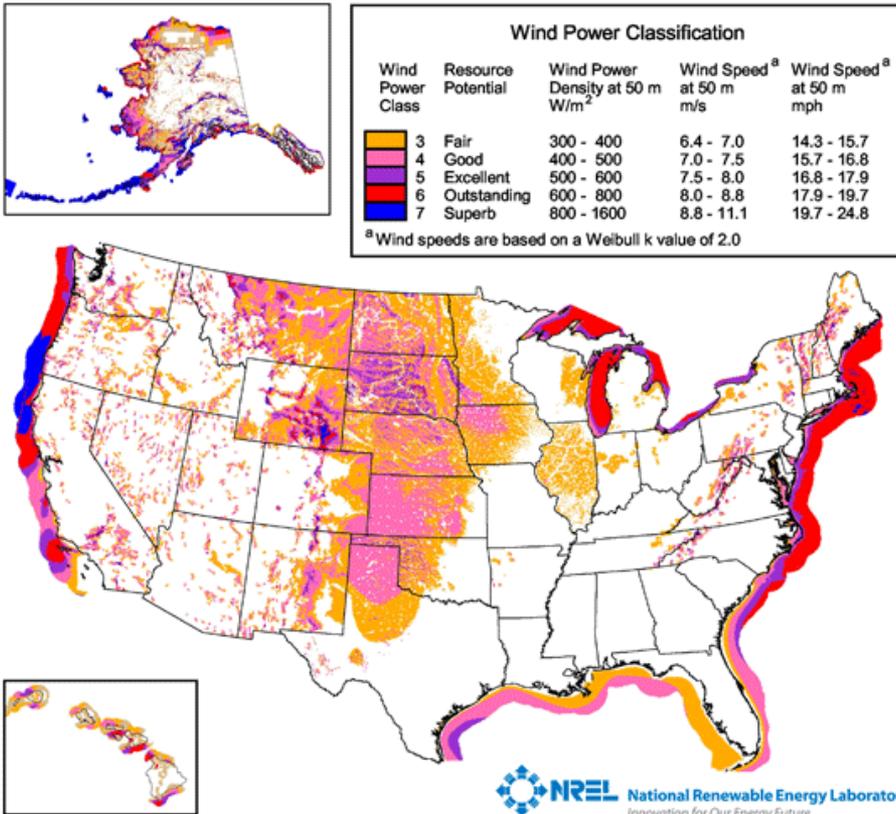
- Achieve cost competitive cellulosic ethanol and other cellulosic and advanced biofuels through applied research, development and biorefinery demonstrations. Support infrastructure activities to enable 36 bgy biofuels by 2022.
- Advanced biofuels that reduce GHG emissions up to 80% compared to a 2005 gasoline baseline
- Advances in enzymes and catalysis
- Engineering of new microorganisms
- Novel sustainability indicators
- Test intermediate blends of ethanol



# Wind Energy

FY 2011 Budget Request: \$122.5 M (+53% FY2010)

## Wind Energy Resource Potential



## Market Status:

U.S. installed capacity is 35,159 MW, including over 9,900 MW installed in 2009

Wind power is the leading source of new renewable energy capacity

U.S. investment in wind power was close to \$20B in 2009

## Wind Program RD&D Goals and Focus:

- Facilitate wind energy's rapid market expansion
- Improve cost, performance and reliability of wind turbine technology
- Supporting U.S. manufacturing and workforce development
- Reducing barriers to deployment
- Supporting grid interconnection
- Facilitating offshore wind power deployment



FY 2011 Budget Request: \$40.5 M (-19% FY2010)



## Market Status:

U.S. ocean power industry still in early technology development stages; no clear cost and performance data; high capital costs

U.S. wave & current resource estimated at 51 GW of extractable energy; Global OTEC resource = 3–5 TW

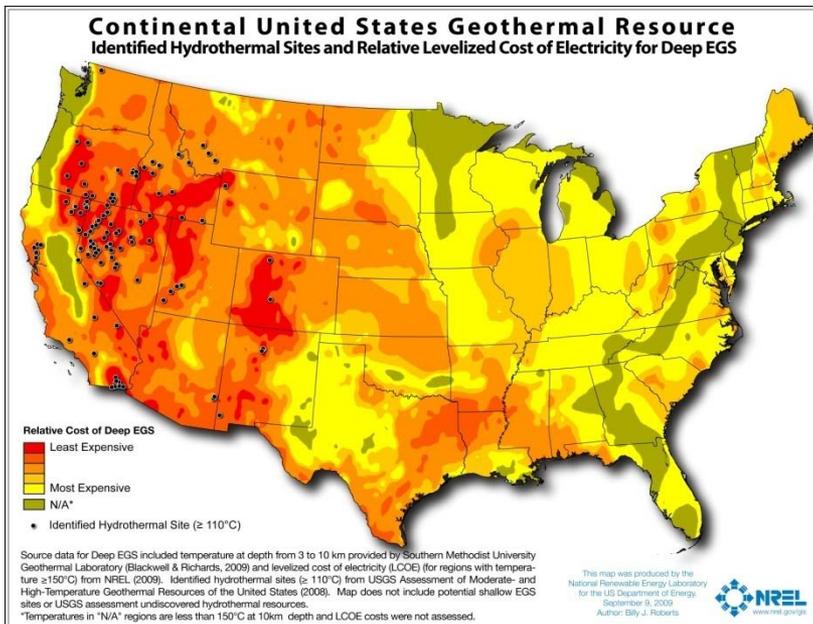
Remaining conventional hydropower potential is large (>50 GW), but limited by licensing and regulatory barriers, as well as environmental concerns

## Water Power Program RD&D Goals and Focus:

- Reduce the barriers to deployment for marine and hydrokinetic technologies through technology development and testing, resource assessments, and environmental impact studies.
- Wave, current, tidal technologies:
  - Device and component development and testing
  - Resource assessments
- Conventional hydropower:
  - Efficiency and capacity upgrades
  - Licensing and environmental impacts
  - Resource assessments for non-powered dams, small hydropower facilities



FY 2011 Budget Request: \$55 M (+25% FY2010)



## Industry Status:

Installed capacity of 3,000 MW e

Total of 132 new projects underway in 12 states, resulting up to 6,442 MW

EGS potential > 100 GW by 2050

## Geothermal Program RD&D Goals and Focus:

- Demonstrate technical feasibility of Enhanced Geothermal Systems (EGS) in different geological conditions;
- Cost-shared step-out approach to EGS Demonstration Projects
- Emphasis on EGS while supporting undiscovered hydrothermal;
- Expand program to include co-produced fluids and power from oil and gas wells, and low-temperature resources;
- Remove institutional barriers for all geothermal resources
  - National Geothermal Data Systems
  - Workforce Development and Education

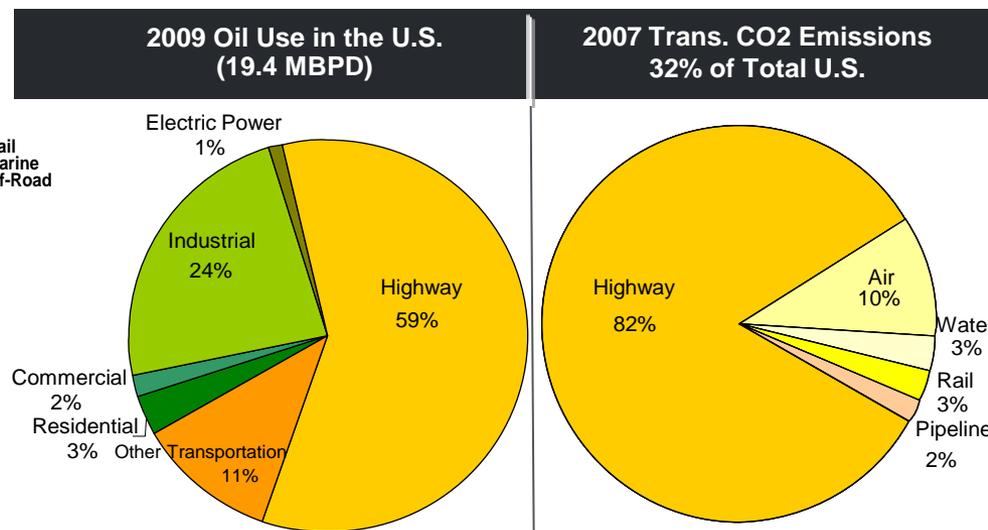
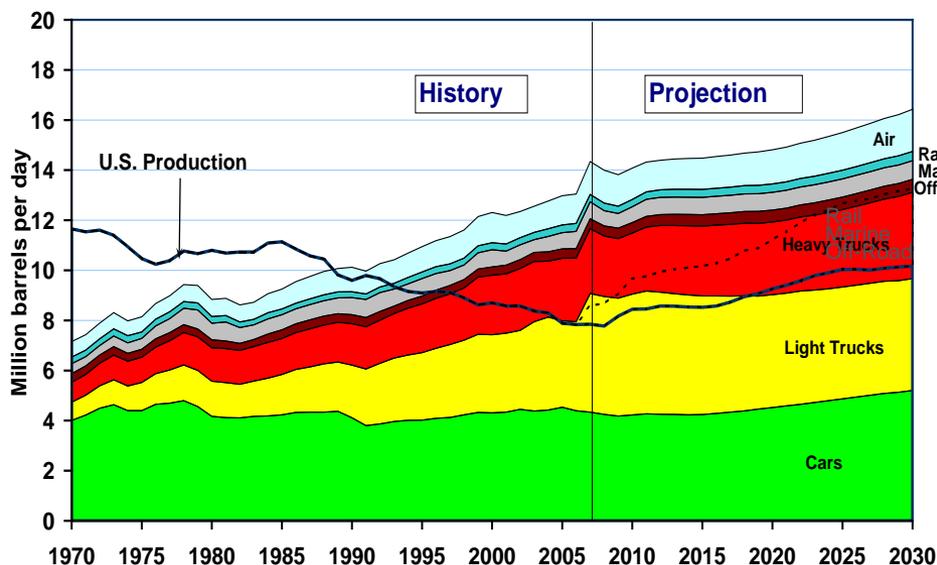


# Vehicle Technologies Mission, Goals and Targets

**Mission: Develop more energy efficient highway transportation technologies to enable America to use less petroleum**

## Key Administration Goals Relevant to Vehicle Technologies

- One million PHEVs on the highway by 2015
- Reduce oil use in 10 years by an amount equivalent to today's imports from the Middle East and Venezuela (~3.5 mbpd). The transportation share of this goal is estimated as ~1.75 mbpd.



# Clean Cities Supports Local Decisions that Reduce the Use of Petroleum in Transportation

\$300 million in Recovery Act to support local decisions to reduce petroleum in transportation

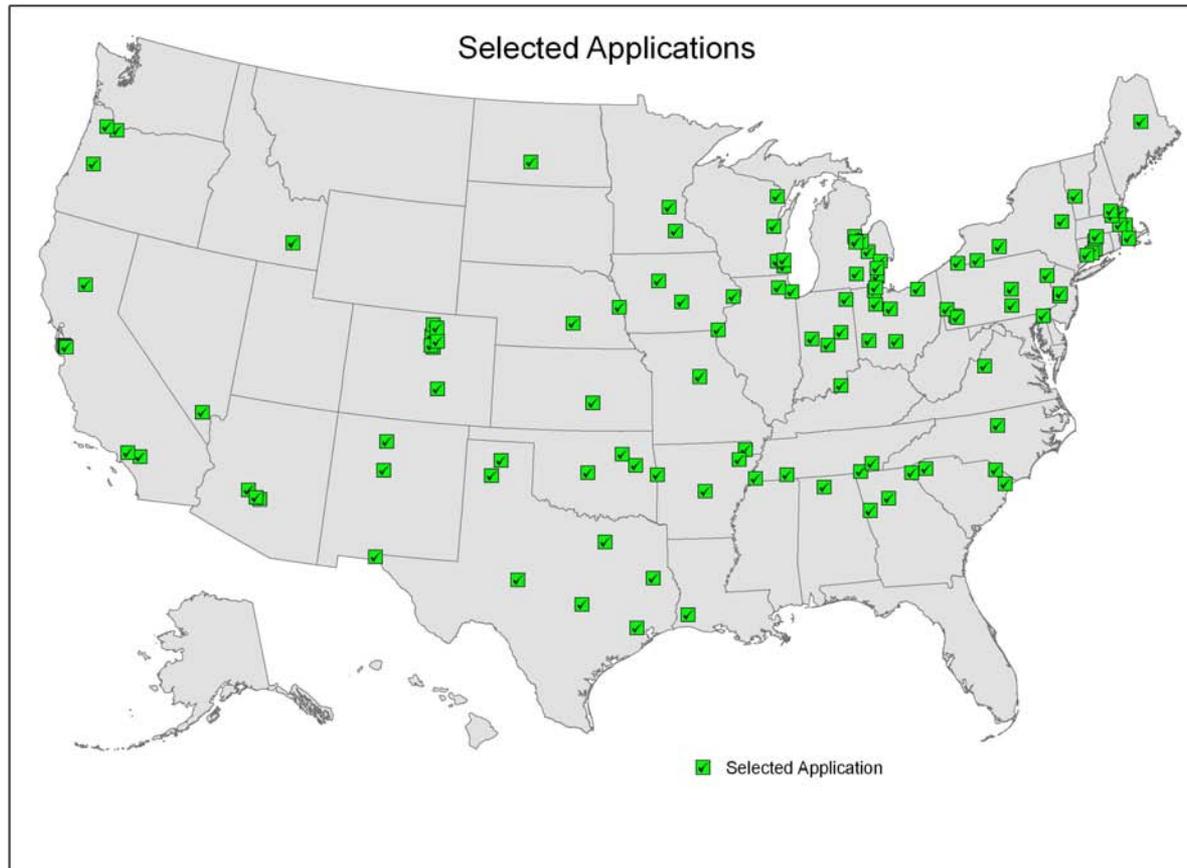
(e.g. alternative fuels, hybrid, idle reduction, blended fuels, fuel economy)



Highly leveraged program with 87 local coalitions  
**Has helped displace more than 2 billion gallons  
of petroleum since 1993**

# 48C Manufacturing Tax Credits Spur American Manufacturing

\$2.3B in awards, leveraging \$5B in private sector capital

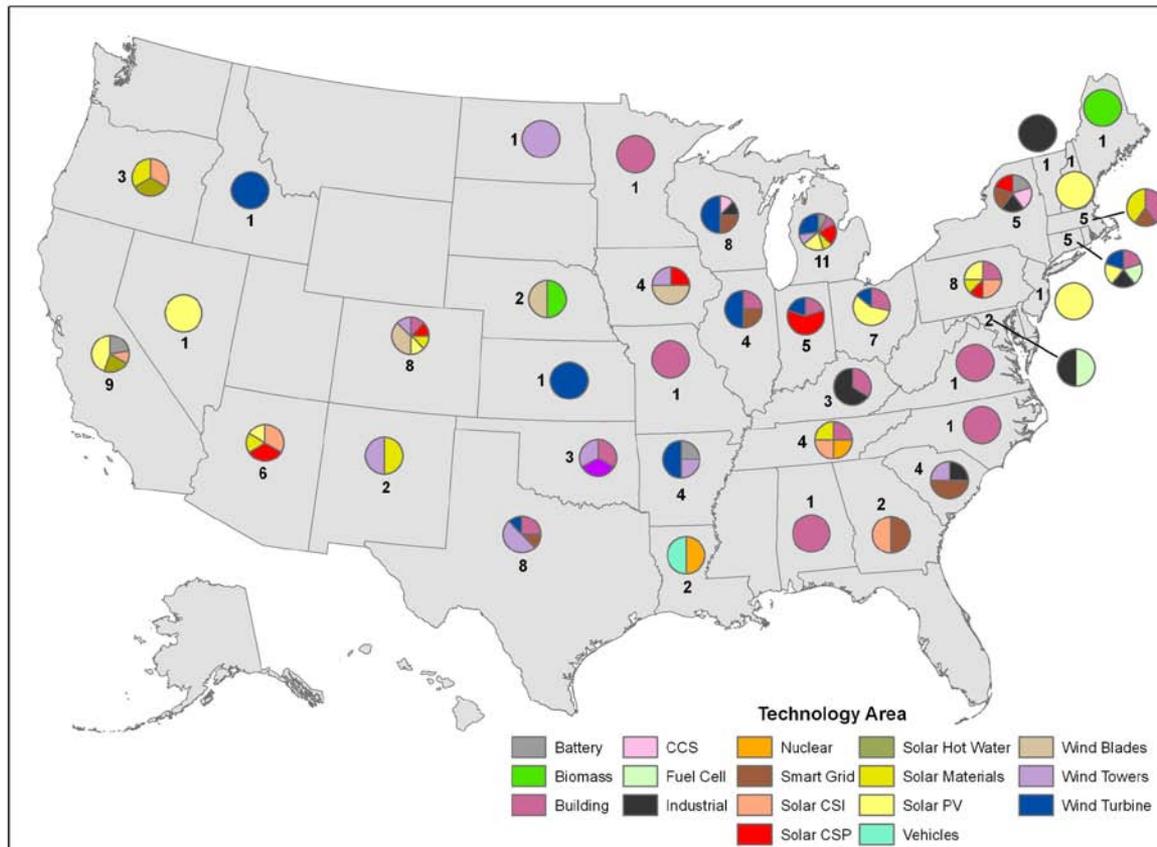


Jan 7, 2010

- American manufacturing of energy technology leads to jobs and energy security

# 48C Tax Credits Are Technologically Diverse

<http://www.energy.gov/recovery/48C.htm>



Jan 7, 2010

- What can cities do to attract technology manufacturing in their town?

EERE: Energy Empowers Home Page

http://www.eere.energy.gov/energyempowers/

Google

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## Energy Empowers

*your stories...*



*from a clean energy economy*

### Weatherization Helping Idahoans Save Green by Going Green

Pocatello, Idaho – Helen Humphreys never thought she could afford the upfront costs of making her home energy-efficient, but stimulus money helped her home get weatherized and lowered her energy bills. [Read More](#)



#### Multimedia

Here you'll witness the first-hand stories of people like you who have taken the next steps toward a future of renewed prosperity. By pushing the limits of energy efficiency and renewable energy technologies and supporting some of America's most innovative businesses, we are saving American jobs and continuing to build a clean-energy economy that will improve the lives and reward the ingenuity of the American people.



#### Powering Up for Recovery in Michigan

Elizabeth Rolinski can't wait to reopen the factory she was once

Being energy efficient and using renewable energy isn't just a fad—it's a real force that's changing people's lives, putting people back to work, and helping rebuild America's economy. Here you can read more about the stories of the people who have been touched by these technologies.

[Share Your Stories With Us](#)



See Where These Stories Happen

[Energy Empowers Blog](#)

[Ohio town installing 'green' traffic signals](#)

# Thank You

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