EERE FY 2015 Budget Request

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

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Assistant Secretary, Office of Energy Efficiency and Renewable Energy

MARCH 4, 2014

Major Administration Energy Goals

- **Reduce GHG emissions** in the range of 17% by 2020*
- **80% electricity from diverse clean energy** by 2035
- **Reduce net oil imports by 50%** by 2020
- **Double energy productivity** by 2030*

*Climate Action Plan Goal

Office of Energy Efficiency and Renewable Energy

EERE Vision

A strong and prosperous America powered by clean, affordable, and secure energy

EERE Mission

To create and sustain American leadership in the transition to a global clean energy economy

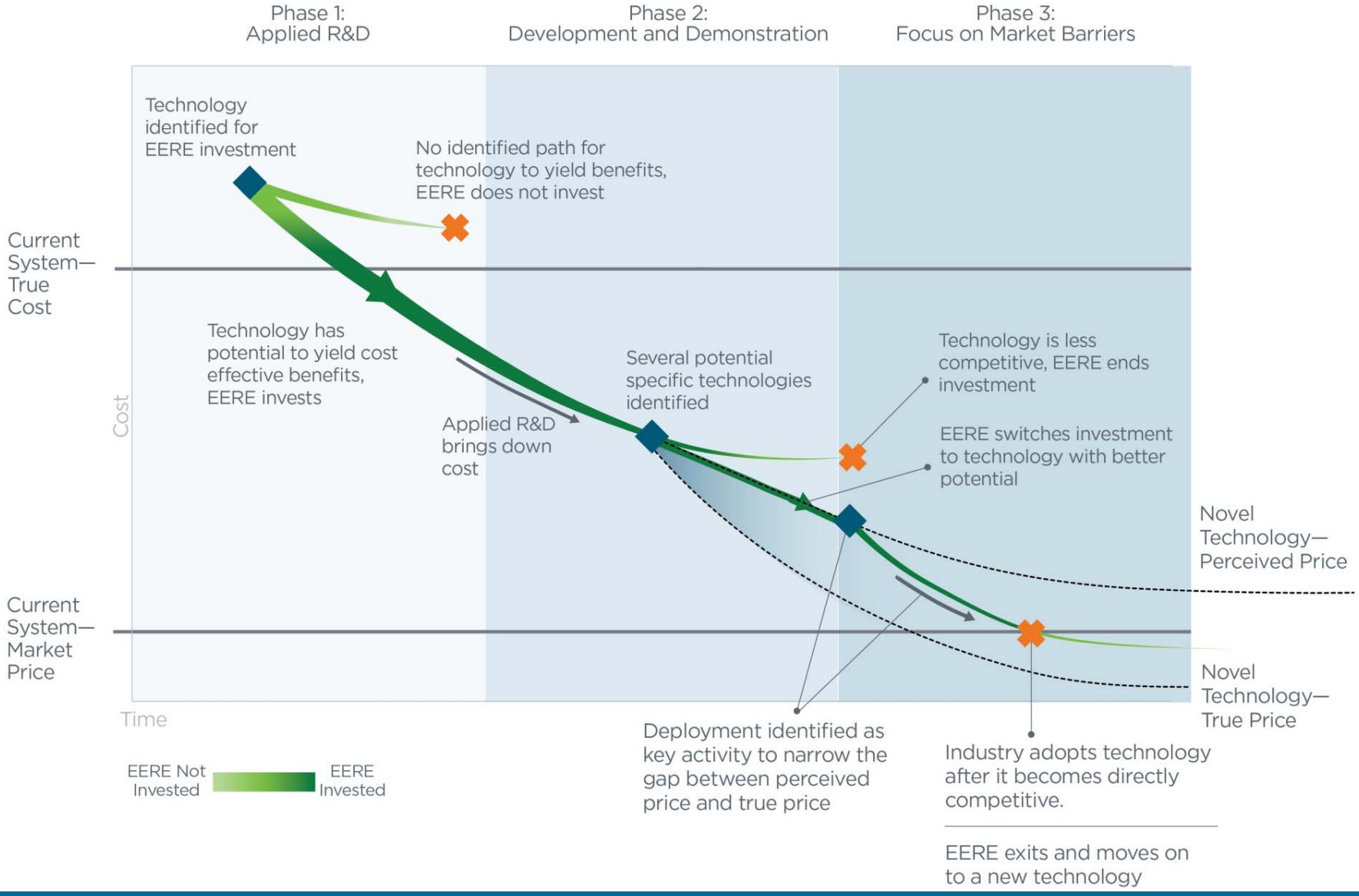
EERE's Guiding Principles

The 5 EERE Core Questions

1. **IMPACT:** Is this a high impact problem?
2. **ADDITIONALITY:** Will the EERE funding make a large difference relative to existing funding from other sources, including the private sector?
3. **OPENNESS:** Are we focusing on the broad problem we are trying to solve and open to new ideas, approaches, and performers?
4. **ENDURING ECONOMIC IMPACT:** How will EERE funding result in enduring economic impact for the United States?
5. **PROPER ROLE OF GOVERNMENT:** Why is this investment a necessary, proper, and unique role of government rather than something best left to the private sector to address?

Applying Impact Assessments to All of Our Activities

EERE Investment Pathways



Select Recent EERE Accomplishments

Sustainable TRANSPORTATION

- **First commercial cellulosic ethanol plant in U.S.**
- **SuperTruck – exceeded goal to develop and demonstrate trucks that have a 50% improvement in freight efficiency compared to current models**
- **Battery cost reduction: $325/kWh, based on useable energy, complete packaged battery, and high volume production**

Renewable ELECTRICITY GENERATION

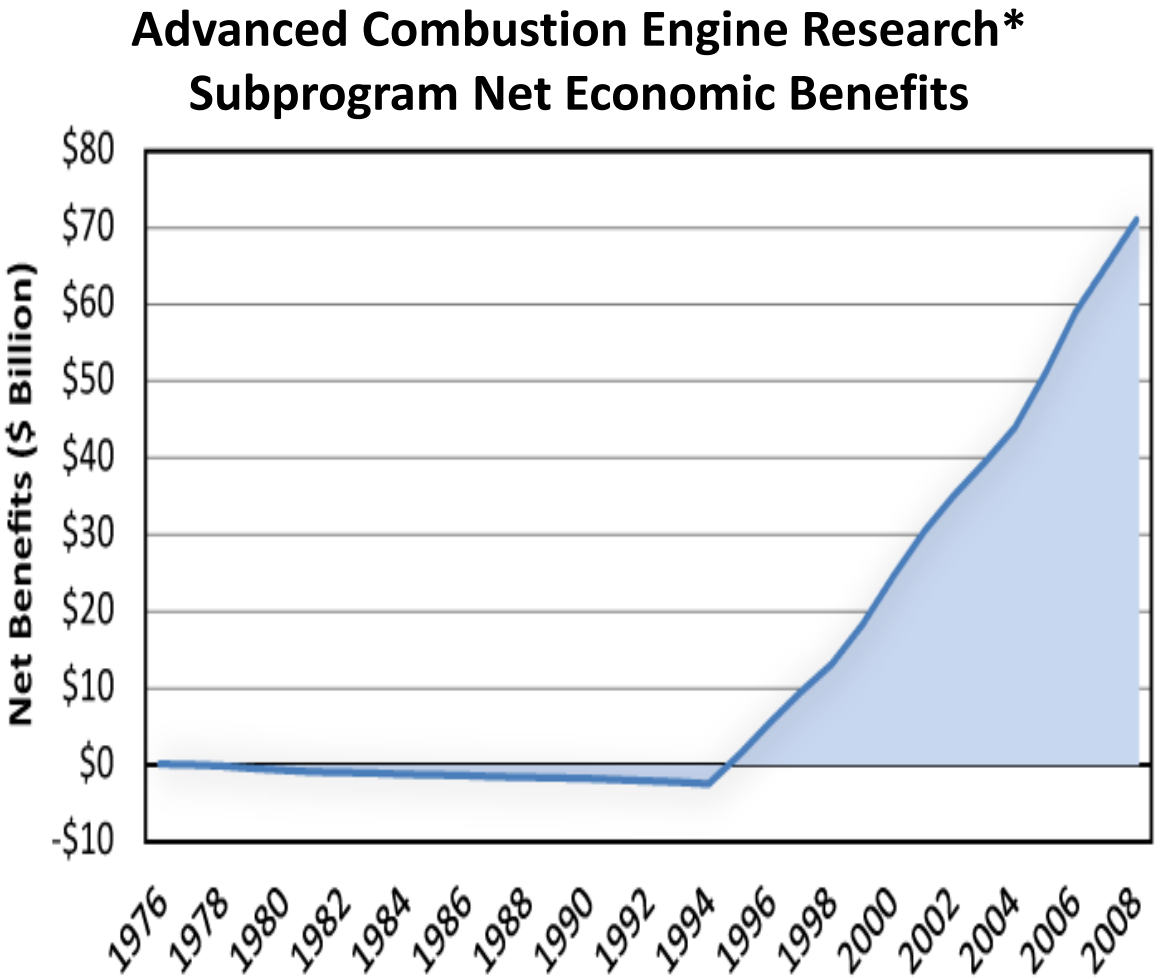
- **First grid connected near-field EGS plant increased power output of nearby operating geothermal field by nearly 38%**
- **Two of the world's largest state-of-the-art wind turbine drivetrain testing facilities open for business**

Energy Saving HOMES, BUILDINGS, & MANUFACTURING

- **Since 2009, finalized new efficiency standards for more than 30 household and commercial products, which are estimated to save consumers hundreds of billions of dollars through 2030 and cut greenhouse gas emissions.**

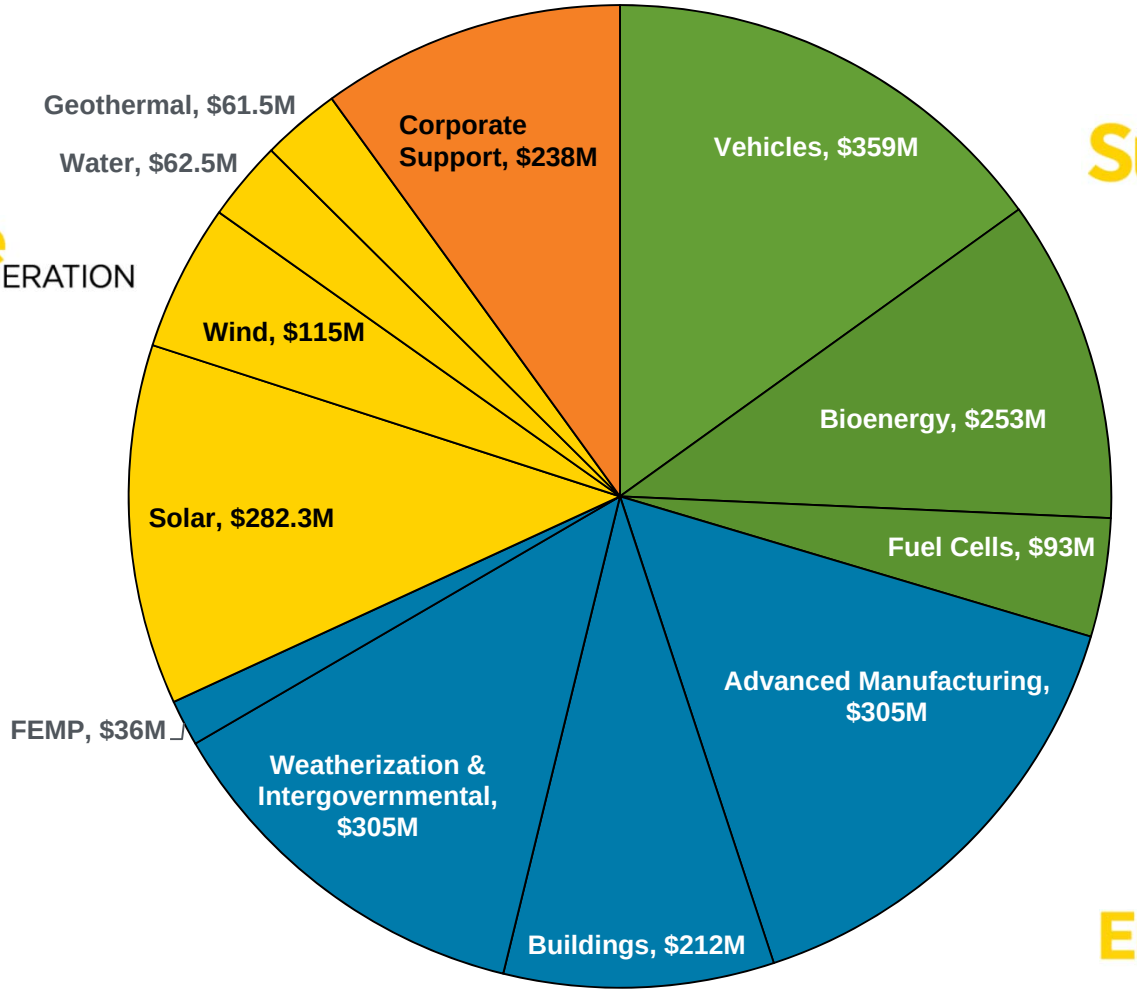
An Example of EERE ROI

Combustion R&D ROI: 70 to 1 Benefit-to-Cost Ratio



*Vehicle Technologies

FY 2015 EERE Budget Request - $2.317B



Renewable ELECTRICITY GENERATION
$521M

Sustainable TRANSPORTATION
$705M

Energy Saving HOMES, BUILDINGS, & MANUFACTURING
$858M

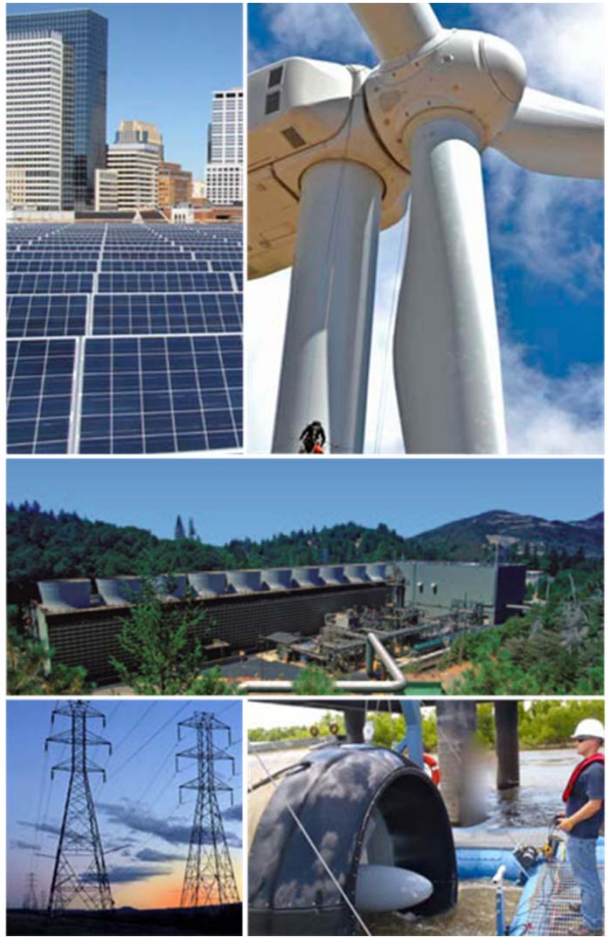
FY 2015 Budget Summary Table

Dollars in Thousands	FY 2013 Current	FY 2014 Enacted	FY 2015 Request	FY 2015 vs FY 2014
Transportation	**584,199**	**614,955**	**705,183**	**+90,228**
- Vehicle Technologies	303,165	289,737	359,000	+69,263
- Bioenergy Technologies	185,190	232,290	253,200	+20,910
- Hydrogen and Fuel Cell Technologies	95,844	92,928	92,983	+55
Renewable Electricity	**444,891**	**449,524**	**521,300**	**+71,776**
- Solar Energy	269,050	257,058	282,300	+25,242
- Wind Energy	86,129	88,126	115,000	+26,874
- Water Power	54,687	58,565	62,500	+3,935
- Geothermal Technologies	35,025	45,775	61,500	+15,725
End-Use Efficiency	**535,354**	**617,449**	**857,700**	**+240,251**
- Advanced Manufacturing	114,254	180,471	305,100	+124,629
- Federal Energy Management Program	28,265	28,248	36,200	+7,952
- Building Technologies	204,601	177,868	211,700	+33,832
- Weatherization and Intergovernmental Activities	188,234	230,862	304,700	+73,838
Corporate Support Programs	**208,889**	**231,513**	**237,779**	**+6,266**
Subtotal, Energy Efficiency and Renewable Energy	**1,773,333**	**1,913,441**	**2,321,962**	**+408,521**
- Use of Prior Year Balances	-81,576	-2,382	-5,213	N/A
- Rescission of Prior Year Balances	0	-10,418	0	N/A
Total, Energy Efficiency and Renewable Energy	**1,691,757**	**1,900,641**	**2,316,749**	**+416,108**

Sustainable
TRANSPORTATION

Renewable
ELECTRICITY GENERATION

Energy Saving
HOMES, BUILDINGS, & MANUFACTURING



Sustainable TRANSPORTATION

Office of Energy Efficiency and Renewable Energy

U.S. Department of Energy

Vehicle Technologies

Fiscal Year 2015 Priority Activities

- ***EV Everywhere* Grand Challenge, $209M:** Accelerate the development of advanced batteries with better performance and reduced system cost, high-performance/low-cost electric drive systems that use wide bandgap devices as well as advanced power electronics and improved motor technologies with reduced or no rare earth materials, lightweight materials to increase vehicle efficiency and electric range, and advanced technologies for convenient and efficient vehicle charging from the electric grid.
- **Advanced Combustion R&D, $49M:** Support SuperTruck initiative, promising to increase the fuel efficiency of Class 8 heavy-duty trucks by at least 50%, as well as low temperature combustion regimes that can dramatically increase passenger vehicle fuel economy.
- **Material Lightweighting, $47M:** Support significantly greater depth of ultra lightweight vehicle substructure demonstrations; greater emphasis on improved properties, manufacturability, computational materials science, and enabling technologies for carbon fiber composites, advanced high-strength steels, aluminum alloys, and magnesium alloys**.**
- **Natural Gas and Drop-in Biofuels, $21.7M:** Expand R&D to eliminate technical barriers to the increased use of alternative and renewable fuels – specifically natural gas and drop-in biofuels. Focus includes natural gas storage and high-efficiency natural gas engines, as well as analysis of optimal biorefinery products for use in fueling infrastructure and vehicles (with EERE Bioenergy Technologies).
- **Alternative Fuel Vehicle Community Partner Projects, $20M**: Accelerate the adoption of alternative fuels through competitively-awarded projects that build strategically-placed, high-impact community-scale demonstrations of alternative fuel vehicles.

(Dollars in Thousands)	FY 2013 Current	FY 2014 Enacted	FY 2015 Request
Batteries and Electric Drive	111,663	108,935	135,531
Vehicle and Systems Simulation & Testing	44,763	43,474	39,500
Advanced Combustion Engines	55,004	49,970	49,000
Materials Technology	40,336	38,137	54,069
Fuels and Lubricant Technologies	16,960	15,990	27,400
Outreach, Deployment and Analysis	34,439	31,231	50,400
NREL Site-Wide Facility Support	-	2,000	3,100
Total, Vehicle Technologies	**303,165**	**289,737**	**359,000**

EV Everywhere Grand Challenge ($209M)

President Obama issued the *EV Everywhere* Grand Challenge in March 2012 with the bold goal to enable the United States to produce plug-in electric vehicles (PEVs) that are as affordable and convenient for the average American family as today's gasoline-powered vehicles, within the next 10 years.

***EV Everywhere* Grand Challenge** *EV Everywhere* focuses on technical targets to reduce PEV cost and directs attention to breaking down the most difficult PEV deployment barriers.

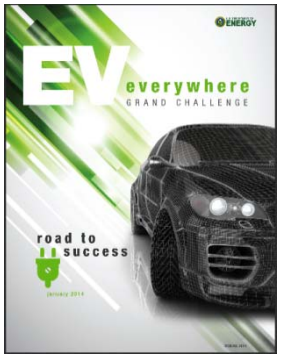
R&D Technology performance and cost targets (by 2022):

- **Batteries:** $125/kWh cost, 400 Wh/L energy density, 250 Wh/kg specific energy, 200 W/kg specific power
- **Electric drive system:** $8/kW cost, 1.4 kW/kg specific power, 4 kW/L power density, 94% system efficiency (55kW system cost of $440)
- **Materials lightweighting**: Overall weight reduction of almost 30% (35% reduction of body structure weight, 25% reduction of chassis and suspension weight, 5% reduction of interior weight)

Targets will guide DOE investments to reduce combined PEV battery and electric drive system costs by up to 75%. FY15 budget request includes $135.5M from Batteries and Electric Drive Technology, $26.4M from Vehicle and Systems Simulation & Testing, and $47M from Materials Technology.

Workplace Charging Challenge Goal is to achieve a tenfold increase in the number of U.S. employers offering workplace charging in the next five years. Leading U.S. employers in all economic sectors are taking the Challenge by committing to install workplace charging.

EV Everywhere Blueprint (Jan 2013)



EV Everywhere Progress Report (Jan 2014)

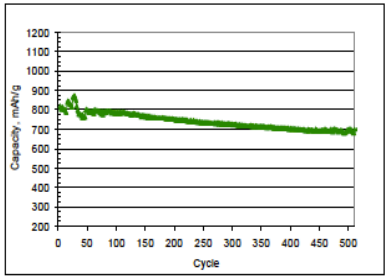
workplace charging challenge

Now Over 50 Partners

Vehicle Technologies Battery R&D ($100M)

Accomplishments

- FY 2013 cost target met, now at $325/kWh
- Industry awardee demonstrated novel cathode slurry processing techniques that reduced N-Methylpyrrolidone solvent use by 32% and increased coated electrode density by 31%. The awardee also increased cell energy density by 36% and reduced PHEV cell costs to $250/kWh from $420/kWh
- Industry awardee developed a silicon-graphite anode material that demonstrated 850mAh/g of reversible capacity and ~500 cycles
- Established 2.5 million kWh battery manufacturing capacity



Status

- On track to meet cost target of $300/kWh in FY 2014
- Calendar life up to 10 - 15 years
- Cycle life between 3,000-5,000 deep discharge

FY15 Emphasis

Cost reduction, durability, safety, and increased specific energy:

- Develop and demonstrate next generation lithium ion PEV materials and cell technology
  - Develop high voltage, high capacity cathodes
  - Develop silicon composite and metal alloy anodes
  - Develop high voltage electrolytes
- Expand focus on beyond-Lithium-ion technology

FY 2015 Goal

Reduce the cost of a PHEV40 battery to $275/kWh

Bioenergy Technologies

Fiscal Year 2015 Priority Activities

- **Conversion Technologies, $100.5M:** High-impact conversion technology R&D to demonstrate $3/gasoline gallon equivalent drop-in hydrocarbon biofuels by 2017 and 2022 using a wide array of feedstock and conversion technologies, with at least 50% greenhouse gas reduction on a lifecycle basis.

- **Demonstration and Deployment, $105M:** Advance biofuel commercial deployment through scale-up of integrated biorefinery demonstrations of newly developed hydrocarbon pathways with high-volume potential, as well as support of military-specification jet fuel in collaboration with DOD and USDA through the Defense Production Act.

- **Feedstocks, $30.5M:**
  - **Terrestrial Production and Logistics, $16.5M:** Develop strategies, technologies, and systems that can sustainably provide feedstock to the throat of the conversion reactor for a total cost of no more than $80/dry ton by FY 2017, while meeting conversion process specifications and providing sufficient volume to meet demand.
  - **Algae, $14M:** Pursue research in advanced biology and carbon dioxide utilization to leverage capabilities at the algae testbed facilities and lay a foundation for breakthroughs needed to meet FY 2022 algae productivity target (5,200 gallons of biofuel intermediate per acre of cultivation per year).

(Dollars in Thousands)	FY 2013 Current	FY 2014 Enacted	FY 2015 Request
Feedstocks	47,359	46,972	30,500
Conversion Technologies	75,140	101,384	100,500
Demonstration and Deployment (formerly Integrated Biorefineries)	43,630	64,790	105,000
Strategic Analysis and Cross-Cutting Sustainability	14,939	12,146	11,000
Biopower/Cookstoves	4,122	1,998	0
NREL Site-Wide Facility Support	0	5,000	6,200
Total, Bioenergy Technologies	**185,190**	**232,290**	**253,200**

Fuel Cell Technologies

Fiscal Year 2015 Priority Activities

- **Fuel Cell R&D, $33M:** Develop innovative technologies to reduce cost and improve durability – e.g., by increasing PEM fuel cell power output per gram of platinum-group metal catalyst to 6.5kW/g in 2015 and 8.0kW/g by 2020 (from 2.8kW/g in 2008).

- **Hydrogen Fuel R&D, $36.3M:** Advance pioneering technologies in materials, components, and processes that will reduce the cost of hydrogen from renewable resources to $6.80/gge (dispensed and untaxed) from $8.00/gge in 2011; and the cost of hydrogen storage systems by 15% compared to the 2013 baseline of $17/kWh by 2015.

- **Manufacturing R&D, $3M:** Demonstrate a ground-breaking 3X increase of continuous in-line measurement processes to achieve 100 ft/min for MEA and MEA component roll-to-roll processing by 2015.

- **Technology Validation and Market Transformation, $9M:** Demonstrate zero-emissions medium-duty fuel cell hybrid electric trucks with a projected range of >100 miles, meeting parcel delivery route requirements.

(Dollars in Thousands)	FY 2013 Current	FY 2014 Enacted	FY 2015 Request
Fuel Cell R&D	41,266	33,383	33,000
Hydrogen Fuel R&D	31,681	36,545	36,283
Manufacturing R&D	1,899	3,000	3,000
Systems Analysis	2,838	3,000	3,000
Technology Validation	8,514	6,000	6,000
Safety, Codes and Standards	6,808	7,000	7,000
Market Transformation	2,838	3,000	3,000
NREL Site-Wide Facility Support	0	1,000	1,700
Total, Fuel Cell Technologies	**95,844**	**92,928**	**92,983**

Renewable ELECTRICITY GENERATION

Office of Energy Efficiency and Renewable Energy
U.S. Department of Energy

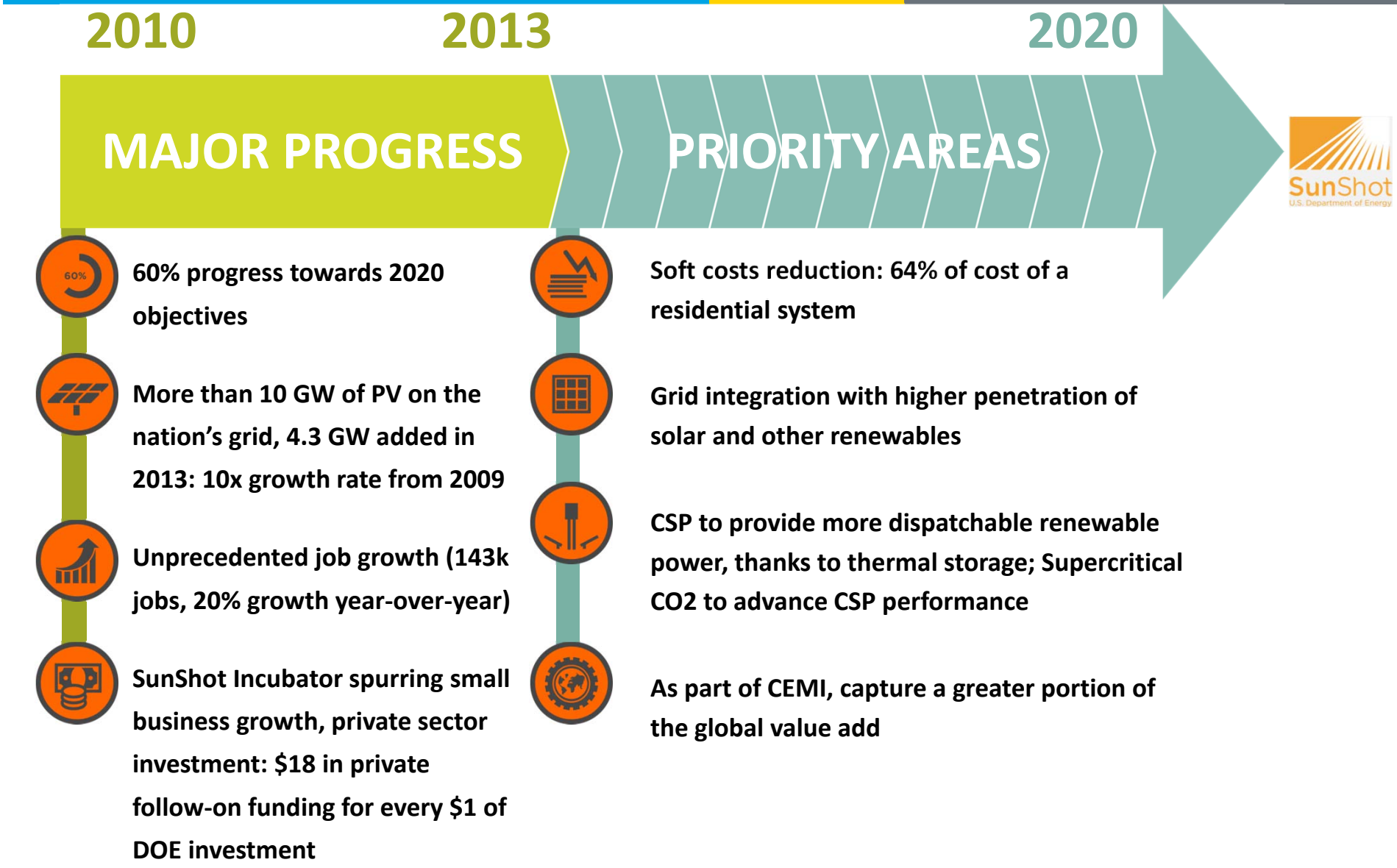
Solar Energy Technologies

Fiscal Year 2015 Priority Activities

- **Concentrating Solar Power, $61.4M:** Significant progress in CSP has enabled reductions in LCOE from $0.21/kWh in 2010 down to $0.185 kWh in 2012 with a goal of reaching $0.06/kWh by 2020. Higher system temperatures , lower cost collectors, and thermal storage will be required to achieve the 2020 goals. An increased effort, in coordination with other DOE offices, on Supercritical CO2 Brayton power cycles will advance CSP system efficiencies.
- **Photovoltaic R&D, $42M:** Continued focus on advancing PV performance in our nation's laboratories where the DOE has supported U.S. leadership in technology advancement to enable a globally competitive U.S. industry. New effort on developing PV recycling technology.
- **System Integration, $56.9M:** In coordination with other DOE offices, new efforts to develop technologies to integrate solar with buildings and electric vehicles will create systems with better optimized overall performance and improved technologies for interacting with the power grid.
- **Balance of Systems Soft Cost Reduction, $45.1M:** Enables an increased focus on engagement with state and local governments, small businesses, and community colleges that will help reduce the "soft costs" associated with the deployment of solar energy, as well as enable a highly skilled and informed workforce for both the solar industry and ancillary fields related to solar deployment.
- **Innovations in Manufacturing Competitiveness, $67.7M:** Focus on supporting manufacturing R&D that could help U.S. industries reduce manufacturing costs for global competitiveness.

(Dollars in Thousands)	FY 2013 Current	FY 2014 Enacted	FY 2015 Request
Concentrating Solar Power	43,080	48,571	61,400
Photovoltaic R&D	150,580	56,641	42,000
Systems Integration	45,773	52,816	56,900
Balance of Systems Soft Cost Reduction	29,617	42,558	45,100
Innovations in Manufacturing Competitiveness	0	44,472	67,700
NREL Site-Wide Facility Support	0	12,000	9,200
Total, Solar Energy Technologies	**269,050**	**257,058**	**282,300**

SunShot Initiative – Solar Grid Parity by 2020



Wind Power Technologies

Fiscal Year 2015 Priority Activities

- **Promote Offshore Wind, $46.7M:** Multi-year program to develop and demonstrate pioneering U.S. offshore wind systems, including targeted research at full scale, validating innovative technologies and speeding deployment of the first U.S. offshore wind projects.
- **Atmosphere to Electrons (A2e), $14.4M:** Comprehensive R&D initiative to address wind plant performance improvement opportunities. Key research institutions and computational assets will be leveraged to conduct high fidelity modeling activities to understand the complex flow of the resource in wind farms to increase wind farm energy capture, reduce annual operational costs and inform project financing.
- **Manufacturing Competitiveness, $3.5M:** R&D to address logistical and transportation constraints of very tall wind towers (120 meters and above) and very large (~100 meter) turbine blades, enabling access to better wind resources, lower energy costs, and improved domestic manufacturing competitiveness.
- **Market Barriers, $17.2M:** Facilitate environmentally responsible deployment of wind technologies through continued multi-year efforts to ensure wind-wildlife interactions are considered and addressed; collaboration with Federal agencies on mitigating the effects of wind turbines on long range surveillance and terminal radars; and next-generation wind integration studies.

(Dollars in Thousands)	FY 2013 Current	FY 2014 Enacted	FY 2015 Request
Resource Characterization & Technology RD&T (Land, Offshore, Distributed)	52,939	34,409	38,416
Technology Validation and Market Transformation	8,000	21,049	42,613
Mitigate Market Barriers	11,301	10,129	17,209
Modeling and Analysis	13,889	13,539	12,062
NREL Site-Wide Facility Support	0	9,000	4,700
Total, Wind Power Technologies	**86,129**	**88,126**	**115,000**

Offshore Wind ($46.7M)

Consistent with DOE/DOI's the *National Offshore Wind Strategy,* Offshore Wind activities will support research that is expected to simultaneously improve offshore wind power plant performance, reduce capital and operational costs and reduce market barriers—directly contributing to the office goal of lowering the cost of energy. This activity supports a multi-year program to facilitate the creation of U.S. offshore wind industry.

- Tremendous U.S. offshore wind resource, exceeding 50 quads (4,000 GW), which is more than three times the Nation's current annual electricity production.
- The Offshore Wind Demonstration Funding Opportunity is a 5-year initiative
- In 2014, will down select to three of seven projects to move to final design, construction, and installation activities based on:
  - Project progress in 2013 and 2014
  - Innovations and their potential reductions on the cost of energy
  - Likelihood of project success as well as advancement of the national knowledge base and commercial impact in the United States.
- Projects are anticipated to complete construction and be in operation by the end of 2017, and will represent some of the very first at-scale deployments in the United States.

Water Power Technologies

Fiscal Year 2015 Priority Activities

- **HydroNEXT, $20M:** This new initiative aims to double the current contribution of hydropower in the United States. Activities will focus on technologies and tools to improve performance and sustainably increase generation at existing water resources infrastructure, in addition to the development and demonstration of technologies to lower the cost, improve the performance, and reduce the environmental impacts of hydropower for new stream-reach development.
- **Modular Pumped-Storage Hydropower, $4M:** Building on the Modular Pumped Storage Feasibility Study conducted in FY 2014, the office will begin developing innovative m-PSH system designs that exhibit cost-competitiveness with existing large-scale designs.
- **MHK Research and Design, $12.5M:** To advance system designs of marine energy conversion devices, the office will continue to support field studies and applied MHK research; integrate innovative component technologies into advance system designs; and will demonstrate the viability of MHK systems.
- **Validate Open-Source Advanced Design Tools, $6M:** Compile, analyze, and disseminate performance data from device testing to enable the validation and improvement of numerical modeling tools. These datasets will be freely available to entrepreneurs and industry to allow for the simulation of device array designs and array impacts.

(Dollars in Thousands)	FY 2013 Current	FY 2014 Enacted	FY 2015 Request
Marine and Hydrokinetic Technologies	35,456	41,275	30,500
Hydropower Technologies	19,231	17,290	31,500
NREL Site Wide Facility Support	0	0	500
Total, Water Power Technologies	**54,687**	**58,565**	**62,500**

HydroNEXT ($20M)

The new ***HydroNEXT*** initiative will focus on accelerating the use of hydropower through development and demonstration of technologies to lower cost, improve performance, and reduce environmental impacts of hydropower.

- **HydroMax:** Capturing near-term growth opportunities through R&D on technologies to cost-effectively improve performance and increase sustainable generation at existing water resources infrastructure.
- **Low Impact New Development (LIND):** A new set of hydro technologies is needed to capture the wide range of low impact development opportunities that are currently available from new stream-reach development. These technologies are acutely directed to address the dual barriers currently limiting new hydropower – high capital costs & environmental sustainability.
- **Environmental Performance Analysis + Regulatory Process Improvement:** High-level, predictive analysis is needed to assess LIND designs and inform future design requirements to meet environmental performance needs and ease the permitting processes for future deployments of LIND technologies. DOE will also develop a tool to reduce permitting barriers and increase efficiency and transparency of federal permitting processes.

Through HydroNEXT, the Energy Department aims to **double hydropower generation in the U.S.** by 2030 (an additional 300 TWh) to create a large and enduring economic and environmental benefit to the U.S.

Geothermal Technologies

Fiscal Year 2015 Priority Activities

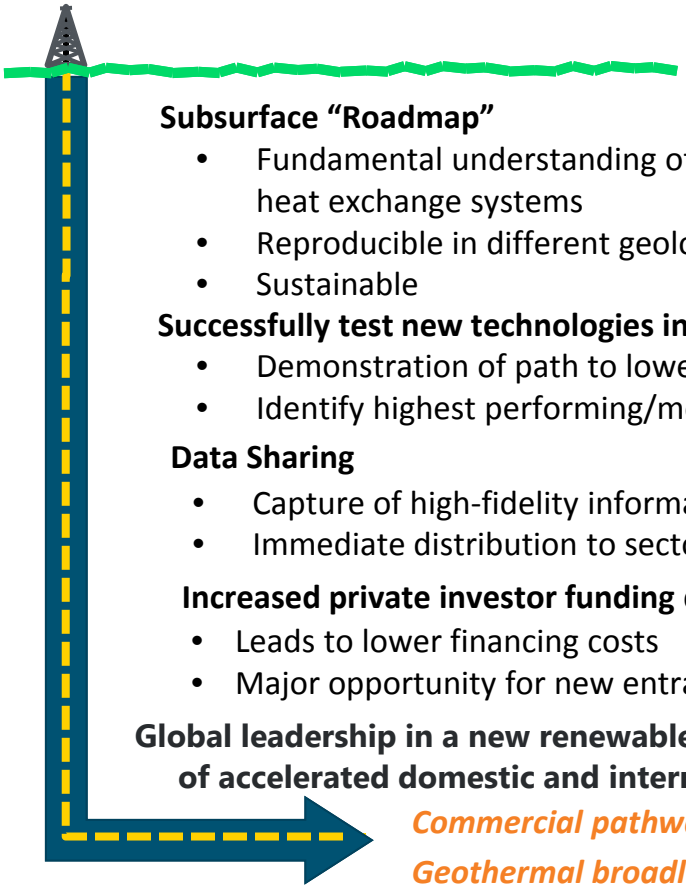
- **Frontier Observatory for Research in Geothermal Energy (FORGE), $29M:** Site characterization for FORGE, a dedicated site for testing and validating cutting-edge EGS technologies and techniques, creating an accelerated commercial pathway to large-scale EGS power generation in the U.S.
- **Play Fairway Analysis, $4.5M:** Continuation of FY 2014 "Play Fairway" analyses, an assessment of exploration risk and the probability of finding new resources on a regional scale that identifies the most prospective areas for new geothermal exploration and development.
- **Strategic Materials, $4M:** Continuation of FY 2014 Strategic Materials effort, transitioning the most successful feasibility studies to technology prototype development or field demonstration projects.
- **Subsurface Crosscut Roadmapping and R&D, $6M:** Subsurface roadmapping and R&D collaboration with Program Offices across DOE—including the Office of Fossil Energy, the Office of Nuclear Energy, the Office of Science, and the Office of Environmental Management— on crosscutting geology and engineering initiatives within the Geothermal portfolio. In FY 2015, the Program's contributions will target roadmapping and shared R&D challenges, including subsurface characterization and an In-Field EGS stimulation protocol that can accelerate the addition of an estimated 7-10 GW of potential from in- and near-field EGS.

(Dollars in Thousands)	FY 2013 Current	FY 2014 Enacted	FY 2015 Request
Enhanced Geothermal Systems	20,103	27,084	33,500
Hydrothermal	8,092	10,285	17,500
Low Temperature and Coproduced Resources	2,942	4,708	6,000
Systems Analysis	3,888	3,698	4,000
NREL Site-Wide Facility Support	0	0	500
Total, Geothermal Technologies	**35,025**	**45,775**	**61,500**

Frontier Observatory for Research in Geothermal Energy (FORGE) ($29M)

- The FORGE initiative promotes transformative science and engineering to validate and optimize enhanced geothermal systems (EGS) technology
- FORGE intends to create an accelerated commercial pathway to large-scale EGS power generation in the U.S.

Value Proposition



Subsurface "Roadmap"
- Fundamental understanding of how to create large-scale subsurface heat exchange systems
- Reproducible in different geologic settings
- Sustainable

Successfully test new technologies in controlled environment
- Demonstration of path to lower costs
- Identify highest performing/most reliable methods and tools

Data Sharing
- Capture of high-fidelity information and measurements
- Immediate distribution to sector stakeholders

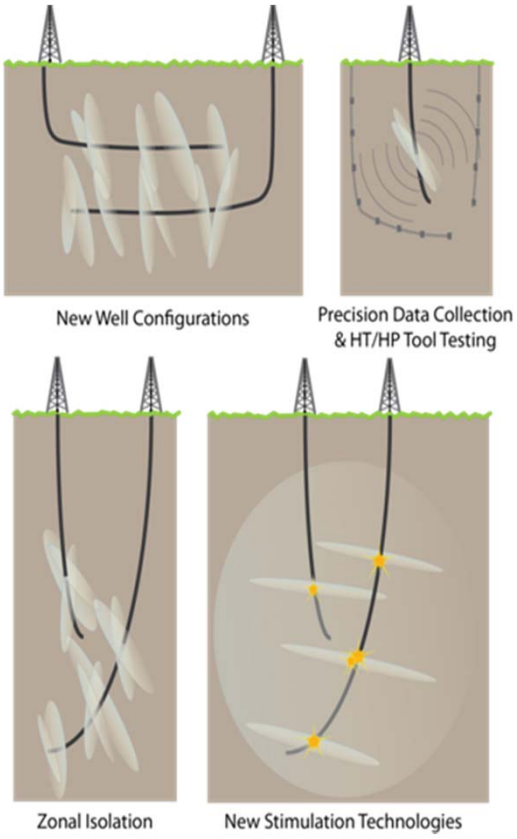
Increased private investor funding due to lower risk and costs
- Leads to lower financing costs
- Major opportunity for new entrants into the industry

Global leadership in a new renewable energy sector – with expectation of accelerated domestic and international adoption of EGS

Commercial pathway to large-scale EGS power generation

Geothermal broadly distributed throughout the U.S.

Examples of Novel Technologies and Techniques to be Tested



Energy Saving

HOMES, BUILDINGS, & MANUFACTURING

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Building Technologies

Fiscal Year 2015 Priority Activities

- **Emerging Technologies, $79M:** Increased funding above FY 2014 includes focus on non-vapor compression technologies capable of being used in HVAC applications through Future of Air Conditioning Technologies (FACTs) FOA. Non-vapor compression air conditioning technologies have the potential to provide up to 50% reductions in energy consumption. Building Technologies will also focus additional investments in transactive controls and grid integration to optimize energy performance and comfort as well as support energy-related transaction outside the building envelope.
- **Commercial Building Integration, $28M:** Build the common data structures, tools and processes to support and drive greater investment in energy efficiency across all commercial market sectors, including through decision-grade energy performance data access and design and decision support tools. Demonstrate and evaluate the impact of three promising new technologies, broaden the use of the Commercial Energy Asset Score, and assist Better Building industry partner organizations in demonstrating 2% per year portfolio-wide energy savings.
- **Penn State Univ. Consortium for Building Energy Innovation, $10M:** Develop new technologies and solutions not currently available in the market that are needed to reduce energy use in existing small- and medium size commercial buildings, and demonstrate new paths to market for real energy savings.
- **Residential Building Integration, $23M:** Continue to develop new, cost-effective energy efficient technical solutions for existing and new construction, however rather than only focusing on whole house approaches, actionable solutions will be developed around typical systems that are retrofitted individually.
- **Equipment and Buildings Standards, $69M:** Support standards and test procedure activities contributing to the reduction of building source energy use and carbon pollution. There will be an increased emphasis on building code compliance initiatives.

(Dollars in Thousands)	FY 2013 Current	FY 2014 Enacted	FY 2015 Request
Emerging Technologies (ET)	58,599	55,862	79,000
Commercial Buildings Integration (CBI)	33,956	30,782	28,000
Penn State Consortium for Building Energy Innovation	22,843	9,994	10,000
Residential Buildings Integration (RBI)	27,678	24,390	23,000
Equipment and Buildings Standards	61,525	55,840	69,000
NREL Site-Wide Facility Support	0	1,000	2,700
Total, Building Technologies	**204,601**	**177,868**	**211,700**

Advanced Manufacturing

Fiscal Year 2015 Priority Activities

- **Next Generation Manufacturing R&D Projects, $86M:** Three or four targeted FOAs will address core technical issues for foundational technologies to enable U.S. manufacturers to realize significant gains in energy productivity, environmental performance, product yield, competitiveness, and economic growth.

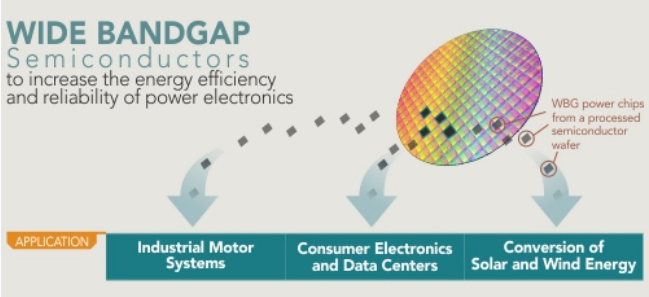
- **Advanced Manufacturing R&D Facilities, $190.5M:** Supports the creation of at least one new Clean Energy Manufacturing Innovation Institute and supports two existing institutes, consistent with the President's vision for a larger, multi-agency National Network of Manufacturing Innovation, as well as continuing investment in the Critical Materials Hub and existing Manufacturing Demonstration Facility.

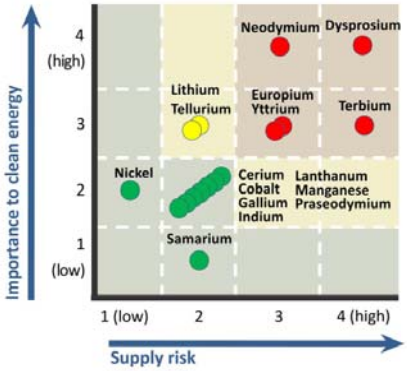
- **Technical Assistance, $28.5 M:** Continue to support Better Plants and Superior Energy Performance; support Industrial Assessment Centers with a focus around increased productivity as well as energy and water savings for small and medium manufacturers; and expand technical assistance resources for increased combined heat and power installations.

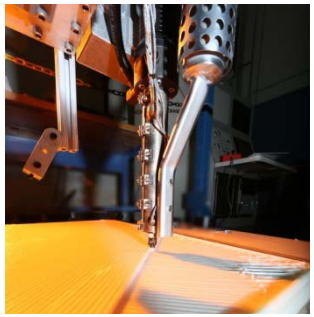
(Dollars in Thousands)	FY 2013 Current	FY 2014 Enacted	FY 2015 Request
Next Generation Manufacturing R&D Projects	41,745	76,971	86,000
Advanced Manufacturing R&D Facilities	55,009	81,500	190,500
Industrial Technical Assistance	17,500	22,000	28,500
NREL Site-Wide Facility Support	0	0	100
Total, Advanced Manufacturing	**114,254**	**180,471**	**305,100**

Advanced Manufacturing R&D Facilities ($191M)

Objective: Accelerate the use of cutting-edge technologies to position the United States as a world leader in manufacturing by creating public-private partnership facilities that bring together manufacturers, research institutions, suppliers, and universities.







FY 2015 activities include support for:

- At least one new Clean Energy Manufacturing Innovation Institute and two existing Institutes (Next Generation Power Electronics; Advanced Composites Manufacturing)
- Critical Materials Hub
- Manufacturing Demonstration Facility

Impacts:

- Increased domestic manufacturing capabilities and expertise
- Increased manufacturing collaboration among small, medium and large businesses, and university and government
- Workforce training for advanced manufacturing

Weatherization and Intergovernmental Programs

Fiscal Year 2015 Priority Activities

Weatherization Assistance Program, $227M:

- Achieve target of over 33,000 home energy upgrades nationwide through active management of 59 weatherization formula grantees and competitively select and manage approximately 20 high-impact projects on financing models for the retrofit of low-income multi-family buildings.
- Establish, improve, and implement worker training curricula, work standards, and audit processes in retrofits.

State Energy Program, $63.1M:

- Use key engagements through the State Energy Office network and their capacity to use strategic policy levers and innovative programs to bring markets to scale for cost-competitive clean energy technologies by leveraging best practice approaches and voluntary commitment-driven partnerships.
- Provide technical assistance and competitively selected awards to States to design and adopt develop effective policies and strategies to drive progress toward State and regional clean energy economy goals.
- Develop and deploy assessment, planning, and decision-making tools for the adoption of policy infrastructures to facilitate clean energy technology deployment, including self-sustaining financial models.

Clean Energy and Economic Development Partnerships (CEED Partnerships), $14M:

- Provide technical assistance to States and local communities to create economic development roadmaps that leverage the current shale gas boom to support sustained economic development and growth, as well as to assist local governments in their efforts to diversify their economies by attracting advanced manufacturing and clean energy industries.

(Dollars in Thousands)	FY 2013 Current	FY 2014 Enacted	FY 2015 Request
Weatherization Assistance	128,879	170,898	224,600
Training and Technical Assistance	2,826	2,998	3,000
Total, Weatherization Assistance Program	131,705	173,896	227,000
State Energy Program	47,108	49,970	63,100
Clean Energy/Economic Development Partnerships	0	0	14,000
Tribal Energy Program	9,421	6,996	0
Total, Weatherization and Intergovernmental Programs	**188,234**	**230,862**	**304,700**
*In FY 2015 the Tribal Energy Program is being consolidated within DOE's Office of Indian Energy Policy and Programs			

Federal Energy Management Program

Fiscal Year 2015 Priority Activities

- **Project Financing, $11.4M:** Leverage FEMP's Federal financing and project expertise to assist agencies with initial decision making on the scope of performance contracts, guide agencies through project development and implementation, and track project implementation and performance in support of Federal agency energy goals.
- **Technical Guidance and Assistance, $12.4M:** Support for the establishment of a center of expertise focused on Federal Data Center Energy Efficiency and Optimization, improved project tracking, and technical assistance supporting energy-efficient and sustainable building practices and technology deployment.
- **Planning, Reporting, and Evaluation, $4.1M:** Services to agencies that include the collection, tracking, and verification of Federal data; managing recognition awards programs; and training Federal workforce in energy management.
- **Federal Fleet, $1.6M:** Direct technical assistance and tools for agencies to support implementing and managing energy-efficient and alternative fuel vehicles and facilitate reducing petroleum consumption and increasing alternative fuel use.
- **Federal Energy Efficiency Fund (FEEF), $3.0M:** Direct funding and leveraged cost-sharing to Federal agencies for capital projects and other initiatives to increase energy efficiency, water conservation, and renewable energy investments at agency facilities.
- **DOE Specific Investment (SPO), $2.9M:** Support for managing, reporting, evaluating and achieving DOE's sustainability goals established by Executive Orders, statues, and internal DOE policies.

(Dollars in Thousands)	FY 2013 Current	FY 2014 Enacted	FY 2015 Request
Project Financing	9,501	9,558	11,433
Technical Guidance and Assistance	9,126	6,224	12,433
Planning, Reporting and Evaluation	4,324	5,569	4,073
Federal Fleet	1,540	1,388	1,634
Federal Energy Efficiency Fund	0	3,000	3,000
DOE Specific Investments	3,774	2,509	2,927
NREL Site-Wide Facility Support	0	0	700
Total, Federal Energy Management Program	**28,265**	**28,248**	**36,200**

Office of Strategic Programs

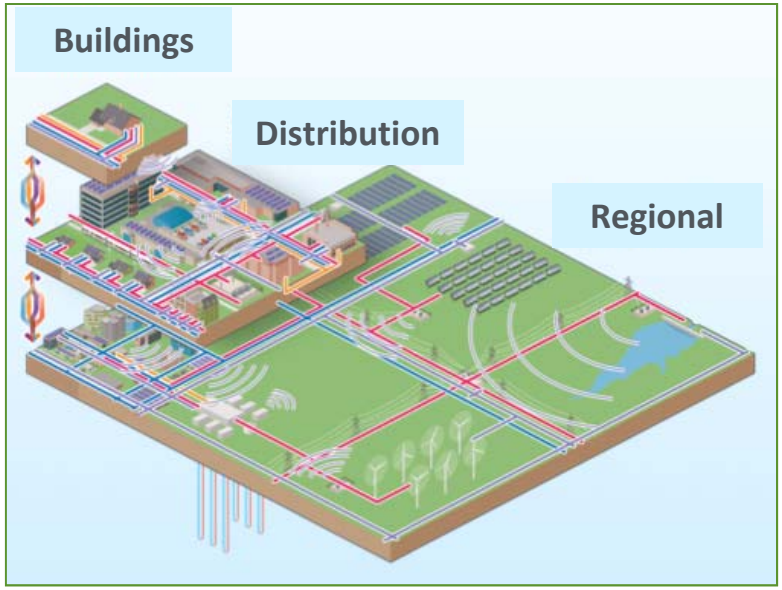
Fiscal Year 2015 Priority Activities

- **Technology-to-Market, $7.7M:** Leverage innovative approaches and partnerships to attract new investors to EERE technologies and to bridge gaps in the U.S. clean energy ecosystem, especially in the areas of entrepreneurship, technology transfer, and finance. Includes continuing the National Incubator Initiative for Clean Energy, launching Phase II of the National Clean Energy Business Plan Competition, supporting the whole systems integrated deployment energy approach, and completing the first phase of EERE competitions/workforce activities evaluation.
- **Strategic Priorities and Impact Analysis, $6.4M:** Continue to conduct futures scenarios, retrospective and prospective impact analysis, characterization of technology cost and performance data, energy systems and market intelligence analysis; extend analysis of factors influencing competitiveness of domestic manufacture of EERE technologies; initiate one larger-scale technology futures study; and complete one new retrospective impact and return on investment evaluation study that quantifies EERE impact and guides future EERE program implementation by showing what has worked and what has not.
- **International, $2.85M:** Catalyze international markets for U.S. clean energy solutions through technical and policy assistance, analysis, and promoting standards, test procedures, and certification prevalent in the United States. Focus primarily on partnerships with 5 to 7 countries and 1 multilateral organization with the highest potential material impact on enabling U.S. exports and carbon pollution reduction.
- **Communications and Outreach, $4.8M:** Focus resources on maintaining functions for web/online, media, executive communications, and internal communications to provide high-priority communications execution, oversight, and support activities for EERE and to use more effective media and on-line analytic tools.

(Dollars in Thousands)	FY 2013 Current	FY 2014 Enacted	FY 2015 Request
Technology-to-Market	6,504	6,590	7,700
Strategic Priorities and Impact Analysis	7,000	6,400	6,429
International	4,450	4,550	2,850
Communications and Outreach	5,600	6,000	4,800
Total, Office of Strategic Programs	**23,554**	**23,540**	**21,779**

EERE Cross-Cut: Grid Integration Initiative– ($120.9M)

- To support DOE's cross-cutting grid integration efforts, February 2014 workshop held with industry, universities, utilities, and other stakeholders focused on addressing relevant challenges at the Building, Campus, Distribution, and Regional Scale.
- In FY14, EERE has developed a coordinated effort across the program offices with the Energy Systems Integration Facility (ESIF) which received stakeholder review in February. This will support the joint FY15 activity.
- The FY 2015 request includes a joint (Solar, Buildings ,and Vehicles offices) $19 million funding opportunity announcement to develop and demonstrate technologies and tools enabling improved integration of electric vehicles, distributed renewable generation, and building equipment – optimizing overall performance and improving interactivity with the utility grid to better meet grid requirements .



Additional High Priority Activities Focused on Challenges at a Variety of Scales

Buildings, Campus, and Fleet Scale	Distribution Scale	Regional Scale
• Transactive Controls: Develop technologies and control systems that not only can optimize energy performance and comfort, but also can support energy-related transactions outside the building envelope.	• Distributed energy storage technologies integrated with distributed solar PV for addressing the variability of the resource and increasing the hosting capacity of PV systems on the grid.	• Continued development of "concurrent cooling" analyses and methodologies to describe the correlation between wind plant generation and wind cooling of transmission lines

Dollars in Thousands

EERE Grid Integration Initiative Activities by Program Office	FY 2015 Request
Buildings Technologies	17,000
Fuel Cell Technologies	1,000
Solar Energy Technologies	56,900
Vehicle Technologies	8,500
Water Power Technologies	4,000
Wind Power Technologies	3,559
Energy Systems Integration Facility	30,000
Total, EERE Grid Integration Initiative	**120,959**

EERE Incubators: On-Boarding New Approaches into the EERE Portfolio

EERE Incubators

- Supports on-boarding of “off-roadmap” innovative technologies and solutions that could help meet existing goals, but are not represented in a significant way in the Offices' existing Multi-Year Program Plans
- Small fraction of each Technology Office annual R&D budget (~5%)




EERE Strategic Plan

Purposes of the Strategic Plan

- (Re)Define EERE
- Demonstrate the logical basis for our vision and goals
- Connect to our stakeholders