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# **DOE FY2015 Congressional Budget Request for EERE**

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# Outline

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- Overview & Background
- Key Funding Changes, by Four Themes
- Key Funding Changes, by Program
- Program Highlights: Goals & Funding
- Additional Reference Material
  - Context for Innovation & Demonstrations
  - Historical Spending Context
  - Framework of Issues for Staff
  - Further CRS Information for Staff



# Overview & Background

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- Highlights
- Administration's Goals
- FY2015 EERE Emphasis
- Funding Calculation References
- Thematic Grouping of Accounts



# Highlights

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- DOE total request up \$716 M (3%)
- EERE up \$416 M (22%)
- Largest EERE program increases are for manufacturing and vehicles
- Electric (OE) up \$33 M (22%)
- Offsets
  - Federal budget request would repeal \$4 billion in annual oil and natural gas tax subsidies



# Administration's Goals

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- Reduce oil imports 1/2 by 2020
- Lead the world in clean energy technologies
  - Double renewable energy production by 2020
  - Double energy productivity by 2030
    - EERE + OGSII (Race to the Top: EE & Grid Modernization); relative to 2010
  - Non-residential buildings 20% more efficient by 2020
  - 80% clean energy power generation by 2035 (includes nuclear and efficient gas)
  - Cut greenhouse gases 17% below 2005 level by 2020



# FY2015 EERE Emphasis

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Entire EERE effort: Transformation to Clean Energy Economy

- International Competitiveness (Manufacturing & Jobs)
- Climate Change (Reduced Carbon)
- Oil Imports (EVs & Biofuels)



# Funding Calculation References

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- All funding changes shown in the presentation follow those in the DOE request.
- The differences are calculated between the FY2015 request and the FY2014 appropriation.
- For simplicity, many figures are rounded-off.
- DOE still presents a thematic grouping of major program accounts, first used in FY2014 request.



# Thematic Grouping of Accounts

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- Current appropriation accounts are grouped by renewable energy, energy efficiency, grants, and management.
- The request preserves the major program accounts (e.g., “Solar Energy,” “Building Technologies,” etc).
- DOE organizes those accounts into four functional groups, which help reveal program connections:
  1. Sustainable Transportation
  2. Renewable Electricity Generation
  3. Energy Efficiency
  4. Corporate Management





# Key Funding Changes, by Theme

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- Sustainable Transportation
- Renewable Electricity Generation
- Energy Efficiency
- Corporate Management



# Sustainable Transportation (FY2015-FY2014 difference)

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- TOTAL, + \$90 M (15%)
  - Vehicles, + \$69 M (24%)
    - Electric Vehicle (EV) Everywhere Initiative
  - Bioenergy (Biorefinery), + \$21 M (9%)
  - Hydrogen/Fuel Cells, -- no change



# Renewable Electricity Generation (FY2015-FY2014 difference)

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- TOTAL, + \$72 M (16%)
  - Wind, + \$27 M (40%)
  - Solar, + \$25 M (25%)
  - Geothermal, + \$16 M (34%)
  - Water, + \$4 M (7%)



# Energy Efficiency (FY2015-FY2014 difference)

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- TOTAL, + \$241 M (39%)
  - Manufacturing, + \$125 M (69%)
  - Weatherization/IG, + \$74 M (32%)
    - WAP, + \$54 M (31%)
    - Clean Energy & Econ. Partnerships, + \$14 M (new)
  - Buildings, + \$34 M (19%)
  - Federal Energy Management Program, (FEMP) + \$8 M (28%)



# Corporate Management (FY2015-FY2014 difference)

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- TOTAL, + \$6 M (3%)
  - Facilities, + \$10 M (22%)
  - Program Direction, - \$2 M (-1%)
  - Strategic Programs, - \$2 M (-7%)



# Key Funding Changes, by Program

- Major Program Increases
- Small Program Decreases



# Major Program Increases (FY2015-FY2014 difference)

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- Manufacturing + \$125 M (69%)
- Vehicles + \$69 M (24%)
- Weatherization + \$54 M (31%)
- Buildings + \$34 M (19%)
- Wind + \$27 M (30%)
- Solar + \$25 M (10%)
- Bioenergy + \$21 M (9%)
- Geothermal + \$16 M (34%)
- Clean Energy EDPs + \$14 M (new program)



# Small Program Decreases (FY2015-FY2014 difference)

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- Tribal Energy - \$7 M (transfer to OIEPP)
- Program Management - \$2 M (-1%)
- Strategic Programs - \$2 M (-7%)





# Program Highlights: Goals & Funding

- Manufacturing (2 pages)
- Vehicles (2 pages)
- Buildings
- Wind
- Solar
- Bioenergy
- Geothermal
- Clean Energy EDPs
- Innovation Hubs



# Manufacturing Program, Highlights (FY2015-FY2014 difference)

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- Goals & Objectives
  - Anchors the Clean Energy Manufacturing Initiative (started in 2013)
  - Improve competitiveness in global markets for products (e.g., solar PV modules, LED lights, batteries, wind turbine blades)
  - Increase competitiveness by raising industrial energy productivity (Race to the Top)
  - 50% energy savings through advanced materials & processes
  - 40 gw (million kilowatts) of combined heat and power by 2020
  - Help leading companies cut energy intensity by 25% over 10 years
- \$125 M (69%) increase:
  - + \$109 M (134%) for Advanced Manufacturing R&D Facilities:  
[which include Clean Energy Manufacturing Innovation Institutes, Critical Materials Hub, Manufacturing Demonstration Facility]
  - + \$9 M (12%) for R&D Projects (mainly Advanced Incubator)



# Manufacturing Program: Advanced Manufacturing R&D Facilities, + \$109 M

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- Up to \$70 million to create at least one new Clean Energy Manufacturing Innovation Institute (MII) & support for two existing institutes
  - The new Institute would address: nanomaterials for energy, next generation electric machines, bio-manufacturing, smart manufacturing, or other topics
  - Two existing institutes: Next Generation Power Electronics MII (North Carolina) and Advanced Composites MII (just announced)
  - Institutes are consistent with President's National Network for Manufacturing Innovation (NNMI)
    - 4 in place, 5 scheduled for 2014, goal of 45 over 10 years
  - Institutes focus on technologies applicable to multiple industries and markets
  - Institutes bring together government, industry, & academia
  - Each Institute to be financially sustainable within 5-7 years
- \$25 million to continue the Critical Materials Hub—led by Ames National Lab—to develop processes and materials to reduce or eliminate need for rare earth elements and other key materials
- \$10 million of further support for Manufacturing Demonstration Facility at Oak Ridge National Lab



# Vehicles Program, Highlights (FY2015-FY2014 difference)

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- Goals & Objectives
  - Parity for Plug-in EV affordability & convenience by 2022
  - Cut 2008 battery production cost 70% by 2015, 88% by 2022
  - Grid Integration Initiative
  - 1.8 million barrels per day (16%) cut in oil use trend by 2020
  - 61.6 miles per gallon (mpg) fuel economy for cars by 2025
  - 50% increase in heavy duty truck fuel economy by 2015
- \$69 M (24%) increase, esp. for EV Grand Challenge:
  - + \$27 M (24%) for Batteries & Electric Drives:  
[advanced batteries, power electronics, charging stations]
  - + 19 M (61%) for Outreach and Deployment
  - + 16 M (42%) for Materials Technology
  - + 11 M (71%) for Fuels and Lubricants



# Vehicles Subprogram Changes (FY2015-FY2014 difference)

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- Batteries & Electric Drives (+ \$27 M)
  - Reduce weight and costs
  - Develop motors and magnets without rare earths
  - Improve wide bandgap semiconductors & cut costs
- Outreach and Deployment (+ \$19 M)
  - Initiate Alternative Fuel Vehicle Community Partner projects
- Materials Technology (+ \$16 M)
  - Carbon fiber & other composites
  - Lightweight materials compatible with manufacturing infrastructure
  - High temperature materials for valves & turbochargers
- Fuels & Lubricants (+ \$11 M)
  - Expand work on drop-in biofuel compatibility with components and infrastructure (replace gasoline, diesel, jet fuel)



# Buildings Program, Highlights (FY2015-FY2014 difference)

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## Goals & Objectives

- 50% energy use reduction for new buildings by 2030

## Buildings, + \$34 M (19%)

- + \$23 M (41%) for Emerging Technologies, R&D on sensors, controls, and grid integration; and new air conditioning technologies
- + \$13 M (24%) to accelerate equipment standards & building codes
- PSU Consortium for Building Energy Innovation (formerly Building Design Innovation Hub), unchanged at \$10 M
- Note: Major long-term barriers (Cong. Staff, see CRS report R40670 by Paul Parfomak)



# Wind Program, Highlights (FY2015-FY2014 difference)

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## Goals & Objectives

- Land-Based: 5.7 cents/kilowatt-hour (kwh) for energy cost of utility-scale turbines by 2020 and 4.2 cents/kwh by 2030
- Offshore: cut energy cost from 21 cents/kwh in 2010 to 17 cents/kwh by 2020 (unsubsidized)
- Increase installed windfarm capacity from 60 billion watts (gw) in 2012 to 125 gw by 2020 and 300 gw by 2030

## Wind, + \$27 M (30%)

- + \$22 M (102%) for Technology Validation & Market Transform
- + \$7 M (92%) to Mitigate Market Barriers
- No new funding for offshore wind demonstration



# Solar Program, Highlights (FY2015-FY2014 difference)

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## Goals & Objectives

- 6 cents/kilowatt-hour (75% cut) for energy cost of utility-scale photovoltaic (PV) plants by 2020 (SunShot Initiative)
- Installed PV capacity cost targets of \$1 M/megawatt-hour(mwh) for utility-scale (\$1.25 M/mwh commercial, \$1.50 M/mwh residential)
- Concentrated solar power (CSP) installed cost of \$3.5 M/mwh (includes storage), equivalent to 6 cents/kwh
- Grid Integration Initiative

## Solar, + \$25 M (10%)

- + \$23 M (52%) for Innovative Manufacturing
- + \$13 M (26%) for Concentrating Solar Power
- - \$15 M (-26%) for Photovoltaic R&D





# Bioenergy Program, Highlights (FY2015-FY2014 difference)

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## Goals & Objectives

- \$3 per gallon of gasoline equivalent (gge) for “drop-in” fuels (to replace gasoline, diesel, jet fuel) by 2017
- \$3/gge for algal biomass productivity by 2022

## Bioenergy, + \$21 M (9%)

- + \$40 M (62%) for Demonstration & Deployment of pilot- and demonstration-scale biorefinery projects
- - \$16 M (-35%) for Feedstocks, due to greater reliance on feedstock activities at U.S. Dept. of Agriculture



# Clean Energy EDPs (FY2015 requested amount = \$14 M)

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- Focus: Regional, state, and local joint efforts
- +\$10 M, Sustainable Shale Gas Growth Zones
  - Rapid growth challenges infrastructure and services; focus on economic diversification and long-term, to avoid boom-bust cycle
- +\$4 M, Local Technical Assistance Program
  - Support scale-up and adoption of EE and clean energy technologies
  - DOE assists with models from other places



# Innovation Hubs (FY2015 requested amount)

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Hub focus: innovation & commercialization

- Critical Materials Hub (Manufacturing Program), + \$25 million
- PSU Consortium for Building Energy Innovation (formerly the Energy-Efficient Building Systems Design Hub), \$10 million requested—same as FY2014 (no increase)





# Additional Reference Material

# Context: Innovation & Demonstration Projects

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- Innovation Valley of Death. Long-standing policy debate over the federal role in filling the gap between R&D and market commercialization.
- Demonstration projects tend to be very expensive.
- ARPA-E was created to spur development of “breakthrough” technologies.
- Loan guarantee program for innovative technologies still open, some funding available to cover subsidy costs.
- Budget deficit concerns tend to limit spending.



# Historical Spending Context for Major Energy Technologies R&D

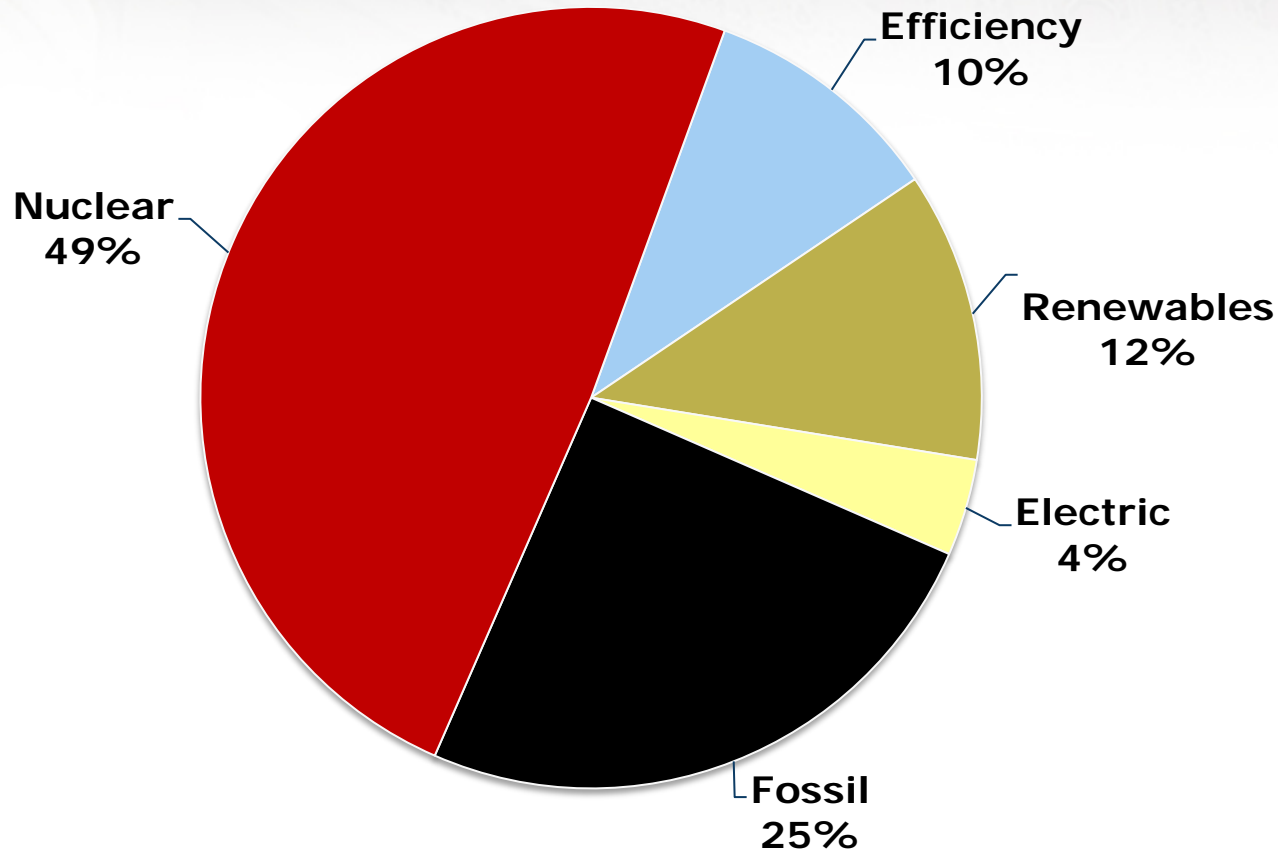
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- Chart of Energy R&D Shares, FY1948-FY2012
- Table with Energy R&D funding for FY2013, FY2014, and FY2015 request
- Chart of Energy R&D funding for FY2013, FY2014, and FY2015 request



# DOE Energy R&D Funding Shares, FY1948-FY2012

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Note: Nuclear includes Fission and Fusion. Source: DOE, Analysis of Federal Incentives, 1980 & DOE History Table. Also, see CRS report RS22858.



# DOE Energy R&D Funding Shares for FY2013, FY2014 and FY2015 Request (\$ millions)

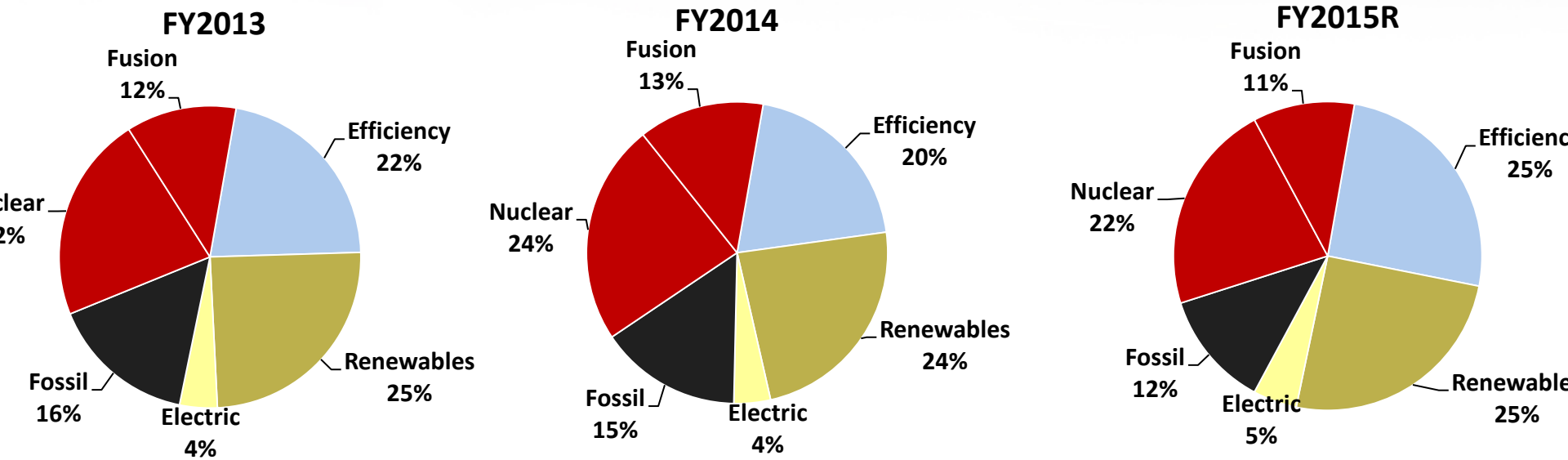
		FY2013	FY2014	FY2015R
Fusion		378	505	416
Nuclear		708	888	863
Fossil		499	570	476
Electric		129	147	180
Renewables		790	884	983
Efficiency		696	750	991
Totals		3,200	3,744	3,909

Source: DOE FY2015 budget request. Nuclear Fusion is funded under the Office of Science, all others under Energy Resources Supply and Conservation.





# Chart of Energy R&D Funding Shares, FY2013, FY2014, & FY2015 Request



Source: DOE FY2015 Cong. Budget Request. Fusion is funded under Office of Science, all others under Energy Resources Supply and Conservation.



# Framework of Issues for Staff

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- Role of government
- Budget deficit
- Trade deficit & competitiveness
- Energy security
- Energy prices
- Pollution & greenhouse gas emissions



## Further information available to Congressional Staff:

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- CRS R43121, DOE FY2014 appropriations
- CRS R42498, DOE FY2013 appropriations
- CRS R41908, DOE FY2012 appropriations
- CRS RS22858, on R&D funding history
- All are on the CRS web site at:
  - [www.crs.gov](http://www.crs.gov)
  - Fred is at 7-7039, [fsissine@crs.loc.gov](mailto:fsissine@crs.loc.gov)

