Summary

Energy is crucial to operating a modern industrial and services economy. Concerns about the availability and cost of energy and about environmental impacts of fossil energy use have led to a wide variety of federal incentives for renewable energy and energy efficiency. These incentives aim to implement renewable energy and energy efficiency measures and to develop and commercialize renewable energy and energy efficiency technologies.

Many of the existing energy efficiency and renewable energy programs have authorizations tracing back to the 1970s. Many programs have been reauthorized and redesigned repeatedly to meet changing economic factors. The programs apply broadly to sectors ranging from industry to academia and from state and local governments to rural communities.


The Department of Energy (DOE) operates the greatest number of efficiency and renewable energy incentive programs, including RDD&D grants and contracts, weatherization assistance, production incentives, loan guarantees, and technology transfers. DOE also provides grants to states for energy policy development and assists other federal agencies in developing and implementing energy efficient and renewable energy resources.

The Department of Agriculture (USDA) runs several programs that largely focus on biofuels, such as ethanol and wood energy. Other USDA programs include assistance to rural communities with high energy costs, biomass crop assistance, grants and loans to promote energy efficiency and renewable energy for agricultural producers and rural businesses, assistance to general consumers for rural energy savings, and sustainable agricultural research.

The Department of the Treasury administers tax credits and other incentives for energy efficiency and renewable energy. Eligible activities include energy efficient home improvements, renewable energy production, and business investments in energy efficiency and renewable energy.

Other federal agencies with energy efficiency and renewable energy programs include the following:

- Department of the Interior (DOI), with programs on tribal energy production and use;
- Department of Housing and Urban Development (HUD), with energy efficient mortgages and loan programs;
- Fannie Mae, with a “Green Initiative” loan program;
- Department of Health and Human Services (HHS), which provides energy assistance to low-income households; and
- Department of Veterans Affairs (VA), which provides energy efficient mortgages.

A wide range of entities are eligible for these energy efficiency and renewable incentives, including biofuels producers; state, local, and tribal governments; businesses; schools and universities; research organizations; builders and developers; homeowners; utilities; and veterans. Eligibility also includes a variety of energy-related technologies, such as advanced batteries,
heating and cooling systems, vehicles and biofuels, appliances, building envelope technologies, renewable energy production technologies, lighting, and electricity generation and transmission.
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Introduction

The United States has an abundance of natural resources. For much of the nation’s history, energy availability was not a concern as commerce and industry needs could be met by domestic supplies. However, industrialization and population growth, and the continuing development of a consumer-oriented society, led to growing dependence on foreign sources of energy during the 20th century to supplement the demands of a growing economy.

Recognizing the impacts of depending on foreign energy sources, coupled with concerns over the volatility of prices driven by fluctuations in supply spurred by world events, prompted federal efforts to increase U.S. energy independence and reduce domestic consumption. As a major result, numerous programs have been established, focusing on energy efficiency, domestic conservation resources, and research that target the development of renewable sources of energy. Many of these programs have roots dating back more than 40 years and have been redesigned many times over that period.

Many of the current programs have been reauthorized and redesigned periodically to meet changing economic conditions and national interests. The programs apply broadly to sectors ranging from industry to academia and from state and local governments to rural communities. Each program has been designed to meet perceived current needs as well as future anticipated challenges.

Since 2005, Congress has passed several major energy laws: the Energy Policy Act of 2005 (EPACT 2005; P.L. 109-58); the Energy Independence and Security Act of 2007 (EISA; P.L. 110-140); the Energy Improvement and Extension Act (EIEA), enacted as Division B of the Emergency Economic Stabilization Act of 2008 (EESA; P.L. 110-343); and the American Recovery and Reinvestment Act (ARRA; P.L. 111-5). Each of those laws established, expanded, or modified energy efficiency and renewable energy research, development, demonstration, and deployment (RDD&D) programs. The Department of Energy (DOE) operates the greatest number of efficiency and renewable energy incentive programs. The Department of the Treasury and the Department of Agriculture (USDA) operate several programs. A few programs can also be found among the Department of the Interior (DOI), the Department of Housing and Urban Development (HUD), the Small Business Administration (SBA), Fannie Mae, the Department of Health and Human Services (HHS), and the Department of Veterans Affairs (VA).

This report outlines current federal programs and provisions providing grants, loans, loan guarantees, tax credits, and other direct or indirect incentives for energy efficiency, energy conservation, and renewable energy RDD&D. The programs are grouped by administering agency with references to applicable federal agency websites. Incentives are summarized and indexed in the appendixes.

Most program descriptions were compiled from authorizing statutes, the U.S. Code, and Administration budget request documents. Other program descriptions and some funding information were compiled from the Database of State Incentives for Renewables and Efficiency (DSIRE), the Assistance Listings (formerly the Catalog of Federal Domestic Assistance or CFDA) housed on the beta.SAM.gov website, and the Energy Star website. Most budgetary figures were compiled from executive agency budget justifications and congressional committee reports. For more information on agriculture-related grant programs, see: CRS Report R45943, The Farm Bill Energy Title: An Overview and Funding History, by Kelsi Bracmort; and CRS In Focus IF10288, Overview of Bioenergy Programs in the 2018 Farm Bill, by Kelsi Bracmort. For more information on programs supporting the development and deployment of alternatives to conventional fuels and engines in transportation, see CRS Report R42566, Alternative Fuel and
Advanced Vehicle Technology Incentives: A Summary of Federal Programs, by Lynn J. Cunningham et al.


Renewable Energy

Biomass

1. Bioenergy Technologies Office (formerly the Biomass and Biorefinery Systems R&D Program)

Administered by Office of Energy Efficiency and Renewable Energy (EERE)

Authority

- Federal Nonnuclear Energy Research and Development Act of 1974 (P.L. 93-577)
- Energy Policy and Conservation Act (EPCA; P.L. 94-163)
- Energy Conservation and Production Act (ECPA; P.L. 94-385)
- Department of Energy Organization Act (P.L. 95-91)
- Energy Tax Act (P.L. 95-618)
- National Energy Conservation Policy Act (NECPA; P.L. 95-619)
- Powerplant and Industrial Fuel Use Act of 1978 (P.L. 95-620)
- Energy Security Act (P.L. 96-294)
- National Appliance Energy Conservation Act of 1987 (P.L. 100-12)
- Federal Energy Management Improvement Act of 1988 (P.L. 100-615)
- Clean Air Act Amendments of 1990 (P.L. 101-549)
- Biomass Research and Development Act of 2000 (Title III of Agricultural Risk Protection Act of 2000; P.L. 106-224)
- Farm Security and Rural Investment Act of 2002 (P.L. 107-171)
- Energy Independence and Security Act of 2007 (EISA; P.L. 110-140)
- Food, Conservation, and Energy Act of 2008 (P.L. 110-234)
- American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)

Annual Funding

- $196.3 million for FY2007
- $195.6 million for FY2008
- $214 million for FY2009
- An additional $777 million in FY2009 from ARRA
- $220 million for FY2010
- $180 million for FY2011
- $195 million for FY2012
- $185.2 million for FY2013
- $182.3 million for FY2014
- $175.9 million for FY2015
- $225 million for FY2016
Renewable Energy and Energy Efficiency Incentives: A Summary of Federal Programs

$205 million for FY2017
$221.5 million for FY2018
$226 million for FY2019
$40 million requested for FY2020

Scheduled Termination
None

Description
This program works with industrial partners, national laboratories, universities, and other stakeholders to develop the technologies and systems needed to cost-effectively transform the nation's renewable and abundant domestic biomass resources into clean, affordable, and sustainable biofuels, bioproducts, and biopower. In recent years, the program has been primarily geared toward development and deployment of ethanol from non-food feedstocks (e.g., wastes, switchgrass, algae), but is now expanding its scope to additional alternative fuels, such as bio-butanol, green gasoline, jet fuel, and diesel.

Qualified Applicant(s) Colleges and universities; profit organizations

Qualified Technologies Biomass

For More Information
See CRS Report R42566, Alternative Fuel and Advanced Vehicle Technology Incentives: A Summary of Federal Programs, by Lynn J. Cunningham et al.; DOE's Bioenergy Technologies Office overview; DOE's Bioenergy Technologies Office – Funding Opportunities online resource; and program number 81.087 at the beta.SAM.gov website.

2. Regional Biomass Energy Grant Programs

Administered by Bioenergy Technologies Office, EERE

Authority Department of Energy Organization Act (P.L. 95-91)

Annual Funding
$395,000 for FY2007
$75,131 for FY2008
$25,705 for FY2009
$4.8 million for FY2010
$0 for FY2011-FY2019

FY2020 budget request data are currently unavailable; the FY2020 DOE budget justifications do not provide details on this program.

Scheduled Termination None

Description
This program provides assistance to increase America’s use of fuels, chemicals, materials, and power made from domestic biomass on a sustainable basis. Assistance may be used to develop and transfer any of several biomass energy technologies to the scientific and industrial communities. For regional programs, such technologies will be appropriate for the needs and resources of particular regions of the United States. This program has not expired, but it has not been regularly funded since 2011, and it is unlikely that it will receive significant funding in future years.1

Qualified Applicant(s) State and local governments; colleges and universities; profit organizations; nonprofit organizations

Qualified Technologies Biomass

For More Information
See program number 81.079 at the beta.SAM.gov website.

Geothermal

3. Geothermal Technologies Office (GTO)

Administered by EERE

1 According to the program description in the Assistance Listings at the beta.Sam.gov website on July 9, 2018.
Renewable Energy and Energy Efficiency Incentives: A Summary of Federal Programs

Authority
Geothermal Energy Research, Development, and Demonstration Act of 1974 (P.L. 93-410)
Department of Energy Organization Act (P.L. 95-91)
Energy Tax Act of 1978 (P.L. 95-618)
Energy Independence and Security Act of 2007 (EISA; P.L. 110-140)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)

Annual Funding
$5 million for FY2007
$19.3 million for FY2008
$43.3 million for FY2009
An additional $393 million appropriated in FY2009 from ARRA
$44 million for FY2010
$37 million for FY2011
$37 million for FY2012
$35 million for FY2013
$44.8 million for FY2014
$54.3 million for FY2015
$71 million for FY2016
$69.5 million for FY2017
$80.9 million for FY2018
$84 million for FY2019
$28 million requested for FY2020

Scheduled Termination
None

Description
This program partners the federal government with industry, academia, and research facilities to further the development and deployment of innovative geothermal energy technologies. Currently, the program’s technology portfolio has prioritized early-stage R&D in three geothermal categories: hydrothermal, enhanced geothermal systems (EGS), and low temperature.
Competitive solicitations issued as Funding Opportunity Announcements (FOAs) are the principal mechanism used by the GTP to contract for cost-shared research, development, and demonstration projects.

Qualified Applicant(s)
Profit organizations; colleges and universities

Qualified Technologies
Geothermal

For More Information
See EERE’s Geothermal Technologies Office website; and program number 81.087 at the beta.Sam.gov website.

Hydrogen and Fuel Cells


Authority
EERE
Federal Energy Administration Act of 1974 (P.L. 93-275)
Federal Nonnuclear Energy Research and Development Act of 1974 (P.L. 93-577)
Energy Policy and Conservation Act (EPCA; P.L. 94-163)
Electric and Hybrid Vehicle Research, Development and Demonstration Act (P.L. 94-413)
Renewable Energy and Energy Efficiency Incentives: A Summary of Federal Programs

Department of Energy Organization Act (P.L. 95-91)
Automotive Propulsion Research and Development Act of 1978 (Title III of Department of Energy Act of 1978-Civilian Applications; P.L. 95-238)
Energy Security Act (P.L. 96-294)
Methane Transportation Research, Development, and Demonstration Act of 1980 (P.L. 96-512)
Alternative Motor Fuels Act of 1988 (P.L. 100-494)
Spark M. Matsunaga Hydrogen Research, Development, and Demonstration Act of 1990 (P.L. 101-566)
Hydrogen Future Act of 1996 (P.L. 104-271)
Energy Independence and Security Act of 2007 (EISA; P.L. 110-140)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)

Annual Funding
$190 million for FY2007
$206.2 million for FY2008
$164.6 million for FY2009
An additional $43 million appropriated in FY2009 from ARRA
$174 million for FY2010
$95.8 million for FY2011
$101.3 million for FY2012
$95.8 million for FY2013
$89.5 million for FY2014
$94.8 million for FY2015
$101 million for FY2016
$101 million for FY2017
$115 million for FY2018
$120 million for FY2019
$44 million requested for FY2020

Scheduled Termination
None

Description
This program partners with industry, academia, and national laboratories and works in close coordination with Vehicle Technologies and other programs at DOE to overcome technical barriers through R&D of hydrogen production, delivery, and storage technologies; overcome technical barriers to fuel cell technologies for transportation, distributed stationary power, and portable power applications; address safety issues and facilitate the development of model codes and standards; validate and demonstrate hydrogen and fuel cells in real-world conditions; and educate key stakeholders whose acceptance of these technologies will determine their success in the marketplace.

Qualified Applicant(s)
Federal government; national laboratories; colleges and universities; and profit organizations

Qualified Technologies
Hydrogen and fuel cells

For More Information
See EERE’s Hydrogen and Fuel Cell Technologies website; and program number 81.087 at the beta.Sam.gov website.

Solar

5. Solar Energy Technologies Office (SETO)

Administered by
EERE

Authority
Energy Policy and Conservation Act (EPCA; P.L. 94-163)
Energy Conservation and Production Act (ECPA; P.L. 94-385)
Department of Energy Organization Act (P.L. 95-91)
National Energy Conservation Policy Act (NECPA; P.L. 95-619)
Energy Security Act (P.L. 96-294)
Energy Independence and Security Act of 2007 (EISA; P.L. 110-140)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)

Annual Funding
$157 million for FY2007
$166.3 million for FY2008
$172.4 million for FY2009
An additional $116 million appropriated in FY2009 from ARRA
$247 million for FY2010
$259.6 million for FY2011
$284.7 million for FY2012
$269.1 million for FY2013
$254.3 million for FY2014
$230.8 million for FY2015
$241.6 million for FY2016
$207.6 million for FY2017
$241.6 million for FY2018
$246.5 million for FY2019
$67 million requested for FY2020

Scheduled Termination
None

Description
SETP partners with industry, national laboratories, and universities to develop and bring reliable and affordable solar energy technologies to the marketplace. This program finances R&D in five major subprograms: Photovoltaics (PV); Concentrating Solar Power (CSP), Systems Integration for Solar Technologies, Balance of Systems Soft Cost Reduction, and Innovations in Manufacturing Competitiveness.

Qualified Applicant(s)
Industry; national laboratories; colleges and universities

Qualified Technologies
Solar

For More Information
See EERE’s Solar Energy Technologies Office website; and program number 81.087 at the beta.SAM.gov website.

Water Power

6. Water Power Technologies Office (formerly Wind and Hydropower Technologies Program)

Administered by
EERE

Authority
Energy Policy and Conservation Act (EPCA; P.L. 94-163)
Renewable Energy and Energy Efficiency Incentives: A Summary of Federal Programs

Energy Independence and Security Act of 2007 (EISA; P.L. 110-140)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)

Annual Funding

$0 for FY2007
$9.7 million for FY2008
$39.1 million for FY2009
An additional $31.7 million appropriated in FY2009 from ARRA
$50 million for FY2010
$29.2 million for FY2011
$58.1 million for FY2012
$54.7 million for FY2013
$57.8 million for FY2014
$60 million for FY2015
$70 million for FY2016
$84 million for FY2017
$105 million for FY2018
$105 million for FY2019
$45 million requested for FY2020

Scheduled Termination
None

Description
This program partners with the national laboratories, industry, universities, and other federal agencies to promote the development and deployment of technologies capable of generating environmentally sustainable and cost-effective electricity from the nation’s water resources (both conventional and marine and hydrokinetic technologies).

Qualified Applicant(s)
Federal, state, local, and tribal governments; national laboratories; industry; small businesses; colleges and universities

Qualified Technologies
Hydroelectric; hydrokinetic energy; wave energy; tidal energy; ocean thermal energy conversion

For More Information
See EERE’s Water Power Technologies Office website; and program number 81.087 at the beta.SAM.gov website.

Wind Energy

7. Wind Energy Technologies Office (formerly Wind and Hydropower Technologies Program)

Administered by
EERE

Authority
Energy Policy and Conservation Act (EPCA; P.L. 94-163)
Energy Independence and Security Act of 2007 (EISA; P.L. 110-140)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)

Annual Funding

$48.7 million for FY2007
$49 million for FY2008
$54.4 million for FY2009
An additional $106.9 million appropriated in FY2009 from ARRA
$80 million for FY2010

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$78.8 million for FY2011
$91.8 million for FY2012
$86.1 million for FY2013
$87 million for FY2014
$105.9 million for FY2015
$95.5 million for FY2016
$90 million for FY2017
$92 million for FY2018
$92 million for FY2019
$23.7 million requested for FY2020

Scheduled Termination
None

Description
This program partners with federal, state, and other stakeholder groups to conduct research and development activities through competitively selected, cost-shared research and development projects with industry to improve the performance, lower the costs, and accelerate the deployment of wind energy technologies.

Qualified Applicant(s)
Federal, state, local, and tribal governments; national laboratories; industry; small businesses; colleges and universities

Qualified Technologies
Wind

For More Information
See EERE’s Wind Energy Office website; and program number 81.087 at the beta.SAM.gov website.

Energy Efficiency

Buildings

8. Building Technologies Office

Administered by
EERE

Authority
Energy Policy and Conservation Act (EPCA; P.L. 94-163)
Energy Conservation and Production Act (ECPA; P.L. 94-385)
Department of Energy Organization Act (P.L. 95-91)
Energy Tax Act of 1978 (P.L. 95-618)
National Energy Conservation Policy Act (NECPA; P.L. 95-619)
Powerplant and Industrial Fuel Use Act of 1978 (P.L. 95-620)
Energy Security Act (P.L. 96-294)
National Appliance Energy Conservation Act of 1987 (P.L. 100-12)
National Appliance Energy Conservation Amendments of 1988 (P.L. 100-357)
Federal Energy Management Improvement Act of 1988 (P.L. 100-615)
Energy Independence and Security Act of 2007 (EISA; P.L. 110-140)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)

Annual Funding
$103 million for FY2007
$107.4 million for FY2008
$138.1 million for FY2009
An additional $319.2 million appropriated in FY2009 from ARRA
$222 million for FY2010
$207.3 million for FY2011
$214.7 million for FY2012
Renewable Energy and Energy Efficiency Incentives: A Summary of Federal Programs

9. Weatherization Assistance Program (WAP)

Administered by EERE

Authority
Energy Conservation and Production Act (ECPA; P.L. 94-385)
National Energy Conservation Policy Act (NECPA; P.L. 95-619)
Energy Security Act (P.L. 96-294)
Energy Independence and Security Act of 2007 (EISA; P.L. 110-140)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)

Annual Funding
$227.2 million for FY2008
$450 million for FY2009
An additional $5 billion appropriated in FY2009 from ARRA
$270 million for FY2010
$171 million for FY2011
$68 million for FY2012
$131.7 million for FY2013
$173.9 million for FY2014
$193 million for FY2015
$215 million for FY2016
$228 million for FY2017
$251 million for FY2018
$312 million for FY2019
$0 requested for FY2020

Scheduled Termination None

Description
This program reduces energy costs for low-income households by increasing the energy efficiency of their homes while ensuring their health and safety. DOE provides funding and technical guidance to states, which manage the day-to-day details of the program. Low-income families receive services from a network of more than 900 local weatherization service providers who install energy efficiency measures in the homes of qualifying homeowners free of charge.

Qualified Applicant(s)
State and local governments; universities; national laboratories

Qualified Technologies
Energy-efficient innovations for building envelopes, equipment, lighting, daylighting, and windows; passive solar; photovoltaics; fuel cells; advanced sensors and controls; and combined heating, cooling, and power systems

For More Information
See EERE’s Building Technologies Office website.
Qualified Applicant(s)  State and tribal governments, including U.S. territories

Qualified Technologies  Weatherization technologies include a wide range of energy efficiency measures for retrofitting homes and apartment buildings. Weatherization service providers choose the best package of efficiency measures for each home based on an energy audit of the home. Typical measures may include installing insulation, sealing ducts, tuning and repairing heating and cooling systems, and if indicated, replacement of the same; mitigating air infiltration; and reducing electric base load consumption.

For More Information  See EERE's Weatherization Assistance Program website; the National Association for State Community Services Program's (NASCSP's) WAP Clearinghouse; EERE's Weatherization Success Stories website; and program number 81.042 at the beta.SAM.gov website.

Industrial

10. Advanced Manufacturing Office (AMO, formerly the Industrial Technologies Program - ITP)

Administered by  EERE

Authority  Energy Policy and Conservation Act (EPCA; P.L. 94-163)
Energy Conservation and Production Act (ECPA; P.L. 94-385)
Department of Energy Organization Act (P.L. 95-91)
National Energy Conservation Policy Act (NECPA; P.L. 95-619)
Powerplant and Industrial Fuel Use Act of 1978 (P.L. 95-620)
Energy Security Act (P.L. 96-294)
Energy Independence and Security Act of 2007 (EISA; P.L. 110-140)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)

Annual Funding  $55.8 million for FY2007
$63.2 million for FY2008
$88.2 million for FY2009
An additional $261.5 million appropriated in FY2009 from ARRA
$96 million for FY2010
$105.9 million for FY2011
$112.7 million for FY2012
$114.3 million for FY2013
$175.4 million for FY2014
$194.2 million for FY2015
$228.5 million for FY2016
$257.5 million for FY2017
$305 million for FY2018
$320 million for FY2019
$80.5 million requested for FY2020

Scheduled Termination  None

Description  AMO works with industry to improve industrial energy efficiency and environmental performance while increasing productivity by conducting R&D on new energy efficient technologies; supporting commercialization of emerging technologies; providing plants with access to proven technologies, energy assessments, software tools, and other resources; and promoting energy and carbon management in industry.
11. Inventions and Innovations Program

Administered by
EERE

Authority

Annual Funding
$2.8 million for FY2007
$145,000 for FY2008
$1.8 million for FY2009
$3 million for FY2010
$0 for FY2011
$940,000 for FY2012
$1 million for FY2013
$0 for FY2014-FY2019

FY2020 budget request data are currently unavailable; the FY2020 DOE budget justifications do not provide details on this program.

Scheduled Termination
None

Description
This program provides financial and technical assistance for research and development of innovative, energy-saving ideas and inventions with future commercial market potential. It supports energy efficiency and renewable energy technology development in focus areas that align with Office of Energy Efficiency and Renewable Energy programs. This program has not expired, but it has not been regularly funded since 2013, and it is unlikely that it will receive significant funding in future years.²

Qualified Applicant(s)
Individuals; small businesses

Qualified Technologies
Specific energy efficiency and renewable energy technologies not listed

For More Information
See program number 81.036 at the beta.SAM.gov website. The U.S. Department of Energy’s Inventions & Innovations website has been retired. To access information on financial opportunities and current solicitations, visit the Advanced Manufacturing Office’s (formerly the Industrial Technologies Program’s) funding opportunities website.

Vehicles

12. Vehicle Technologies Office

Administered by
EERE

Authority
Department of Energy Organization Act (P.L. 95-91)
Energy Independence and Security Act of 2007 (EISA; P.L. 110-140)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)

Annual Funding
$183.6 million for FY2007
$208.4 million for FY2008

² According to the program description in the Assistance Listings at the beta.SAM.gov website, first noted on July 9, 2018, and, more recently, on October 18, 2019.
Renewable Energy and Energy Efficiency Incentives: A Summary of Federal Programs

$267.1 million for FY2009
An additional $2.8 billion appropriated in FY2009 from ARRA
$311.4 million for FY2010
$293.2 million for FY2011
$321 million for FY2012
$303.2 million for FY2013
$282.2 million for FY2014
$272.5 million for FY2015
$310 million for FY2016
$307 million for FY2017
$337.5 million for FY2018
$344 million for FY2019
$73.4 million requested for FY2020

Scheduled Termination
None

Description
The Vehicle Technologies Program works with industry leaders to develop and deploy advanced transportation technologies that could achieve significant improvements in vehicle fuel efficiency and displace oil with other fuels that ultimately can be domestically produced in a clean and cost-competitive manner. Program activities include research, development, demonstration, testing, technology validation, technology transfer, and education.

Qualified Applicant(s)
Industry; colleges and universities; federal, state, and local governments; national laboratories

Qualified Technologies
Hybrid electric systems; biofuels or fuels technology; advanced internal combustion engines; advanced propulsion materials

For More Information
See EERE's Vehicle Technology Program website; and EERE's Vehicle Technologies Program Factsheet.

Other Energy Efficiency and Renewable Energy Programs

13. Conservation Research and Development Grants

Administered by
EERE

Authority
Federal Nonnuclear Energy Research and Development Act of 1974 (P.L. 93-577)
Department of Energy Organization Act (P.L. 95-91)
Further Continuing Appropriations Act for FY1983 (P.L. 97-377)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)

Annual Funding
$87.5 million for FY2008
$203.7 million for FY2009
$1.96 billion for FY2010
$300 million for FY2011
$188.3 million for FY2012
$164 million for FY2013
$38.5 million for FY2014
$0 for FY2015; $142.4 million was de-obligated from this CFDA program number for FY2015
$180.7 million for FY2016
$102.7 million for FY2017 (est.)
$18.8 million for FY2018 (est.)
FY2019 funding and FY2020 budget request data are unavailable; the FY2020 DOE budget justifications do not provide details on this program.

Scheduled Termination
None

Administered by: EERE
Annual Funding:
- $30 million for FY2007
- $39.7 million for FY2008
- $38 million for FY2009
- $80.4 million for FY2010
- $15 million for FY2011
- $32.2 million for FY2012
- $36.1 million for FY2013
- $27.1 million for FY2014
- $33.1 million for FY2015
- $19.5 million for FY2016
- $41 million for FY2017 (est.)
- $8.8 million for FY2018 (est.)

FY2019 estimated funding and FY2020 budget request data are unavailable; the FY2020 DOE budget justifications do not provide details on this program.

Scheduled Termination: None
Description: This program provides financial assistance for information dissemination, outreach, training, and related technical analysis/assistance that will (1) stimulate increased energy efficiency in transportation, buildings, industry, and the federal sector and encourage increased use of renewable and alternative energy; and (2) accelerate the adoption of new technologies to increase energy efficiency and the use of renewable and alternative energy through the competitive solicitation of applications.
Qualified Applicant(s): State and local governments; Native American organizations; individuals; universities; profit organizations; private nonprofit organizations; public nonprofit organizations; Alaskan Native corporations and universities
Qualified Technologies: Specific energy efficiency and renewable energy technologies not listed
For More Information: See program number 81.117 at the beta.SAM.gov website.

15. Renewable Energy Production Incentive (REPI)

Administered by: EERE
Annual Funding:
- $4.95 million for FY2006
- $4.95 million for FY2007
- $4.95 million for FY2008
- $5 million for FY2009
16. Renewable Energy Research and Development Program

Administered by: EERE
Authority: Department of Energy Organization Act (P.L. 95-91)
Department of Energy Act of 1978-Civilian Applications (P.L. 95-238), Section 207
Energy Independence and Security Act of 2007 (EISA; P.L. 110-140)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)

Annual Funding
- $520 million for FY2008
- $472.8 million for FY2009
- $2.3 billion for FY2010 from ARRA funds
- $114.7 million for FY2011
- $233.2 million for FY2012
- $356.6 million for FY2013
- $157.7 million for FY2014
- $0 for FY2015 (est.); $109.4 million was de-obligated from this CFDA program number for FY2015
- $245.4 million for FY2016
- $384.8 million for FY2017 (est.)

FY2018 and FY2019 funding estimates and FY2020 budget request data are unavailable; the FY2020 DOE budget justifications do not provide details on this program.

Scheduled Termination: None

Description: This program provides financial assistance to conduct balanced research and development efforts in the following energy technologies: solar, biomass, hydrogen, fuel cells and infrastructure, wind, waterpower, hydrogen, and geothermal. Assistance may be used to develop and transfer renewable energy technologies to the scientific and industrial communities, states, and local governments.

Qualified Applicant(s): State, local, and tribal governments; colleges and universities; profit organizations; private nonprofit organizations

Qualified Technologies: Solar; biomass; hydrogen; fuel cells; wind; hydropower; geothermal

For More Information: See program number 81.087 at the beta.SAM.gov website.

17. State Energy Program (SEP)

Administered by: EERE
Authority: Energy Policy and Conservation Act (EPCA; P.L. 94-163)
Energy Conservation and Production Act (ECPA; P.L. 94-385)
Renewable Energy and Energy Efficiency Incentives: A Summary of Federal Programs

National Energy Conservation Policy Act (NECPA; P.L. 95-619)
State Energy Efficiency Programs Improvement Act of 1990 (P.L. 101-440)
Energy Conservation Reauthorization Act of 1998 (P.L. 105-388)
Energy Independence and Security Act of 2007 (EISA; P.L. 110-140)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)

Annual Funding
$44.1 million for FY2008
$50 million for FY2009
An additional $3.1 billion appropriated in FY2009 from ARRA
$50 million for FY2010
$50 million for FY2011
$50 million for FY2012
$47.1 million for FY2013
$50 million for FY2014
$50 million for FY2015
$50 million for FY2016
$50 million for FY2017
$55 million for FY2018
$55 million for FY2019
$0 requested for FY2020

Scheduled Termination
None

Description
SEP provides grants to states to design and carry out their own renewable energy and energy efficiency programs.

Qualified Applicant(s)
State and tribal governments, including U.S. territories

Qualified Technologies
Emerging renewable energy and energy efficiency technologies

For More Information
See EERE’s State Energy Program website; EERE’s State Energy Program Success Stories website; and program number 81.041 at the beta.SAM.gov website.

18. Tribal Energy Program (TEP)

Administered by Office of Indian Energy Policy and Programs (IE)

Authority
Energy Policy and Conservation Act (EPCA; P.L. 94-163)
Energy Conservation and Production Act (ECPA; P.L. 94-385)
Department of Energy Organization Act (P.L. 95-91)
Energy Tax Act of 1978 (P.L. 95-618)
National Energy Conservation Policy Act (NECPA; P.L. 95-619)
Power Plant and Industrial Fuel Use Act of 1978 (P.L. 95-620)
Energy Security Act (P.L. 96-294)
National Appliance Energy Conservation Act of 1987 (P.L. 100-12)
Federal Energy Management Improvement Act of 1988 (P.L. 100-615)
Energy Independence and Security Act of 2007 (EISA; P.L. 110-140)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)

Annual Funding
$3.96 million for FY2007
$5.95 million for FY2008
$6 million for FY2009
$10 million for FY2010
$7 million for FY2011
$10 million for FY2012
$9.4 million for FY2013
$8.3 million for FY2014
$14.7 million for FY2015
$13.2 million for FY2016
$13.5 million for FY2017
$15.7 million for FY2018
$13.2 million for FY2019
$4.5 million requested for FY2020

Scheduled Termination: None

Description: This program promotes tribal energy sufficiency, economic growth, and employment on tribal lands through the development of renewable energy and energy efficiency technologies. The program provides financial assistance, technical assistance, education, and training to tribes for the evaluation and development of renewable energy resources and energy efficiency measures. In FY2015, DOE transferred TEP from the Weatherization and Intergovernmental Program (WIP) to the new Office of Indian Energy Policy and Programs (IE).

Qualified Applicant(s): Tribal governments

Qualified Technologies:
- Energy efficient technologies: clothes washers; refrigerators/freezers; water heaters; lighting; lighting controls/sensors; chillers; furnaces; boilers; air conditioners; programmable thermostats; energy management; systems/building controls; caulking/weather-stripping; duct/air sealing; building insulation; windows; doors; siding; roofs; comprehensive measures/whole building; and other energy efficiency improvements may be eligible. Renewable energy technologies: passive solar space heat; solar water heat; solar space heat; photovoltaics; wind; biomass; hydroelectric; geothermal electric; geothermal heat pumps

For More Information: See the Office of Indian Energy Policy and Program’s website; National Renewable Energy Laboratory’s (NREL’s) report: Tribal Energy Program—Assisting Tribes to Realize Their Energy Visions; and DSIRE’s program summary for the Tribal Energy Program.

Other DOE Offices/Cross-Cutting Programs

19. Advanced Research Projects Energy Financial Assistance Program (ARPA-E)

Administered by: Advanced Research Projects Agency-Energy (ARPA-E)

Authority: Department of Energy Organization Act (P.L. 95-91)
COMPETES Act (P.L. 110-69), Section 5012
America COMPETES Reauthorization Act of 2010 (P.L. 111-358)

Annual Funding: $15 million for FY2009
An additional $388.9 million in FY2009 from ARRA
$0 for FY2010
$165.6 million for FY2011
$275 million for FY2012
$250.6 million for FY2013

3 The Tribal Energy Program (TEP) was funded in FY2014 within the Office of Energy Efficiency and Renewable Energy appropriation.

4 In 2015, TEP was transferred to the Office of Indian Energy (IE) and funding for FY2015 and FY2016 was provided within the DOE Departmental Administration appropriation.

5 For FY2017, DOE requested funding for TEP as a separate appropriation from the Departmental Administrative appropriation “to align the budget structure with IE’s mission and activities.”
Renewable Energy and Energy Efficiency Incentives: A Summary of Federal Programs

$280 million for FY2014
$280 million for FY2015
$261.7 million for FY2016
$276.8 million for FY2017
$353.3 million for FY2018
$366 million for FY2019
$0 requested for FY2020 and a requested cancellation of $287 million in unobligated balances previously appropriated.

Scheduled Termination
After ARPA-E has been in operation for six years, the Secretary of Energy shall offer to enter into a contract with the National Academy of Sciences under which the National Academy shall conduct an evaluation of how well ARPA-E is achieving its goals and mission. The evaluation shall include the recommendation of the National Academy of Sciences on whether ARPA-E should be continued or terminated.

Description
This program will fund organizations that have proposed sophisticated energy technology R&D projects that (1) translate scientific discoveries and cutting-edge inventions into technological innovations and (2) accelerate transformational technological advances in areas that industry by itself is not likely to undertake because of high technical or financial risk. Transformational energy technologies are those that have the potential to create new paradigms in how energy is produced, transmitted, used, or stored.

Qualified Applicant(s)
ARPA-E welcomes submissions from any type of capable technology research and development entity. This includes, but is not limited to for-profit entities, academic institutions, research foundations, not-for-profit entities, collaborations, and consortia. Individuals are typically eligible to apply for funding. However, any ARPA-E award funding would need to be made to a business entity formed by the applicant, if selected for award negotiations. The lead organization that will enter into the agreement with ARPA-E must be a U.S. entity.

Qualified Technologies
Transformational energy technologies

For More Information
See ARPA-E’s Frequently Asked Questions (FAQ) website; and program number 81.135 at the beta.SAM.gov website.

20. Electricity Delivery and Energy Reliability, Research, Development and Analysis Grant Program (Office of Electricity Delivery and Energy Reliability - OE)

Administered by
Office of Electricity Delivery and Energy Reliability (OE)

Authority
Department of Energy Organization Act (P.L. 95-91)
Energy Security Act (P.L. 96-294)
National Superconductivity and Competitiveness Act of 1988 (P.L. 100-697)
Energy Independence and Security Act of 2007 (EISA; P.L. 110-140)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)

Annual Funding
$82.8 million for FY2008
$83.1 million for FY2009

An additional $4.5 billion was appropriated to the Office of Electricity Delivery and Energy Reliability in FY2009 from ARRA. Approximately $4 billion of that total was used to implement smart grid programs authorized by EISA and accelerate the

6 In the FY2020 DOE Budget Justifications (vol.3, part 2, p. 419), DOE states that “ARPA-E requests no additional appropriation and requests the cancellation of $287,000,000 in unobligated balances. ARPA-E will utilize the remainder of its unobligated balances to execute the multi-year termination of the program, with all operations ceasing by FY2022.”
deployment of smart grid technologies across the transmission and distributions systems.\(^7\)

$121.4 million for FY2010
$138.2 million for FY2011
$136.2 million for FY2012
$129.2 million for FY2013
$144.2 million for FY2014
$144.2 million for FY2015
$178 million for FY2016
$201.1 million for FY2017
$220 million for FY2018
$139 million for FY2019\(^8\)
$173 million requested for FY2020\(^9\)

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<tr>
<th>Scheduled Termination</th>
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<tr>
<th>Description</th>
<th>This grant program aims to develop cost-effective technology that enhances the reliability, efficiency, and resiliency of the electric grid.</th>
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<th>Qualified Applicant(s)</th>
<th>State, local, and tribal governments; universities; profit organizations; private nonprofit organizations; research organizations</th>
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<tr>
<th>Qualified Technologies</th>
<th>Specific technologies not listed</th>
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For More Information
See OE's Technology Development website; and program number 81.122 at the beta.SAM.gov website.


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<th>Administered by</th>
<th>EERE</th>
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| Authority | Energy Policy and Conservation Act (EPCA; P.L. 94-163)  
Energy Conservation and Production Act (ECPA; P.L. 94-385)  
Department of Energy Organization Act (P.L. 95-91)  
National Energy Conservation Policy Act (NECPA; P.L. 95-619)  
Federal Energy Management Improvement Act of 1998 (P.L. 100-615)  
Energy Independence and Security Act of 2007 (EISA; P.L. 110-140) |

| Annual Funding | $19.5 million for FY2007  
$19.8 million for FY2008  
$22 million for FY2009  
An additional $22.4 million in FY2009 from ARRA  
$32 million for FY2010  
$30.4 million for FY2011  
$29.9 million for FY2012  
$28.3 million for FY2013  
$28.2 million for FY2014  
$27 million for FY2015 |


\(^8\) For FY2019, DOE split the Electricity Delivery and Energy Reliability appropriation into two appropriations: Electricity Delivery (OE) and Cybersecurity, Energy Security, and Emergency Response (CESER). The CESER appropriation for FY2019 is $108.5 million. To compare to previous years, the combined appropriation for the now separated programs in FY2019 would be $247.5 million.

\(^9\) DOE’s budget request for CESAR for FY2020 is $145 million. To compare to previous years, the combined appropriation request for FY2020 would be $318 million.
Renewable Energy and Energy Efficiency Incentives: A Summary of Federal Programs

$27 million for FY2016
$27 million for FY2017
$27 million for FY2018
$30 million for FY2019
$8.4 million requested for FY2020

Scheduled Termination: None

Description: FEMP assists federal agencies in developing and implementing energy efficient and renewable energy resources to meet energy management regulations and goals.

Qualified Applicant(s): Federal agencies

Qualified Technologies: Energy efficient technologies; solar; wind; incremental hydro; ocean; biomass; geothermal


22. Financial Assistance Program (Office of Science)

Administered by: Office of Science

Authority: Atomic Energy Act of 1954 (P.L. 83-703), Section 31
Energy Reorganization Act of 1974 (P.L. 93-438), Title I, Section 107
Federal Nonnuclear Energy Research and Development Act of 1974 (P.L. 93-577)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)

Annual Funding: $974 million for FY2008
$1.4 billion for FY2009
$1.3 billion for FY2010
$1.3 billion for FY2011
$1 billion for FY2012
$965.1 million for FY2013
$1.1 billion for FY2014
$1.1 billion for FY2015
$1.1 billion for FY2016
$1.1 billion for FY2017 (est.)
$1.1 billion for FY2018 (est.)
$1.1 billion for FY2019 (est.)
FY2020 budget request data are unavailable; the FY2020 DOE budget justifications do not provide details on this program.

Scheduled Termination: None

Description: This program provides financial support for fundamental research in the basic sciences and advanced technology concepts and assessments in fields related to energy.

Qualified Applicant(s): State, local, and tribal governments; colleges and universities; profit commercial organizations; private nonprofit organizations; public nonprofit organizations; small businesses

Qualified Technologies: Specific advanced technologies not listed

For More Information: See program number 81.049 at the beta.SAM.gov website; and the Office of Science’s Funding Opportunities website.

23. Loan Guarantee Program (Office of the Chief Financial Officer)

Administered by: Office of the Chief Financial Officer

American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)
Omnibus Appropriations Act, 2009 (P.L. 111-8)
Renewable Energy and Energy Efficiency Incentives: A Summary of Federal Programs

Department of Defense and Full-Year Continuing Appropriations Act, 2011 (P.L. 112-10)

Annual Funding:

Section 1703 Innovative Technology Loan Guarantee Program (permanent)

- $4.5 million for FY2008
- $0 for FY2009
- $0 for FY2010
- $169.6 million for FY2011
- $0 for FY2012
- $0 for FY2013
- $7.9 million for FY2014
- $17 million for FY2015
- $17 million for FY2016
- $139,000 for FY2017
- $30.9 million for FY2018
- $13 million for FY2019
- No funding requested for FY2020

Section 1705 Temporary Loan Guarantee Program

- $0 for FY2008
- $6 billion was appropriated for FY2009. However, $2 billion of that funding was transferred to the “cash for clunkers” automobile trade-in program by P.L. 111-47.
- An additional $1.5 billion was rescinded for the Education Jobs and Medicaid Assistance Act, P.L. 111-226 (Section 308), leaving a total of $2.5 billion remaining from the FY2009 appropriations.
- $0 for FY2010-FY2019
- $0 requested for FY2020

Scheduled Termination:

- None for the permanent (Section 1703) loan guarantee program. Projects authorized by the temporary loan guarantee (Section 1705) had to begin construction no later than September 30, 2011. The Loan Programs Office (LPO) continues to administer and monitor loan guarantees for Section 1705 projects.

Description:

This program provides federal loan guarantees to encourage early commercial use in the United States of new or significantly improved technologies in energy projects that (1) avoid, reduce, or sequester air pollutants or anthropogenic emissions of

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10 For FY2014, $42 million was enacted for administrative purposes only, but these expenses were offset by $34.1 million in collections from borrowers for a net appropriation of $7.9 million.

11 For FY2015, $42 million was enacted for administrative expenses. These administrative expenses were offset by $25 million in collections from borrowers for a net appropriation of $17 million.

12 For FY2016, $42 million was enacted for administrative expenses. These administrative expenses were offset by $25 million in collections from borrowers for a net appropriation of $17 million.

13 For FY2017, $37 million was enacted for administrative expenses. These administrative expenses were reduced by (1) an offset of $27 million in collections from applicants and borrowers and (2) a rescission of an additional $9.861 million of administrative appropriations from FY2012 and FY2013 (P.L. 115-31) for a net appropriation of $139,000.

14 For FY2018, $33 million was enacted for administrative purposes. These administrative expenses were reduced by an offset of $2.1 million in collections from applicants and borrowers for a net appropriation of $30.9 million.

15 For FY2019, $33 million was enacted for administrative expenses. These administrative expenses were reduced by $20 million in collections from applicants and borrowers for a net appropriation of $13 million.

16 For FY2020, $3 million is requested for administrative expenses. These administrative expenses are expected to be offset by an estimated $3 million for a net appropriation of $0.

17 For more information, see CRS Report R40669, Energy and Water Development: FY2010 Appropriations, coordinated by Carl E. Behrens.

18 The authority to enter into new loan guarantees under Section 1705 expired on September 30, 2011, but LPO continues to administer and monitor the portfolio of loan guarantees obligated prior to the expiration date.
Renewable Energy and Energy Efficiency Incentives: A Summary of Federal Programs

Congressional Research Service

Qualified Applicant(s) State, local, and tribal governments; universities; profit organizations; public nonprofit organizations. No federal entity may apply.

Qualified Technologies Solar thermal electric; solar thermal process heat; photovoltaics; wind; hydroelectric; renewable transportation fuels; geothermal electric; fuel cells; manufacturing facilities; daylighting; tidal energy; wave energy; ocean thermal; biodiesel

For More Information See program number 81.126 at the beta.SAM.gov website; DSIRE’s program summary for the Loan Guarantee Program; and DOE’s Loan Guarantee Program website.

24. Small Business Innovation Research Program (SBIR)/Small Business Technology Transfer Program (STTR)

Administered by EERE

Authority
Small Business Innovation Development Act of 1982 (P.L. 97-219)
Small Business Technology Transfer Program Reauthorization Act of 2001 (P.L. 107-50)
SBIR/STTR Reauthorization Act of 2011 (P.L. 112-81, Div. E, Title L)

Annual Funding\(^1\)
$24.2 million for FY2011
$29.1 million for FY2012
$26.4 million for FY2013 (SBIR: $23.4 million; STTR: $3 million)
$30.8 million for FY2014 (SBIR: $27.4 million; STTR: $3.4 million)
$28.4 million for FY2015 (SBIR: $25.1 million; STTR: $3.3 million)
$30.2 million for FY2016 (SBIR: $26.3 million; STTR: $3.9 million)
$45.2 million for FY2017 (SBIR: $38.9 million; STTR: $6.3 million)
$58.2 million for FY2018 (SBIR: $51 million; STTR: $7.2 million)
$58.5 million for FY2019 (SBIR: $51.3 million; STTR: $7.2 million)
$12.4 million requested for FY2020 (SBIR: $10.9 million; STTR: $1.5 million)


Description Small Business Innovation Research (SBIR) and Small Business Technology Transfers (STTR) are U.S. government programs in which federal agencies with large research and development (R&D) budgets set aside a small fraction of their funding for competitions among small businesses only. DOE’s SBIR-STTR program is designed to stimulate technological innovation by small advanced technology firms and provide new, cost-effective scientific and engineering solutions to challenging problems. EERE funds appropriated for SBIR/STTR are allocated to larger EERE technology programs, detailed earlier in this report, including Biomass, Geothermal, Hydrogen & Fuel Cell, Solar Energy, Water Power, Wind Energy, Advanced Manufacturing, Building Technologies, and Vehicle Technologies.

Qualified Applicant(s) Small businesses

Qualified Technologies Research areas include energy production (fossil, nuclear, renewable, and fusion energy); energy use (in buildings, vehicles, and industry); fundamental energy sciences

\(^{1}\) Annual funding listed for the Small Business Innovation Research (SBIR) and Small Business Technology Transfers (STTR) programs includes only those funds distributed to DOE’s energy efficiency and renewable energy programs.
II. Department of Agriculture

1. Assistance to High Energy Cost Rural Communities Program

Administered by Rural Development
Authority Rural Electrification Act of 1936 (P.L. 74-605)
Grain Standards and Warehouse Improvement Act of 2000 (P.L. 106-472)

Annual Funding
- $34.8 million for FY2005
- $27.8 million for FY2006
- $27.8 million for FY2007
- $21.3 million for FY2008
- $17.5 million for FY2009
- $17.5 million for FY2010
- $12.0 million for FY2011
- $9.5 million for FY2012
- $9.2 million for FY2013
- $10 million for FY2014
- $10 million for FY2015
- $10 million for FY2016
- $10 million for FY2017
- $10 million for FY2018
- $10 million for FY2019
- No funds requested for FY2020

Scheduled Termination None

Description This program provides financial assistance to rural communities with extremely high energy costs (exceeding 275% of the national average).

Qualified Applicant(s) State, local, and tribal governments (including U.S. territories); for-profit businesses; non-profit businesses; cooperatives; individuals

Qualified Technologies Not specifically identified

For More Information See USDA’s High Energy Cost Grants website; DSIRE’s program summary for the High Energy Cost Grant Program; and program number 10.859 on the beta.SAM.gov website.

2. Bioenergy Program for Advanced Biofuels

Administered by Rural Development
Authority Food, Conservation, and Energy Act of 2008 (P.L. 110-246), Title IX, Section 9005
Agricultural Act of 2014 (P.L. 113-79)
Agriculture Improvement Act of 2018 (P.L. 115-334)

Annual Funding Mandatory: The 2018 farm bill (P.L. 115-334) authorized mandatory funding of $7 million annually for FY2019-FY2023 to remain available until expended. $7 million was appropriated for FY2019.

Scheduled Termination Mandatory funding authorized through FY2023.
Renewable Energy and Energy Efficiency Incentives: A Summary of Federal Programs

**Description**
The 2008 farm bill established a new Bioenergy Program for Advanced Biofuels to support and expand production of advanced biofuels—that is, fuel derived from renewable biomass other than corn kernel starch—under which USDA would enter into contracts with advanced biofuel producers to pay them for production of eligible advanced biofuels. The policy goal is to create long-term, sustained increases in advanced biofuels production. Payments are of two types: one based on actual production, and a second based on incremental production increases. Not more than 5% of the funds in any year can go to facilities with total refining capacity exceeding 150 million gallons per year (7 C.F.R. Part 4288, Subpart B).

**Qualified Applicant(s)**
Eligible advanced biofuels producers

**Qualified Technologies**
Payments will be made to eligible advanced biofuel producers for the production of fuel derived from renewable biomass, other than corn kernel starch, to include biofuel derived from cellulose, hemicellulose, or lignin; biofuel derived from sugar and starch (other than ethanol derived from corn kernel starch); biofuel derived from waste material, including crop residue, other vegetative waste material, animal waste, food waste, and yard waste; diesel-equivalent fuel derived from renewable biomass, including vegetable oil and animal fat; biogas (including landfill gas and sewage waste treatment gas) produced through the conversion of organic matter from renewable biomass; butanol or other alcohols produced through the conversion of organic matter from renewable biomass; and other fuel derived from cellulosic biomass.

**For More Information**
See program number 10.867 on the beta.SAM.gov website; USDA program website; CRS In Focus (IF10288), Overview of Bioenergy Programs in the 2018 Farm Bill, by Kelsi Bracmor; and CRS Report R45943, The Farm Bill Energy Title: An Overview and Funding History, by Kelsi Bracmort.

### 3. Biomass Crop Assistance Program (BCAP)

**Administered by**
Farm Services Agency (FSA)

**Authority**
Farm Security and Rural Investment Act of 2002 (FSRIA; P.L. 107-171), Title IX Food, Conservation, and Energy Act of 2008 (P.L. 110-246), Title IX, Section 9001 created new Section 9011 under FSIRA Agricultural Act of 2014 (P.L. 113-79), Section 9010 Agriculture Improvement Act of 2018 (P.L. 115-334)

**Annual Funding**

**Scheduled Termination**
Funding authorized through FY2023.

**Description**
BCAP provides assistance to support the production of eligible biomass crops on land within approved BCAP project areas. In exchange for growing eligible crops, the FSA will provide annual payments through 5- to 15-year contracts. Under these contracts up to 50% of establishment costs may also be provided. FSA will also provide matching payments to eligible material owners at a rate of $1 for each $1 per dry ton paid by a qualified biomass conversion facility. Matching payments may not exceed $20 per ton and are limited to no more than two years per participant.

**Qualified Applicant(s)**
Eligible biomass material owners and eligible biomass producers

**Qualified Technologies**
Eligible material for a matching payment is renewable biomass, as defined by the 2014 farm bill, with several important exclusions including harvested grains, fiber, or other

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20 For more program information, see the “Advanced Biofuel Payment Program,” RD, USD at https://www.rd.usda.gov/programs-services/advanced-biofuel-payment-program.
commodities eligible to receive payments under the Commodity Title (Title I) of the 2014 farm bill. (The residues of these commodities, however, are eligible and may qualify for payment.) Also excluded are: animal waste and animal waste by-products including fats, oils, greases, and manure; food waste and yard waste; and bagasse. Eligible crops include renewable biomass, with the exception of crops eligible to receive a payment under Title I of the 2014 farm bill and plants that are invasive or noxious, or have the potential to become invasive or noxious.

For More Information
See the USDA BCAP website; CRS Report R41296, Biomass Crop Assistance Program (BCAP): Status and Issues, by Mark A. McMinimy; CRS In Focus (IF10288), Overview of Bioenergy Programs in the 2018 Farm Bill, by Kelsi Bracmort; and CRS Report R45943, The Farm Bill Energy Title: An Overview and Funding History, by Kelsi Bracmort.

4. Biomass Research and Development Initiative (BRDI)

Administered by National Institute of Food and Agriculture (USDA)/EERE (DOE)

Authority Biomass Research and Development Act of 2000 (BRDA; P.L. 106-224), Title III
Farm Security and Rural Investment Act of 2002 (FSRIA; P.L. 107-171), Title IX, Section 9008
Food, Conservation, and Energy Act of 2008 (P.L. 110-246), Title IX, Section 9008
Agricultural Act of 2014 (P.L. 113-79), Title 9010
Agriculture Improvement Act of 2018 (P.L. 115-334), Title VII, Section 7507

Annual Funding
• Mandatory: Under the 2014 farm bill, mandatory funds of $3 million were authorized for FY2014 through FY2017 to remain available until expended. No mandatory funds were authorized or appropriated for FY2018. The 2018 farm bill did not extend mandatory funding for BRDI.
• Discretionary: The 2018 farm bill authorized $20 million in annual appropriations for FY2019-FY2023. No discretionary funding has been appropriated through FY2019.

Scheduled Termination Funding authorized through FY2023.

Description BRDI is an interagency collaboration program between USDA’s National Institute of Bioenergy (Institute of Bioenergy, Climate, and Environment) and DOE’s Office of Energy Efficiency and Renewable Energy (Bioenergy Technologies Program). The program provides competitive grants, contracts, and financial assistance for research, development, and demonstration of technologies and processes for biofuels and biobased products.

Qualified Applicant(s) Colleges and universities (including 1862, 1890, and 1994 Land-Grant Colleges and Universities); national laboratories; federal research agencies; state research agencies; small businesses; non-profit organizations; and/or a consortium of two or more entities identified as eligible

Qualified Technologies Biomass; biofuels; biobased products

For More Information See the program website; program number 10.312 on the beta.Sam.gov website; CRS In Focus (IF10288), Overview of Bioenergy Programs in the 2018 Farm Bill, by Kelsi Bracmort; and CRS Report R45943, The Farm Bill Energy Title: An Overview and Funding History, by Kelsi Bracmort.

5. Biorefinery, Renewable Chemical, and Biobased Product Manufacturing Assistance Program (formerly the Biorefinery Assistance Program)

Administered by Rural Development

Authority Food, Conservation, and Energy Act of 2008 (P.L. 110-246), Title IX, Section 9003 created the Biorefinery Assistance Program
Agricultural Act of 2014 (P.L. 113-79), Title IX, Section 9003 amended and renamed the program as the Biorefinery, Renewable Chemical and Biobased Product Manufacturing Assistance Program
Agriculture Improvement Act of 2018 (P.L. 115-334), Title IX, Section 9003
### 6. Community Wood Energy and Wood Innovation Program

<table>
<thead>
<tr>
<th>Administered by</th>
<th>Forest Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authority</td>
<td>Food, Conservation, and Energy Act of 2008 (P.L. 110-246), Title IX, Section 9013, Agricultural Act of 2014 (P.L. 113-79), Title IX, Section 9012, Agriculture Improvement Act of 2018 (P.L. 115-334), Title VIII, Section 8644</td>
</tr>
</tbody>
</table>
| Annual Funding           | • Mandatory: No mandatory funding has been authorized.  
                           • Discretionary: Discretionary funding of $25 million annually is authorized to be appropriated for FY2019-FY2023 under the 2018 farm bill, but no funds have been appropriated through FY2019. |
| Scheduled Termination    | Funding authorized through FY2023. |
| Description              | The 2018 farm bill extended the program through FY2023 and changed the name to the Community Wood Energy and Wood Energy Innovation Program. The program provides matching grants for the installation of community wood energy systems or building an innovative wood product facility.  
                           A community wood energy system is defined in the 2018 farm bill as an energy system that produces thermal energy or combined thermal energy and electricity, services public facilities owned or operated by state or local governments, and uses woody biomass. This includes single-facility central heating, district heating systems for multiple buildings, and combined heat and electric systems, and other related biomass energy systems.  
                           The 2018 farm bill added innovative wood product facilities to the program, defining such facility as a manufacturing or processing plant or mill that produces: building components or systems using panelized wood construction; wood products derived from woody biomass; and biorefineries that produce advanced biofuels, renewable chemicals, or biobased products. |

### Annual Funding

- **Mandatory:** Under the 2018 farm bill, mandatory Commodity Credit Corporation (CCC) funding of $50 million for FY2019 and $25 million for FY2020 (to remain available until expended) was authorized for loan guarantees. $50 million was appropriated for FY2019.

- **Discretionary:** Funds of $75 million annually are authorized to be appropriated for FY2014-FY2018 and FY2019-FY2023. For FY2009-FY2013, $150 million was authorized to be appropriated annually. No discretionary funding has been appropriated for this program through FY2019.

### Scheduled Termination

Mandatory funding authorized through FY2020 and discretionary funding authorized through FY2023.

### Description

The purpose is to assist in the development of new and emerging technologies for the development of advanced biofuels, so as to increase the energy independence of the United States; promote resource conservation, public health, and the environment; diversify markets for agricultural and forestry products and agriculture waste material; and create jobs and enhance the economic development of the rural economy. Competitive grants and loan guarantees are made to fund the development, construction, and retrofitting of commercial-scale biorefineries using eligible technologies. Biorefinery grants can provide for up to 30% of total project costs. Loan guarantees are limited to $250 million or 80% of project cost.

### Qualified Applicant(s)

Individuals; tribal entities; state government entities; local government entities; corporations; farm cooperatives; farmer cooperative organizations; associations of agricultural producers; national laboratories; institutions of higher education; rural electric cooperatives; public power entities; consortia of any of the previous entities.

### Qualified Technologies

Technologies being adopted in a viable commercial-scale operation of a biorefinery that produces an advanced biofuel, renewable chemical, or biobased product; and technologies that have been demonstrated to have technical and economic potential for commercial application in a biorefinery that produces an advanced biofuel, renewable chemical, or biobased product.

### For More Information

See the USDA program website; program number 10.865 at the beta.SAM.gov website; and CRS Report R45943, *The Farm Bill Energy Title: An Overview and Funding History*, by Kelsi Bracmort.
from nanotechnology or other new technology processes; or other innovative wood products using low-value, low-quality wood.

Grants are capped at 35% of the capital cost of the system or facility (50% under special circumstances), and are awarded for systems with a nameplate capacity not exceeding 5 megawatts of thermal energy or combined thermal and electric energy as directed by statute.

Qualified Applicant(s)  State and local governments
Qualified Technologies  Biomass

For More Information  See CRS In Focus (IF10288), Overview of Bioenergy Programs in the 2018 Farm Bill, by Kelsi Bracmort; and CRS Report R45943, The Farm Bill Energy Title: An Overview and Funding History, by Kelsi Bracmort.

7. Rural Energy For America Program (REAP) Grants and Loans

Administered by  Rural Development
Authority  Food Conservation, and Energy Act of 2008 (P.L. 110-246), Title IX, Section 9001(a)
Agricultural Act of 2014 (P.L. 113-79), Title IX, Section 9007
Agriculture Improvement Act of 2018 (P.L. 115-334), Title IX, Section 9007

Annual Funding  • Mandatory: The 2018 farm bill retains mandatory CCC funding of $50 million for FY2014 and each fiscal year thereafter (thus, unlike other farm bill renewable energy programs, REAP's mandatory funding authority does not expire with the 2018 farm bill). Mandatory funds are to remain available until expended.

• Discretionary: Under the 2018 farm bill, discretionary funding of $20 million annually is authorized to be appropriated for FY2019-FY2023; of this amount, $335,000 was appropriated for FY2019.

Under the 2014 farm bill, discretionary funding of $20 million annually was authorized to be appropriated for FY2014-FY2018; of this amount, $3.5 million was appropriated for FY2014, $1.35 million for FY2015, $0.5 million for FY2016, $352,000 for FY2017, and $293,000 for FY2018.

Under the 2008 farm bill, $25 million was authorized to be appropriated annually for FY2009-FY2013. Actual discretionary appropriations have been $5 million in FY2009, $39.3 million in FY2010, $5 million in FY2011, $3.4 million in FY2012 and FY2013; $3.5 million in FY2014; and $1.35 million in FY2015.

Scheduled Termination  None
Description  REAP promotes energy efficiency and renewable energy for agricultural producers and rural small businesses through the use of: (1) grants and loan guarantees for energy efficiency improvements (EEI) and renewable energy systems (RES); (2) grants for energy audits and renewable energy development assistance; and (3) grants for conducting renewable energy systems (RES) feasibility studies (eligible entities include rural small businesses and agricultural producers).

The 2014 farm bill added new funding and a three-tiered application process with separate application processes for grants and loan guarantees for RES and EEI projects based on the project cost. It also excluded the use of REAP funds for installing retail energy dispensing equipment, such as blender pumps.

The 2018 farm bill amends the financial assistance for energy efficiency improvements and renewable energy systems section to include certain limitations for loan guarantees to purchase and install energy efficient equipment or agricultural production or processing systems. It also places a cap of 15% of available funds per year to be imposed on loan guarantees to agricultural producers for energy efficiency equipment.

Qualified Applicant(s)  Commercial; schools; state, local, and tribal governments; rural electric cooperatives; agricultural; public power entities
Qualified Technologies  Solar water heat; solar space heat; solar thermal electric; photovoltaics; wind; biomass; hydroelectric; renewable transportation fuels; geothermal electric; geothermal heat pumps; CHP/cogeneration; hydrogen; direct-use geothermal (electric); anaerobic digestion; small hydroelectric; tidal energy; wave energy; ocean
For More Information
See the program website; CRS In Focus (IF10288), Overview of Bioenergy Programs in the 2018 Farm Bill, by Kelsi Bracmort; and CRS Report R45943, The Farm Bill Energy Title: An Overview and Funding History, by Kelsi Bracmort.

8. Rural Energy Savings Program (RESP)
Administered by
Rural Development

Authority
Agricultural Act of 2014 (P.L. 113-79), Title VI, Section 6205
Agriculture Improvement Act of 2018 (P.L. 115-334), Title VI, Section 6303

Annual Funding
• Mandatory: No mandatory funding has been authorized.
• Discretionary: Under the 2014 farm bill, discretionary funding of $75 million was authorized to be appropriated for FY2014-FY2018. The 2018 farm bill extended this authorization of $75 million for FY2019-FY2023. Of this amount, no funding was appropriated for FY2015 and FY2016; $8 million was appropriated annually for FY2016-FY2018; and $10 million was appropriated for FY2019.

Scheduled Termination
Funding authorized through FY2023.

Description
The Rural Energy Savings Program provides loans to entities that agree to make affordable loans to help qualified consumers implement durable and cost-effective energy efficiency upgrades or install cost-effective renewable energy or energy storage systems. The 2018 farm bill requires that loans from eligible entities to qualified consumers may not exceed 5% in interest and must be used for certain purposes (e.g., to establish a loan loss reserve).

Qualified Applicant(s)
Public power entities (public power districts and public utility districts) and rural electric cooperatives that have borrowed, repaid, prepaid, or are paying an electric loan made or guaranteed by the Rural Utilities Service (RUS); or any other entity that is determined eligible for a loan from RUS according to federal regulations (see 7 CFR 1701.101)

Qualified Technologies
On- or off-grid renewable energy systems; on- or off-grid energy storage systems; cost-effective, commercial technologies to increase energy efficiency
Specific renewable energy, energy storage, and energy efficiency technologies not identified

For More Information
See the program website; Rural Energy Savings Program (RESP) factsheet; program number 10.751 at the beta.Sam.gov website; CRS In Focus (IF10288), Overview of Bioenergy Programs in the 2018 Farm Bill, by Kelsi Bracmort; and CRS Report R45943, The Farm Bill Energy Title: An Overview and Funding History, by Kelsi Bracmort.

9. Sun Grant Program
Administered by
National Institute of Food and Agriculture

Authority
Food, Conservation, and Energy Act of 2008 (P.L. 110-246), Title VII, Section 7526
Agricultural Act of 2014 (P.L. 113-79), Title VII, Sections 7128, 7516
Agriculture Improvement Act of 2018 (P.L. 115-334), Title IX, Sections 7414, 7614

Annual Funding
• Mandatory: No mandatory funding has been authorized.
• Discretionary: Under the previous 2008 and 2014 farm bills, discretionary funding of $75 million was authorized to be appropriated for FY2008-FY2018. The 2018 farm bill extended this authorization of $75 million for FY2019-FY2023. Of this amount, $2.5 million was appropriated in FY2015 and FY2016, and $3 million was appropriated for FY2017-FY2019.

Scheduled Termination
Funding authorized through FY2023.

Description
The Sun Grant Initiative (SGI) is a national network of land-grant universities and federally funded laboratories coordinated through six regional Sun Grant centers. The centers receive funding to enhance national energy security using biobased energy technologies, to promote diversification and environmental sustainability of
agricultural production through biobased energy and product technologies, to promote economic diversification in rural areas through biobased energy and product technologies, and to enhance the efficiency of bioenergy and biomass research and development programs. Competitive grants are available to land-grant schools within each region to be used toward integrated, multistate research, extension, and education programs on technology development and implementation.

The combined six regions and subregions, covering all 50 states and U.S. territories are: North-Central Region, Northeastern Region, Southeastern Region, South-Central Region, Western Region, and the Western Insular Pacific Subcenter Region.

Qualified Applicant(s): Colleges and universities: specifically, eligible applicants must represent a consortium of 1862, 1890, and 1994 land-grant universities made up of one university from each of the (six) sun grant regions and subregion.

Qualified Technologies: Biomass; biofuels; biobased products

For More Information: See the program website; program number 10.320 at the beta.Sam.gov website; CRS In Focus (IF10288), Overview of Bioenergy Programs in the 2018 Farm Bill, by Kelsi Bracmort; and CRS Report R45943, The Farm Bill Energy Title: An Overview and Funding History, by Kelsi Bracmort.

10. Sustainable Agriculture Research and Education Program (SARE)

Administered by: National Institute of Food and Agriculture; Agricultural Research Service; and other appropriate agencies

Authority: Food, Agriculture, Conservation and Trade Act of 1990 (P.L. 101-624)
Federal Agriculture Improvement and Reform Act of 1996 (P.L. 104-127)
Food, Conservation, and Energy Act of 2008 (P.L. 110-246)

Annual Funding:
$12.5 million for FY2006
$12.4 million for FY2007
$9.1 million for FY2008
$14.5 million for FY2009
$14.5 million for FY2010
$19.2 million for FY2011
$13.5 million for FY2012
$19.3 million for FY2013
$22.7 million for FY2014
$23 million for FY2015
$25 million for FY2016
$27 million for FY2017
$27 million for FY2018 (est.)
$37 million for FY2019
$19 million requested for FY2020

Scheduled Termination: None

Description: The purpose of the Sustainable Agriculture Research and Education Program (SARE) is, in part, to encourage research designed to increase our knowledge concerning agricultural production systems that conserve soil, water, energy, natural resources, and fish and wildlife habitat. SARE provides grants through the agricultural bioenergy feedstock and energy efficiency research and extension initiative for projects with the purpose of enhancing the production of biomass energy crops and the energy efficiency of agricultural operations.

Qualified Applicant(s): Federal and state governments; colleges and universities; state agricultural experiment stations; state cooperative extension services; nonprofit organizations; individuals with demonstrable expertise

III. U.S. Department of the Treasury


Homeowner

1. Residential Energy Conservation Subsidy Exclusion (Corporate and Personal)

   Administered by Internal Revenue Service
   Authority 26 U.S.C. §136
   Small Business Job Protection Act of 1996 (P.L. 104-188)
   Scheduled Termination None
   Description Energy conservation subsidies provided by public utilities, either directly or indirectly, are nontaxable: “Gross income shall not include the value of any subsidy provided (directly or indirectly) by a public utility to a customer for the purchase or installation of any energy conservation measure.”
   Qualified Applicant(s) Residential; multi-family residential
   Qualified Technologies Technologies installed to reduce electricity or natural gas consumption or improve the management of energy demand in a dwelling unit, including, but not limited to, solar water heat, solar space heat, photovoltaics, and other energy efficiency technologies not identified.

2. Residential Energy Efficiency Tax Credit

   Administered by Internal Revenue Service
   Authority 26 U.S.C. §25C
   Energy Improvement and Extension Act of 2008 (EIA; P.L. 110-343)
   American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)
   American Taxpayer Relief Act of 2012 (ATRA, P.L. 112-240)
   Tax Increase Prevention Act of 2014 (P.L. 113-295)
   Consolidated Appropriations Act of 2016 (P.L. 114-113)
   Bipartisan Budget Act of 2018 (P.L. 115-123)
   Scheduled Termination December 31, 2017
   Description A 10% credit for energy efficiency improvements to the building envelope of existing homes and capped amounts ($50-$300) for the purchase of specific types of high-efficiency heating, cooling, and water-heating equipment. Efficiency improvements or equipment must have served a dwelling in the United States that is owned and used by the taxpayer as a primary residence. For purchases made in 2011-2017, the maximum lifetime amount of homeowner credit for all improvements combined is $500 total. For purchases made in 2009 or 2010, the maximum amount of homeowner credit was $1,500 total.
   Qualified Applicant(s) Residential
Qualified Technologies
Water heaters; furnaces; boilers; heat pumps; air conditioners; building insulation; windows; doors; roofs; circulating fans used in a qualifying furnace; biomass and stoves that use qualified biomass fuel

For More Information
See IRS Form 5695: Residential Energy Credits; IRS Form 5695 Instructions; and CRS Report R42089, Residential Energy Tax Credits: Overview and Analysis, by Margot L. Crandall-Hollick and Molly F. Sherlock.

3. Residential Renewable Energy Tax Credit

Administered by
Internal Revenue Service

Authority
26 U.S.C. §25D

Energy Improvement and Extension Act of 2008 (P.L. 110-343)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)
Consolidated Appropriations Act of 2016 (P.L. 114-113)
Bipartisan Budget Act of 2018 (P.L. 115-123)

Scheduled Termination
December 31, 2021

Description
A taxpayer may claim a credit of 30% of qualified expenditures for a system that serves a dwelling unit located in the United States and is used as a residence by the taxpayer. A 30% credit for solar energy systems is in place through December 31, 2019, but is reduced over the tax credit’s final two years: 26% for 2020 and 22% for 2021.

Qualified Applicant(s)
Residential

Qualified Technologies
Solar electric (including photovoltaics); solar water heating; small wind; fuel cells; geothermal heat pumps

For More Information
See IRS Form 5695: Residential Energy Credits; IRS Form 5695 Instructions; and CRS Report R42089, Residential Energy Tax Credits: Overview and Analysis, by Margot L. Crandall-Hollick and Molly F. Sherlock.

Business and Industry

4. Business Energy Investment Tax Credit (ITC)

Administered by
Internal Revenue Service

Authority
26 U.S.C. §48

Energy Tax Act of 1978 (P.L. 95-618)
Crude Oil Windfall Profit Tax Act of 1980 (P.L. 96-223)
Tax Reform Act of 1986 (TRA86; P.L. 99-514)
Technical and Miscellaneous Revenue Act of 1988 (P.L. 100-647)
Omnibus Budget Reconciliation Act of 1989 (P.L. 101-239)
Omnibus Budget Reconciliation Act of 1990 (P.L. 101-508)
Energy Improvement and Extension Act of 2008 (EISA; P.L. 110-343)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)
Consolidated Appropriations Act of 2016 (P.L. 114-113)
Bipartisan Budget Act of 2018 (P.L. 115-123)
5. Energy Efficient Commercial Buildings Tax Deduction

Scheduled Termination: December 31, 2021, for hybrid (fiber-optic) solar lighting, fuel cells, small wind systems, combined heat and power systems (CHP), microturbines, and geothermal heat pump systems
December 31, 2019, for large wind energy systems
December 31, 2017, for non-wind PTC-eligible property

Description: Credit is 30% for hybrid (fiber-optic) solar lighting, fuel cells, and small wind energy systems, reduced to 22% in 2020 before expiring on December 31, 2021; 30% for solar energy systems through December 31, 2019, reduced to 26% in 2020 and 22% in 2021. 10% credit for solar energy after 2021; 10% for geothermal electric (no termination); 10% for microturbines, and CHP until December 31, 2021; Technologies eligible for the Production Tax Credit (PTC) are eligible to opt for the ITC in lieu of the PTC if construction commenced prior to January 1, 2018. As of January 1, 2018, only wind energy systems are eligible to claim the ITC in lieu of the PTC. 24% credit for large wind systems for 2017, gradually reducing each year to 12% in 2019 when the credit ends (December 31, 2019).

Qualified Applicant(s): Commercial; industrial; utilities; agricultural

Qualified Technologies: Solar energy (solar water heat; solar space heat; solar thermal electric; solar thermal process heat; photovoltaics); hybrid (fiber-optic) solar lighting; small wind; large wind; biomass; fuel cells; geothermal (electric, heat pumps, direct-use); CHP/Cogeneration; microturbines

For More Information: See IRS Form 3468 (Investment Credit); and CRS In Focus IF10479, The Energy Credit: An Investment Tax Credit for Renewable Energy, by Molly F. Sherlock.

5. Energy Efficient Commercial Buildings Tax Deduction

Administered by: Internal Revenue Service

Authority: 26 U.S.C. §179D
Tax Relief and Health Care Act of 2006 (P.L. 109-432)
Energy Improvement and Extension Act of 2008 (P.L. 110-343)
Tax Increase Prevention Act of 2014 (P.L. 113-295)
Consolidated Appropriations Act of 2016 (P.L. 114-113)
Bipartisan Budget Act of 2018 (P.L. 115-123)

Scheduled Termination: December 31, 2017

Description: A tax deduction of $1.80 per square foot is available to owners of new or existing buildings who install (1) interior lighting, (2) building envelope, or (3) heating, cooling, ventilation, or hot water systems that reduce the building’s total energy and power cost by 50% or more in comparison to a building meeting minimum requirements set by ASHRAE/IESNA Standard 90.1-2007. Energy savings must be calculated using qualified computer software approved by the IRS.

Qualified Applicant(s): Commercial; builder/developer; state government; federal government (deductions associated with government buildings are transferred to the designer)

Qualified Technologies: Equipment insulation; water heaters; lighting; lighting controls/sensors; chillers; furnaces; boilers; heat pumps; air conditioners; caulking/weather-stripping; duct/air sealing; building insulation; windows; doors; siding; roofs; comprehensive measures/whole building

6. **Energy-Efficient New Homes Tax Credit for Home Builders**

Administered by: Internal Revenue Service  
Authority: 26 U.S.C. §45L  

- Tax Technical Corrections Act of 2007 (P.L. 110-172)  
- Energy Improvement and Extension Act of 2008 (EIEA; P.L. 110-343)  
- Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010 (P.L. 111-312)  
- American Taxpayer Relief Act of 2012 (ATRA, P.L. 112-240)  
- Tax Increase Prevention Act of 2014 (P.L. 113-295)  
- Consolidated Appropriations Act of 2016 (P.L. 114-113)  
- Bipartisan Budget Act of 2018 (P.L. 115-123)

Scheduled Termination: December 31, 2017  

Description: This program provided tax credits of up to $2,000 for builders of all new energy-efficient homes, including manufactured homes constructed in accordance with the Federal Manufactured Homes Construction and Safety Standards.

Qualified Applicant(s): Builder/developer  
Qualified Technologies: Comprehensive measures/whole building  
For More Information: See IRS Form 8908 (Energy Efficient Home Credit).

7. **Renewable Electricity Production Tax Credit**

Administered by: Internal Revenue Service  
Authorizing Statute(s): 26 U.S.C. §45  

- Ticket to Work and Work Incentives Improvement Act of 1999 (P.L. 106-170)  
- Job Creation and Worker Assistance Act of 2002 (P.L. 107-147)  
- Working Families Tax Relief Act of 2004 (P.L. 108-311)  
- American Jobs Creation Act of 2004 (P.L. 108-357)  
- Tax Relief and Health Care Act of 2006 (P.L. 109-432)  
- Energy Improvement and Extension Act of 2008 (P.L. 110-343)  
- American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)  
- American Taxpayer Relief Act of 2012 (ATRA, P.L. 112-240)  
- Tax Increase Prevention Act of 2014 (P.L. 113-295)  
- Consolidated Appropriations Act of 2016 (P.L. 114-113)  
- Bipartisan Budget Act of 2018 (P.L. 115-123)

Scheduled Termination: December 31, 2019, for wind energy facilities; December 31, 2017, for all other technologies  

Description: The federal renewable electricity Production Tax Credit (PTC) is a per-kilowatt-hour tax credit for electricity generated by qualified energy resources and sold by the taxpayer to an unrelated person during the taxable year. The duration of the credit is 10 years after the date the facility is placed in service for all facilities placed in service after August 8, 2005; unused credits may be carried forward for up to 20 years following the year they were generated or carried back one year if the taxpayer files an amended return.

P.L. 114-113 extended the expiration date for this tax credit to December 31, 2019, for wind facilities commencing construction, with a phase-down beginning for wind projects commencing construction after December 31, 2016. P.L. 115-123 extended the tax credit for other eligible renewable energy technologies commencing construction through December 31, 2017.

Qualified Applicant(s): Commercial; industrial
Qualified Technologies

- Landfill gas
- Wind
- Biomass
- Hydroelectric
- Geothermal electric
- Municipal solid waste
- Hydrokinetic power (i.e., flowing water)
- Anaerobic digestion
- Small hydroelectric
- Tidal energy
- Wave energy
- Ocean thermal

For More Information


State, Local, and Tribal Governments

Cross-Cutting

8. Modified Accelerated Cost-Recovery System (MACRS)

Administered by: Internal Revenue Service

Authority

- 26 U.S.C. §168
- 26 U.S.C. §48

- American Taxpayer Relief Act of 2012 (ATRA, P.L. 112-240)
- Tax Increase Prevention Act of 2014 (P.L. 113-295)
- Consolidated Appropriations Act of 2016 (P.L. 114-113)
- Tax Cuts and Jobs Act of 2017 (P.L. 115-97)

Scheduled Termination: None

Description

Under MACRS, businesses may recover investments in certain property through depreciation deductions. The MACRS establishes a set of class lives for various types of property, ranging from 3 to 50 years, over which the property may be depreciated. A number of renewable energy technologies are classified as five-year property (26 U.S.C. 168(e)(3)(B)(vi)) under MACRS.

P.L. 115-97, signed in December 2017, extended the “placed in service” deadline for bonus depreciation. Equipment placed in service after September 2017 and before January 1, 2023 can qualify for 100% bonus depreciation; for equipment placed in service during the period covering 2023 through 2026, bonus depreciation reduces 20% each year: 80% for 2023, 60% for 2024, 40% for 2025, and 20% for 2026.22

Qualified Applicant(s)

Commercial; industrial

Qualified Technologies

- Solar water heat
- Solar space heat
- Solar thermal electric
- Solar thermal process heat
- Photovoltaic power systems
- Landfill gas
- Wind
- Biomass
- Renewable transportation fuels
- Geothermal electric
- Fuel cells
- Geothermal heat pumps
- Municipal solid waste
- CHP/cogeneration
- Solar hybrid lighting
- Direct use geothermal
- Anaerobic digestion
- Microturbines

For More Information

See IRS Publication 946, IRS Form 4562: Depreciation and Amortization, and Instructions for Form 4562.

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22 Bonus depreciation applies to many classes of property or equipment other than renewable energy technologies covered by MACRS. With 100% bonus depreciation available, businesses can choose to deduct the cost of renewable energy property immediately, as opposed to recovering the cost of the investment over five years (MACRS). Beginning in 2023, when bonus depreciation reduces 20% annually through 2026 (see program description above), businesses can opt to deduct the remaining percentage immediately or the entire amount over five years under MACRS if they choose not to take the bonus depreciation deduction.
IV. Department of the Interior

1. Energy and Mineral Development Program (EMDP): Minerals and Mining on Indian Lands

Administered by: Bureau of Indian Affairs (BIA); Division of Energy and Mineral Development (DEMD)

Authority
- Indian Self-Determination and Education Assistance Act (P.L. 93-638), 25 U.S.C. 450
- Umatilla Basin Project Act (P.L. 100-557), 16 U.S.C. 1271 et seq.

Annual Funding
- $12.972 million for FY2010
- $12.87 million for FY2011
- $12.7 million for FY2012
- $12 million for FY2013
- $9.62 million for FY2014
- $5.14 million for FY2015
- $6 million for FY2016
- No data available for FY2017-FY2019

Scheduled Termination
- None

Description
Funding may be used to facilitate the inventory, assessment, promotion, and marketing of both renewable and nonrenewable energy and mineral resources on Indian lands. Funds are awarded competitively to support assessment and inventory programs or to develop baseline data, but cannot be used for development purposes.

Qualified Applicant(s)
- Federally recognized Indian tribes; individual American Indian mineral owners

Qualified Technologies
- Renewable energy technologies

For More Information
See program number 15.038 at the beta.SAM.gov website; and BIA’s Energy and Mineral Development Program (EMDP) website.

2. Tribal Energy Development Capacity (TEDC) Grant Program

Administered by: Bureau of Indian Affairs

Authority

Annual Funding
- $375,000 for FY2007
- $1 million for FY2008
- no estimate available for FY2009
- $138,839 for FY2010
- $250,000 for FY2011
- $0 for FY2012
- $400,000 for FY2013 (est.)
- $700,000 for FY2014
- $1.56 million for FY2015
- $1.4 million for FY2016
- No data available for FY2017-FY2019

Scheduled Termination
- None

Description
This program provides grants to Indian tribes to (1) develop and sustain the managerial and technical capacity needed to develop their energy resources; and (2) properly account for resulting energy production and revenues.

Qualified Applicant(s)
- Tribal governments

Qualified Technologies
- Renewable energy technologies
V. Small Business Administration

1. 7(a) Loan Guarantees

Administered by: Small Business Administration (SBA)
Authority: Small Business Act of 1953 (P.L. 83-163)
Annual Funding: 7(a) loan guaranty administrative costs are funded through the SBA’s appropriation for business loan administration. ($159.5 million in FY2010, $152.694 million in FY2011, $147.958 million in FY2012, $140.219 million in FY2013 (after sequestration), $151.560 million in FY2014, $147.726 million in FY2015, $152.726 million in FY2016, $152.726 million in FY2017, $152.782 million in FY2018, and $155.150 million in FY2019).

The SBA reports that it spent $95.090 million in FY2010, $88.000 million in FY2011, $93.640 million in FY2012, $75.390 million in FY2013, $66.578 million in FY2014, $63.013 million in FY2015, $75.791 million in FY2016, $82.173 million in FY2017, and $89.785 million in FY2018 on 7(a) loan administration. The SBA has budgeted $93.844 million for 7(a) loan administration in FY2019.

In addition, the 7(a) loan guaranty program was provided $80 million in FY2010, $80 million in FY2011, $139.4 million in FY2012, and $213.8 million in FY2013 (after sequestration) for loan credit subsidies.

Scheduled Termination: None
Description: This program guarantees loans from lenders to small businesses that are unable to obtain financing on reasonable terms and conditions in the private credit marketplace, but can demonstrate an ability to repay loans if granted, in a timely manner. Guaranteed loans are made available to for-profit small businesses. The SBA’s 7(a) lending authority includes (1) regular 7(a); (2) SBAExpress Program; (3) the CapLines Program; (4) Small/Rural Lender Advantage initiative; (5) Export Express Program; (6) Export Working Capital Program; (7) International Trade; and (8) Community Advantage initiatives.

Qualified Applicant(s): Small businesses meeting the size and eligibility standards
Qualified Technologies: Not specifically listed
For More Information: See CRS Report R41146, Small Business Administration 7(a) Loan Guaranty Program, by Robert Jay Dilger; the SBA website; and program number 59.012 at the beta.SAM.gov website.

2. 504 Loan Guarantees

Administered by: Small Business Administration (SBA)
Authority: Small Business Investment Act of 1958 (P.L. 85-699)

In addition, the 504 loan guaranty program was provided $67.7 million in FY2012, $98.1 million in FY2013 (after sequestration), $107.0 million in FY2014, and $45.0 million in FY2015 for loan subsidy costs.

Scheduled Termination: None

Description: This program provides long-term fixed rate financing for major fixed assets, such as land, buildings, equipment, and machinery. Of the total project costs, a third-party lender must provide at least 50% of the financing; the Certified Development Company provides up to 40% of the financing through a 100% SBA-guaranteed debenture; and the applicant provides at least 10% of the financing. Qualified projects are required to modernize or upgrade facilities by (1) reducing energy use by at least 10%; (2) employing sustainable or low-impact design that reduces fossil fuel use; (3) planning, equipping, and/or installing process upgrades or renewable energy sources; or (4) supporting renewable fuels production by biodiesel and ethanol producers.

Qualified Applicant(s): Small businesses meeting the size and eligibility standards

Qualified Technologies: Fossil fuels; energy efficiency equipment; renewable energy sources (unspecified); renewable fuels, including biodiesel and ethanol

For More Information: See CRS Report R41184, Small Business Administration 504/CDC Loan Guaranty Program, by Robert Jay Dilger; the SBA website; and program number 59.041 at the beta.SAM.gov website.

VI. U.S. Department of Housing and Urban Development

1. Energy Efficient Mortgages (EEMs)

Administered by: Federal Housing Administration (FHA) and Department of Veterans Affairs (VA). Conventional mortgages: Private lenders that sell mortgage loans to Fannie Mae or Freddie Mac may also offer Energy Efficient Mortgages (EEMs).

Authority: EEMs were initially introduced by lenders in the 1980s. In 1992, three pieces of legislation passed by Congress worked towards standardizing and expanding the use of EEMs. In 1992, Congress established an FHA Energy Efficient Mortgage Pilot Program (P.L. 102-550). The program was later expanded beyond five states to become a national program. The Housing and Economic Recovery Act of 2008 (HERA; P.L. 110-289) increased the maximum amount that can be added to an FHA mortgage for energy efficient improvements. The 111th Congress included incentives to encourage green home improvements in the American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5).

Scheduled Termination: None

Description: Homeowners can take advantage of EEMs to finance a variety of energy efficiency measures, including renewable energy technologies, in a new or existing home. The federal government directly provides these loans through the FHA and VA lending programs. Fannie Mae and Freddie Mac will also purchase EEMs from primary lenders. Primary lenders may issue EEMs that do not conform to underwriting standards.

Qualified Applicant(s): The loan is available to anyone who meets the income requirements for FHA’s Section 203 (b) program, provided the applicant can meet the monthly mortgage payments. New and existing owner-occupied homes of up to two units qualify for this loan. Cooperative units are not eligible. VA: available to qualified military personnel, reservists, and veterans; Conventional: Applicants qualifying for a conventional mortgage are also eligible for an energy efficient mortgage.

Qualified Technologies: Passive solar space heat; solar water heat; solar space heat; photovoltaics; daylighting; and other technologies not specifically identified
For More Information See the HUD, RESNET (Residential Energy Services Network), Energy Star, and DSIRE websites.

2. FHA PowerSaver Loan Program

Administered by Federal Housing Administration (FHA)

Authority No statutory authority. HUD developed the PowerSaver as part of the Recovery Through Retrofit initiative launched in May 2009 by the White House Task Force on Middle Class Working Families to develop federal actions for expanding green job opportunities in the United States and boosting energy savings by improving home energy efficiency.

Scheduled Termination PowerSaver began as a nationwide two-year pilot program, launching in 2011. No termination date for this program is listed in online government information sources identified at this time.

Description PowerSaver offers FHA-backed loans, with three financing options for homeowners to make energy efficiency and renewable energy upgrades in their residences: (1) PowerSaver Home Energy Upgrade (up to $7,500) for smaller projects; (2) PowerSaver Second Mortgage (Title I, up to $25,000) for financing larger retrofit projects; and (3) PowerSaver Energy Rehab (203(k)). This 203(k) loan is for home purchase or refinance, targeting either home buyers wishing to combine home improvements with a home purchase or to homeowners wishing to include home improvements when refinancing an existing mortgage. For the 203(k), current loan limits for a single-unit property vary by area from $217,500 to $625,000. For all three PowerSaver products, borrowers must select from a list of approved PowerSaver lenders.

Qualified Applicant(s) These loans are available to homeowners who meet the following criteria: a minimum credit score of 660 and a maximum total debt to income ratio of 45% (monthly income divided by monthly debt payments). Eligible housing is limited to single unit homes that must be owner-occupied.

Qualified Technologies Energy efficient improvements, including installation of insulation, duct sealing, replacement doors and windows, HVAC systems, water heaters, home automation systems and controls (e.g., smart thermostats), solar panels, solar thermal hot water systems, small wind power, and geothermal systems.

For More Information See EERE’s factsheet; DSIRE website; and FHA’s approved list of lenders for PowerSaver.

VII. Department of Health and Human Services

1. Low Income Home Energy Assistance Program (LIHEAP)

Administered by Administration For Children and Families Office of Community Services, Division of Energy Assistance

Authority Omnibus Budget Reconciliation Act of 1981 (P.L. 97-35), Title XXVI, §2602

The Human Services Amendments of 1994 (P.L. 103-252), Title III, §§302–304(a), 311(c)(1)


Annual Funding $2.16 billion for FY2007

$2.6 billion for FY2008

$5.1 billion for FY2009

$5.1 billion for FY2010

$4.7 billion for FY2011

$3.47 billion for FY2012
Renewable Energy and Energy Efficiency Incentives: A Summary of Federal Programs

$3.29 billion for FY2013
$3.43 billion for FY2014
$3.39 billion for FY2015
$3.37 billion for FY2016
$3.39 billion for FY2017
$3.64 billion for FY2018
$3.65 billion for FY2019
$0 requested for FY2020

Scheduled Termination
None

Description
LIHEAP is a federal program that helps low-income households pay for heating or cooling their homes. In most states, it also helps people make sure their homes are more energy efficient by paying for certain home improvements, known as weatherization.

Funds are allotted to states, tribes, and territories according to a formula prescribed by the LIHEAP statute. State, tribal, and territorial governments manage the day-to-day details of the program, including the award of assistance to eligible applicants.

The LIHEAP statute limits the amount of funds that each grantee (state, tribe, or territory) may spend on weatherization to 15% of the funds available, or up to 25% with a waiver from HHS. However, in cases of floods or natural disasters, work can be done under the crisis part of the grantee's LIHEAP program, thus bypassing the weatherization limits.

Qualified Applicant(s)
State and tribal governments, including U.S. territories

Qualified Technologies
Weatherization technologies include a wide range of energy efficiency measures for retrofitting homes and apartment buildings. Typical measures may include installing insulation; sealing ducts; tuning and repairing broken or inefficient heating and cooling systems and if indicated, replacement of the same; mitigating air infiltration; and reducing electric base load consumption.

For More Information
See CRS Report RL31865, LIHEAP: Program and Funding, by Libby Perl; and the LIHEAP Frequently Asked Questions (FAQ) website.

VIII. Department of Veterans Affairs

1. Energy Efficient Mortgages (EEMs)

Administered by
FHA and VA. Conventional mortgages: Private lenders that sell mortgage loans to Fannie Mae or Freddie Mac may also offer EEMs

Authority
EEMs were initially introduced by lenders in the 1980s. In 1992, three pieces of legislation passed by Congress worked towards standardizing and expanding the use of EEMs. In 1992, Congress established an FHA Energy Efficient Mortgage Pilot Program (P.L. 102-550). The program was later expanded beyond five states to become a national program. The Housing and Economic Recovery Act of 2008 (HERA; P.L. 110-289) increased the maximum amount that can be added to an FHA mortgage for energy efficient improvements. The 111th Congress included incentives to encourage green home improvements in the American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5).

Scheduled Termination
None

Description
Homeowners can take advantage of EEMs to finance a variety of energy efficiency measures, including renewable energy technologies, in a new or existing home. The U.S. federal government directly provides these loans through the FHA and VA lending programs. Fannie Mae and Freddie Mac will also purchase EEMs from primary lenders. Primary lenders may issue EEMs that do not conform to underwriting standards.

Qualified Applicant(s)
The loan is available to anyone who meets the income requirements for FHA’s Section 203 (b) program, provided the applicant can meet the monthly mortgage
payments. New and existing owner-occupied homes of up to two units qualify for this loan. Cooperative units are not eligible. VA: available to qualified military personnel, reservists, and veterans; Conventional: applicants qualifying for a conventional mortgage are also eligible for an energy efficient mortgage.

**Qualified Technologies**

Passive solar space heat; solar water heat; solar space heat; photovoltaics; daylighting; and other technologies not specifically identified

**For More Information**
See the HUD, RESNET, Energy Star, and DSIRE websites.

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**IX. Fannie Mae**

**1. Fannie Mae Green Initiative-Loan Program**

**Administered by**
Fannie Mae

**Authority**
Housing and Urban Development Act of 1968 (P.L. 90-448)

**Scheduled Termination**
None

**Description**
This program provides owners of multifamily properties (rental or cooperative properties with five or more units) with three financing options and tools to make energy- and water-saving property improvements:

- The Green Rewards program provides up to an additional 5% of loan proceeds by including up to 50% of projected energy and water savings in the loan underwriting. Selected property upgrades must be completed within 12 months of loan closing.

- The Green Preservation Plus program provides additional loan proceeds to Multifamily Affordable Housing (MAH) properties by allowing up to an 85% Loan-to-Value (LTV); lower Debt-Service-Credit-Ratio (DSCR) up to five basis points lower than standard rates; and access to property’s equity amount equal to investments in efficiency. Energy- and water-saving improvements must equal at least 5% of the original mortgage loan amount.

- The Green Building Certification Pricing Break provides the 10-basis-point pricing break to any acquisition or refinance loan on a conventional or affordable property that has a current, eligible Green Building Certification.

**Qualified Applicant(s)**
Only multifamily properties are eligible for the program.

**Qualified Technologies**
Clothes washers, dishwashers, dehumidifiers, water heaters, lighting, furnaces, boilers, heat pumps, air conditioners, caulking/weather-stripping, duct/air sealing, building insulation, windows, roofs, comprehensive measures/whole building, custom/others pending approval, insulation, tankless water heaters

**For More Information**
See the Fannie Mae and DSIRE websites.
# Appendix A. Summary of Federal Renewable Energy and Energy Efficiency Incentives/Index of Programs

## Table A-1. Federal Incentives by Agency

<table>
<thead>
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<th>Administering Agency</th>
<th>Program</th>
<th>Description</th>
<th>U.S. Code Citation</th>
<th>FY2019(^a) Appropriations</th>
<th>Expiration Date</th>
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<tbody>
<tr>
<td>Department of Energy</td>
<td>Advanced Manufacturing Office (formerly Industrial Technologies Program)</td>
<td>Develops and supports the commercialization of new energy efficient technologies to improve industrial efficiency while increasing productivity</td>
<td>42 U.S.C. §17111 et seq.</td>
<td>$320 million</td>
<td>None</td>
</tr>
<tr>
<td>Bioenergy Technologies Office (formerly Biomass and Biorefinery Systems R&amp;D Program)</td>
<td></td>
<td>Grants to develop cost-effective technologies and systems to transform domestic biomass resources into biofuels, bioproducts, and biopower</td>
<td>42 U.S.C. §16232</td>
<td>$226 million</td>
<td>None</td>
</tr>
<tr>
<td>Building Technologies Office</td>
<td></td>
<td>Provides financial and technical assistance to improve efficiency of buildings and the equipment, components, and systems within them</td>
<td>42 U.S.C. §17061-17124</td>
<td>$226 million</td>
<td>None</td>
</tr>
<tr>
<td>Conservation Research and Development Grant Program</td>
<td></td>
<td>Grants to finance long-terms R&amp;D efforts in buildings, industrial, vehicles, and hydrogen/fuel cell technologies</td>
<td>42 U.S.C. §5901 et seq.</td>
<td>$188.8 million for FY2018 (est.)</td>
<td>None</td>
</tr>
<tr>
<td>Electricity Delivery and Energy Reliability, Research, Development and Analysis Grant Program</td>
<td></td>
<td>Grants to develop cost-effective technology to enhance the reliability, efficiency, and resiliency of the electric grid</td>
<td>42 U.S.C. §17381 et seq.</td>
<td>$139 million</td>
<td>None</td>
</tr>
<tr>
<td>Administering Agency</td>
<td>Program</td>
<td>Description</td>
<td>U.S. Code Citation</td>
<td>FY2019 Appropriations</td>
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<tr>
<td>Energy Efficiency and Renewable Energy Information Dissemination, Outreach, Training, and Technical Analysis/Assistance Program</td>
<td>Provides financial assistance to stimulate increased usage of energy efficiency/renewable energy technologies and accelerate the adoption of these technologies</td>
<td>See Notes field&lt;sup&gt;b&lt;/sup&gt;</td>
<td>$8.8 million (est.) for FY2018; FY2019 funding data not available</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Federal Energy Management Program</td>
<td>Provides assistance to federal agencies in developing and implementing energy efficiency and renewable energy technologies to meet energy management goals</td>
<td>42 U.S.C. §17131 et seq.</td>
<td>$30 million</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Financial Assistance Program (Office of Science)</td>
<td>Grants support research in the basic sciences and advanced technology concepts and assessments in fields related to energy</td>
<td>42 U.S.C. §13503</td>
<td>$1.1 billion (est.)</td>
<td>None</td>
<td></td>
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<tr>
<td>Geothermal Technologies Office</td>
<td>Partners DOE with industry, academia, and research facilities to develop geothermal energy technologies</td>
<td>42 U.S.C. §16231 et seq. and 42 U.S.C. §17191 et seq.</td>
<td>$84 million</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Hydrogen &amp; Fuel Cell Technologies Office</td>
<td>Partners DOE with industry, academia, and national laboratories to develop hydrogen and fuel cell technologies for the marketplace</td>
<td>42 U.S.C. §16151 et seq.</td>
<td>$120 million</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Inventions and Innovations Program</td>
<td>Provides financial and technical assistance to develop innovative cost-effective ideas and inventions with future commercial value and focuses on energy efficiency and renewable energy technologies</td>
<td>42 U.S.C. §5913</td>
<td>$0</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Loan Guarantee Program</td>
<td>Loan guarantees to encourage commercial use of new or significantly improved technologies that avoid, reduce, or sequester</td>
<td>42 U.S.C. §16511 et seq.</td>
<td>$13 million for the Innovative Technology Loan Guarantee Program (Section 1703)</td>
<td>None for the Section 1703 program. For Section 1705 program,</td>
<td></td>
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<td>Administering Agency</td>
<td>Program</td>
<td>Description</td>
<td>U.S. Code Citation</td>
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<td></td>
<td></td>
<td>air pollutants or greenhouse gas emissions</td>
<td></td>
<td>$0 for the Temporary Loan Guarantee Program (Section 1705)</td>
<td>construction had to begin by 9/30/2011</td>
</tr>
<tr>
<td></td>
<td>Regional Biomass Energy Programs</td>
<td>Provides financial assistance to increase America’s use of fuels, chemicals, materials, and power made from domestic biomass</td>
<td>42 U.S.C. §13317</td>
<td>$0</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Renewable Energy Production Incentive</td>
<td>Provides incentive payments for electricity generated and sold by new qualifying renewable energy facilities</td>
<td>42 U.S.C. §16231 et seq.</td>
<td>FY2019 funding estimates not available</td>
<td>End of FY2026</td>
</tr>
<tr>
<td></td>
<td>Renewable Energy Research and Development Program</td>
<td>Provides financial assistance to conduct R&amp;D efforts in renewable energy technologies</td>
<td>15 U.S.C. §638</td>
<td>$51.3 million for SBIR</td>
<td>End of FY2022</td>
</tr>
<tr>
<td></td>
<td>Small Business Innovation Research/Small Business Technology Transfer Programs</td>
<td>Grants for small businesses to develop and commercialize energy technologies, including energy efficiency and renewable energy technologies</td>
<td>42 U.S.C. §17011 et seq.</td>
<td>$246.5 million</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Solar Energy Technologies Office</td>
<td>Partners with industry, universities, and national laboratories to finance R&amp;D and bring reliable and affordable solar energy technologies to the marketplace</td>
<td>42 U.S.C. §6321 et seq.</td>
<td>$55 million</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>State Energy Program</td>
<td>Provides grants to states to design and implement their own renewable energy and energy efficiency programs</td>
<td>25 U.S.C. §3501 et seq.</td>
<td>$13.2 million</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Tribal Energy Program</td>
<td>Provides financial and technical assistance, education, and training to tribes to evaluate and develop renewable energy sources and energy efficiency measures</td>
<td>42 U.S.C. §17011 et seq.</td>
<td>$344 million</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Vehicle Technologies Office</td>
<td>Partners with industry leaders to develop and deploy advanced transportation technologies to improve vehicle fuel efficiency and domestically produce clean energy</td>
<td>42 U.S.C. §16231 et seq.</td>
<td>FY2019 funding estimates not available</td>
<td>None</td>
</tr>
</tbody>
</table>
## Renewable Energy and Energy Efficiency Incentives: A Summary of Federal Programs

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<tr>
<td>Water Power Technologies Office (formerly Wind and Hydropower Technologies Program)</td>
<td>Partners with industry, states, federal entities, and other stakeholders on R&amp;D projects to improve performance, lower costs, and accelerate deployment of water power technologies</td>
<td>42 U.S.C. §16231 et seq. and 42 U.S.C. §17211 et seq.</td>
<td>$105 million</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Weatherization Assistance Program</td>
<td>Provides financial and technical assistance to states to increase the energy efficiency of low-income households</td>
<td>42 U.S.C. §6861 et seq.</td>
<td>$312 million</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Wind Energy Technologies Office (formerly Wind and Hydropower Technologies Program)</td>
<td>Partners with industry, states, federal entities, and other stakeholders on R&amp;D projects to improve performance, lower costs, and accelerate deployment of wind energy technologies</td>
<td>42 U.S.C. §16231 et seq.</td>
<td>$92 million</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Department of Agriculture</td>
<td>Assistance to High Energy Cost Rural Communities Program</td>
<td>Provides financial assistance to rural communities with high energy costs</td>
<td>7 U.S.C. §918a</td>
<td>$10 million</td>
<td>None</td>
</tr>
<tr>
<td>Bioenergy Program for Advanced Biofuels</td>
<td>Supports and ensures an expanding production of advanced biofuels by providing payments to advanced biofuels producers</td>
<td>7 U.S.C. §8105</td>
<td>Mandatory funding of $7 million annually for FY2019-FY2023 to remain available until expended Discretionary funding of $20 million authorized annually for FY2019-FY2023</td>
<td>Authorized through FY2023</td>
<td></td>
</tr>
<tr>
<td>Biomass Crop Assistance Program (BCAP)</td>
<td>Provides assistance to support the production of eligible biomass crops on land within approved project areas</td>
<td>7 U.S.C. §8111</td>
<td>The FY2018 farm bill authorized no mandatory funding for FY2019-FY2023 Discretionary funding of $25 million authorized annually for FY2019-FY2023</td>
<td>Authorized through FY2023</td>
<td></td>
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<tr>
<td>Administering Agency</td>
<td>Program</td>
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<tr>
<td>Biomass Research and Development Initiative</td>
<td>Provides competitive grants, contracts, or financial assistance for RD&amp;D of technologies and processes for biofuels and biobased products.</td>
<td>7 U.S.C. §8108</td>
<td>Mandatory funding of $3 million for FY2014-2017 to remain available until expended; Mandatory funding not extended by 2018 farm bill Discretionary funding of $20 million authorized annually for FY2019-FY2023 No discretionary funding has been appropriated through FY2019</td>
<td>Authorized through FY2023</td>
<td></td>
</tr>
<tr>
<td>Biorefinery, Renewable Chemical, and Biobased Product Manufacturing Assistance Program</td>
<td>Assists in the development of new technologies for development of biofuels</td>
<td>7 U.S.C. §8103</td>
<td>$50 million in mandatory funding authorized for loan guarantees for FY2019 No discretionary funding has been appropriated through FY2019</td>
<td>Authorized through FY2023</td>
<td></td>
</tr>
<tr>
<td>Community Wood Energy and Wood Innovation Program</td>
<td>Provides grants to states and local governments to develop community wood energy plans or acquire or upgrade community wood energy systems</td>
<td>7 U.S.C. §8113</td>
<td>No discretionary funding has been appropriated through FY2019</td>
<td>Authorized through FY2023</td>
<td></td>
</tr>
<tr>
<td>Rural Energy for America Program</td>
<td>Provides grants and loan guarantees to promote energy efficiency and renewable energy to agricultural producers and rural small businesses</td>
<td>7 U.S.C. §8107</td>
<td>Mandatory CCC funds of $50 million authorized for FY2014 and each fiscal year thereafter $335,000 appropriated for FY2019</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Rural Energy Savings Program</td>
<td>Provides loans to power producing entities to make loans to consumers for durable, cost-effective energy efficiency upgrades or installation of renewable energy or energy storage systems</td>
<td>7 U.S.C. §8107a</td>
<td>$10 million for FY2019</td>
<td>Authorized through FY2023</td>
<td></td>
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<tr>
<td>Administering Agency</td>
<td>Program</td>
<td>Description</td>
<td>U.S. Code Citation</td>
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<td>Sun Grant Program</td>
<td>Sun Grant Program</td>
<td>Provides grants for research projects with the purpose of enhancing biomass energy crop production and increasing the energy efficiency of agricultural operations</td>
<td>7 U.S.C. §8114</td>
<td>$3 million</td>
<td>Authorized through FY2023</td>
</tr>
<tr>
<td>Sustainable Agriculture Research and Education</td>
<td>Sustainable Agriculture Research and Education</td>
<td>Provides grants for research projects with the purpose of enhancing biomass energy crop production and increasing the energy efficiency of agricultural operations</td>
<td>7 U.S.C. §5801 et seq.</td>
<td>$37 million</td>
<td>None</td>
</tr>
<tr>
<td>Department of the Treasury</td>
<td>Business Energy Investment Tax Credit</td>
<td>Provides a tax credit for 30% of total expenditures on eligible systems placed in service, except geothermal systems, microturbines, and combined heat and power systems (10%)</td>
<td>26 U.S.C. §48</td>
<td>N/A</td>
<td>12/31/2019 for large wind systems; 12/31/2021 for geothermal heat pumps, microturbines, CHP systems, hybrid solar lighting, fuel cells, small wind systems; No expiration date for geothermal electric and solar thermal</td>
</tr>
<tr>
<td>Energy-Efficient New Homes Tax Credit for Home Builders</td>
<td>Energy-Efficient New Homes Tax Credit for Home Builders</td>
<td>Provides tax credits of up to $2,000 for builders of new, energy-efficient homes</td>
<td>26 U.S.C. §45L (amended)</td>
<td>N/A</td>
<td>12/31/2017</td>
</tr>
<tr>
<td>Modified Accelerated Cost-Recovery System (MACRS)</td>
<td>Modified Accelerated Cost-Recovery System (MACRS)</td>
<td>Allows businesses to recover investments in certain renewable energy property through depreciation deductions</td>
<td>26 USC §168 26 USC §48</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Renewable Energy Production Tax Credit (PTC)</td>
<td>Renewable Energy Production Tax Credit (PTC)</td>
<td>Provides a per-kilowatt-hour tax credit for electricity generated by qualified renewable energy technologies and sold during the tax year</td>
<td>26 U.S.C. §45 (amended)</td>
<td>N/A</td>
<td>12/31/2019 for wind energy systems; 12/31/2017 for all other systems</td>
</tr>
<tr>
<td>Residential Energy Conservation Subsidy Exclusion (Corporate and Personal)</td>
<td>Residential Energy Conservation Subsidy Exclusion (Corporate and Personal)</td>
<td>Corporate and personal tax exemptions for energy-conservation subsidies are provided by public utilities, either directly or indirectly</td>
<td>26 U.S.C. §136 (amended)</td>
<td>N/A</td>
<td>None</td>
</tr>
<tr>
<td>Residential Energy Efficiency Tax Credit</td>
<td>Residential Energy Efficiency Tax Credit</td>
<td>Provides tax credit to residents/individuals for the installation of qualified energy efficient equipment</td>
<td>26 U.S.C. §25C</td>
<td>N/A</td>
<td>12/31/2017</td>
</tr>
<tr>
<td>Administering Agency</td>
<td>Program</td>
<td>Description</td>
<td>U.S. Code Citation</td>
<td>FY2019 Appropriations</td>
<td>Expiration Date</td>
</tr>
<tr>
<td>----------------------</td>
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</tr>
<tr>
<td>Residential Renewable Energy Tax Credit</td>
<td>Provides a tax credit to residents/individuals for the installation of qualified renewable energy systems to existing homes (primary residence)</td>
<td>26 U.S.C. §25D (amended)</td>
<td>N/A</td>
<td>12/31/2021</td>
<td></td>
</tr>
<tr>
<td>Department of Health and Human Services</td>
<td>Low Income Energy Assistance Program</td>
<td>Provides assistance to help low income households pay for heating and cooling their homes and energy efficiency improvements</td>
<td>42 U.S.C. §8621 et seq.</td>
<td>$3.65 billion</td>
<td>None</td>
</tr>
<tr>
<td>Department of Housing and Urban Development</td>
<td>Energy Efficient Mortgages</td>
<td>Provides backing of loans for energy efficient mortgages to finance the installation of energy efficiency or renewable energy technologies in new or existing homes</td>
<td>12 U.S.C. §1701z-16</td>
<td>N/A</td>
<td>None</td>
</tr>
<tr>
<td>FHA PowerSaver Loan Program</td>
<td>Offers loans backed by FHA to finance energy efficiency and renewable energy upgrades to single-unit homes</td>
<td>See Notes fieldb</td>
<td>N/A</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Department of the Interior</td>
<td>Energy and Mineral Development Program: Minerals and Mining on Indian Lands</td>
<td>Facilitate the inventory, assessment, promotion, and marketing of both renewable and nonrenewable energy and mineral resources on Indian lands</td>
<td>25 U.S.C. §5301</td>
<td>$6 million for FY2016; no data currently available for FY2017-FY2019</td>
<td>None</td>
</tr>
<tr>
<td>Tribal Energy Development Capacity Grant</td>
<td>Grants to Indian tribes to develop and sustain the managerial and technical capacity needed to develop their energy resources and properly account for resulting energy production and revenues</td>
<td>25 U.S.C. §3502</td>
<td>$1.4 million for FY2016; No data currently available for FY2017-FY2019</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Department of Veterans Affairs</td>
<td>Energy Efficient Mortgages</td>
<td>Provides backing of loans for energy efficient mortgages to finance the installation of energy efficiency or renewable energy technologies in new or existing homes</td>
<td>12 U.S.C. §1701z-16</td>
<td>N/A</td>
<td>None</td>
</tr>
<tr>
<td>Administering Agency</td>
<td>Program</td>
<td>Description</td>
<td>U.S. Code Citation</td>
<td>FY2019 Appropriations</td>
<td>Expiration Date</td>
</tr>
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</tr>
<tr>
<td>Fannie Mae</td>
<td>Fannie Mae Green Initiative- Loan Program</td>
<td>Provides owners of multifamily properties (rental or cooperative properties with 5 five or more units) with three financing options and tools to make energy- and water-saving property improvements</td>
<td>12 USC 1716 et. seq.</td>
<td>N/A</td>
<td>None</td>
</tr>
<tr>
<td>Small Business Administration</td>
<td>7(a) Loan Guarantees</td>
<td>Provides guaranteed loans from lenders to small businesses</td>
<td>15 U.S.C. §636(a)</td>
<td>$93.8 million</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>504 Loan Guarantees</td>
<td>Provides long-term fixed rate financing for major fixed assets, such as land, buildings, equipment, and machinery</td>
<td>16 U.S.C. §685</td>
<td>$40.2 million</td>
<td>None</td>
</tr>
</tbody>
</table>

Source: The Congressional Research Service (CRS).

a. FY2019 appropriations data compiled by CRS using executive agency budget justifications, congressional committee reports, and program descriptions from the online edition of the Assistance Listings.

b. Some programs are not specifically identified or codified in the United States Code.
Appendix B. Index of Programs by Applicant Eligibility and Technology Type

Table B-1. Index of Programs by Applicant Eligibility

<table>
<thead>
<tr>
<th>Applicant Eligibility</th>
<th>Program Numbersa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural/Extension/Biofuel Producers</td>
<td>II-2, II-3, II-5, II-7, II-10, III-4</td>
</tr>
<tr>
<td>Alaska Native Corporations</td>
<td>I-14</td>
</tr>
<tr>
<td>Builder/Developer</td>
<td>III-5, III-6</td>
</tr>
<tr>
<td>Cooperative/Collaborative/Consortia</td>
<td>I-15, I-19, II-1, II-4, II-5, II-7, II-8, II-9</td>
</tr>
<tr>
<td>Federal Government</td>
<td>I-4, I-6, I-7, I-12, I-21, II-4, II-10, III-5</td>
</tr>
<tr>
<td>Land Grant Universities (1862 1890, 1994)</td>
<td>II-4, II-9</td>
</tr>
<tr>
<td>Local Government</td>
<td>I-2, I-6, I-7, I-8, I-12, I-13, I-14, I-15, I-16, I-20, I-22, I-23, II-1, II-5, II-6, II-7</td>
</tr>
<tr>
<td>National Laboratories</td>
<td>I-4, I-5, I-6, I-7, I-8, I-12, II-4, II-5, III-4</td>
</tr>
<tr>
<td>Other/Cross-Cutting</td>
<td>I-19, III-8</td>
</tr>
<tr>
<td>Research Organization</td>
<td>I-19, I-20</td>
</tr>
<tr>
<td>Residential/Individual</td>
<td>I-11, I-14, I-19, II-1, II-5, II-10, III-1, III-2, III-3, IV-1, V-1, VI-1, VI-2, IX-1</td>
</tr>
<tr>
<td>Schools</td>
<td>II-7</td>
</tr>
<tr>
<td>Tribal Government</td>
<td>I-6, I-9, I-13, I-14, I-15, I-16, I-17, I-18, I-20, I-22, I-23, II-1, II-5, II-7, IV-1, IV-2, VII-1</td>
</tr>
<tr>
<td>U.S. Territories</td>
<td>I-9, I-17, VII-1</td>
</tr>
<tr>
<td>Utilities</td>
<td>I-15, II-5, II-7, II-8, III-4</td>
</tr>
<tr>
<td>Veterans</td>
<td>VI-1, VIII-1</td>
</tr>
</tbody>
</table>

Source: CRS.

a. Program numbers correspond to agency (Roman numeral) and (Arabic) number assigned to each program as displayed in this report's Table of Contents.
### Table B-2. Index of Programs by Technology Type

<table>
<thead>
<tr>
<th>Qualified Technologies</th>
<th>Program Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Batteries</td>
<td>I-12, I-13</td>
</tr>
<tr>
<td>Air Conditioners</td>
<td>I-9, I-18, III-2, III-5, VI-1, VI-2, VII-1, IX-1</td>
</tr>
<tr>
<td>Alternative Vehicles/Vehicle Technologies</td>
<td>I-4, I-12, III-8</td>
</tr>
<tr>
<td>Anaerobic Digestion</td>
<td>I-16, II-7, III-8</td>
</tr>
<tr>
<td>Batteries (Energy Storage)</td>
<td>I-12, I-13, I-20, II-8</td>
</tr>
<tr>
<td>Biodiesel / Biofuels</td>
<td>I-1, I-12, I-23, II-2, II-4, II-5, II-10, III-8</td>
</tr>
<tr>
<td>Boilers</td>
<td>I-9, I-18, III-2, III-5, VI-1, VI-2, VII-1, IX-1</td>
</tr>
<tr>
<td>Caulking/Weather Stripping</td>
<td>I-9, I-18, III-5, VI-1, VI-2, VII-1, VIII-1, IX-1</td>
</tr>
<tr>
<td>Chillers</td>
<td>I-18, III-5</td>
</tr>
<tr>
<td>Clothes Washers</td>
<td>I-18, IX-1</td>
</tr>
<tr>
<td>Combined Systems/CHP/Energy Management Systems</td>
<td>I-8, I-18, II-7, III-4, III-8</td>
</tr>
<tr>
<td>Comprehensive/Whole Building</td>
<td>I-18, III-5, III-6, IX-1</td>
</tr>
<tr>
<td>Doors</td>
<td>I-18, III-2, III-5, VI-1, VI-2, VIII-1, IX-1</td>
</tr>
<tr>
<td>Duct/Air Sealing</td>
<td>I-9, I-18, III-5, VI-1, VI-2, VII-1, VIII-1, IX-1</td>
</tr>
<tr>
<td>Equipment (Energy Efficient)</td>
<td>I-8</td>
</tr>
<tr>
<td>Fuel Cells</td>
<td>I-4, I-8, I-13, I-16, I-23, II-7, III-3, III-4, III-8</td>
</tr>
<tr>
<td>Furnaces</td>
<td>I-9, I-18, III-2, III-5, VI-1, VI-2, VII-1, VIII-1, IX-1</td>
</tr>
<tr>
<td>Geothermal (All)</td>
<td>I-3, I-16, I-21, II-7, III-4, III-8, VI-1, II-2, VII-1, VIII-1</td>
</tr>
<tr>
<td>—Geothermal (Direct Use)</td>
<td>II-7, III-4, III-8, VI-1, II-2, VIII-1</td>
</tr>
<tr>
<td>—Geothermal (Electric)</td>
<td>I-15, I-18, I-23, II-7, III-4, III-8, VI-1, VI-2, VIII-1</td>
</tr>
<tr>
<td>—Geothermal (Heat Pumps)</td>
<td>I-18, II-7, III-3, III-4, III-8, VI-1, VI-2, VII-1, VIII-1</td>
</tr>
<tr>
<td>Heat Pumps</td>
<td>III-2, III-5, VI-1, VI-2, VIII-1, IX-1</td>
</tr>
<tr>
<td>Hybrid Electric</td>
<td>I-12</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>I-4, I-13, I-16, II-7</td>
</tr>
<tr>
<td>Hydropower (All)</td>
<td>I-6, I-16, I-21, III-7</td>
</tr>
<tr>
<td>—Hydroelectric</td>
<td>I-6, I-18, I-23, II-7, III-7</td>
</tr>
<tr>
<td>—Hydrokinetic</td>
<td>I-6, III-7</td>
</tr>
<tr>
<td>—Ocean</td>
<td>I-6, I-15, I-21, I-23, II-7, III-7</td>
</tr>
<tr>
<td>—Tidal</td>
<td>I-6, I-15, I-23, II-7, III-7</td>
</tr>
<tr>
<td>—Wave</td>
<td>I-6, I-15, I-23, II-7, III-7</td>
</tr>
<tr>
<td>Insulation</td>
<td>I-9, I-18, III-2, III-5, VI-1, VI-2, VII-1, VIII-1, IX-1</td>
</tr>
<tr>
<td>Landfill Gas</td>
<td>I-15, III-7, III-8</td>
</tr>
<tr>
<td>Lighting/Lighting Sensors</td>
<td>I-8, I-18, I-23, III-4, III-5, III-8, VI-1, VIII-1, IX-1</td>
</tr>
</tbody>
</table>
### Qualified Technologies

<table>
<thead>
<tr>
<th>Qualified Technologies</th>
<th>Program Numbers&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing Facilities</td>
<td>I-23</td>
</tr>
<tr>
<td>Microturbines</td>
<td>II-7, III-4</td>
</tr>
<tr>
<td>Municipal Solid Waste</td>
<td>III-7, III-8</td>
</tr>
<tr>
<td>Other Technologies&lt;sup&gt;b&lt;/sup&gt;</td>
<td>I-9, I-11, I-13, I-14, I-17, I-18, I-19, I-20, I-22, I-24, II-1, II-7, II-8, II-10, III-1, IV-1, IV-2, V-1, V-2, VI-1, VI-2, VII-1, VIII-1, IX-1</td>
</tr>
<tr>
<td>Smart/Programmable Thermostats</td>
<td>I-9, I-18, VI-1, VI-2, VII-1, VIII-1, IX-1</td>
</tr>
<tr>
<td>Refrigerators/Freezers</td>
<td>I-18</td>
</tr>
<tr>
<td>Renewable Transportation Fuels</td>
<td>I-23, II-7, III-8</td>
</tr>
<tr>
<td>Roofs</td>
<td>I-18, III-2, III-5,IX-1</td>
</tr>
<tr>
<td>Siding</td>
<td>I-18, III-5</td>
</tr>
<tr>
<td>Smart Grid</td>
<td>I-20</td>
</tr>
<tr>
<td>Solar (All)</td>
<td>I-5, I-8, I-16, I-21, II-7, III-3, III-4, III-8</td>
</tr>
<tr>
<td>— Photovoltaics</td>
<td>I-5, I-8, I-15, I-18, I-23, II-7, III-1, III-3, III-4, III-8, VI-1, VI-2, VIII-1</td>
</tr>
<tr>
<td>— Solar Space Heat</td>
<td>I-18, II-7, III-1, III-3, III-4, III-8, VI-1, VIII-1</td>
</tr>
<tr>
<td>— Solar Water Heat</td>
<td>II-7, III-1, III-3, III-4, III-8, VI-1, VI-2, VIII-1</td>
</tr>
<tr>
<td>Water Heaters</td>
<td>I-18, III-2, III-5, VI-1, VIII-1, IX-1</td>
</tr>
<tr>
<td>Windows</td>
<td>I-8, I-9, I-18, III-2, III-5, VI-1, VI-2, VII-1, VIII-1, IX-1</td>
</tr>
</tbody>
</table>

**Source:** CRS.

a. Program numbers correspond to agency (Roman numeral) and (Arabic) number assigned to each program as displayed in this report’s Table of Contents.

b. Other technologies include: cross-cutting and advanced technologies; other unspecified technologies; and all energy efficiency and/or renewable energy technologies not specifically identified.
Appendix C. Expired Federal Energy Efficiency and Renewable Energy Incentive Programs

1. Alternative Motor Vehicle Tax Credit
   Administered by Internal Revenue Service
   Energy Improvement and Extension Act of 2008 (P.L. 110-343), Division B, Section 205
   American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5), Division B, Sections 1141-1144
   Consolidated Appropriations Act, 2016 (P.L. 114-113), Division Q, Section 193
   Bipartisan Budget Act of 2018 (P.L. 115-123), Division D, Section 40403
   Scheduled Termination Varied by technology type; see Table D-2 in Appendix D.
   Qualified Applicant(s) Taxpayers
   Qualified Technologies Hybrid gasoline-electric; diesel; battery-electric; alternative fuel and fuel cell vehicles; advanced lean-burn technology vehicles; plug-in hybrid electric vehicles
   For More Information See the IRS website for the Alternative Motor Vehicle Credit; IRS News Releases, Fact Sheets and Legal Guidance on Hybrid Vehicles and Alternative Motor Vehicles; and IRS Form 8910, Alternative Motor Vehicle Credit.

2. Assisted Housing Stability and Energy and Green Retrofit Investments Program (Recovery Act Funded)
   Administered by Department of Housing and Urban Development (HUD)
   Authority American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)
   Annual Funding (Project Grants)
   $0 for FY2009
   $235 million for FY2010
   $0 for FY2011
   Scheduled Termination 9/30/2012. All obligations were to be made by September 30, 2010. Receiving property owners were required to spend the funds on the specific improvements within two years of receipt.
   Description Program provided funding for energy and green retrofit investments to certain eligible assisted, affordable multifamily properties. Funding included incentives for participating property owners, a set-aside for administrative functions, and a set-aside for due diligence and underwriting support. Assistance was for specific retrofit purposes.
   Qualified Applicant(s) Residential
   Qualified Technologies Specific technologies not identified

3. Clean Renewable Energy Bonds (CREBs)
   Administered by Internal Revenue Service
   Authority 26 U.S.C. 54 (CREBs or “old CREBs”); 26 U.S.C. 54A and 26 U.S.C. 54C (New CREBs)
   Tax Relief and Health Care Act of 2006 (P.L. 109-432)
Energy Improvement and Extension Act of 2008 (P.L. 110-343)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)
Tax Cuts and Jobs Act of 2017 (P.L. 115-97)

Annual Funding
EPACT originally allocated $800 million of tax credit bonds to be issued between January 1, 2006, and December 31, 2007. Following the enactment of the federal Tax Relief and Health Care Act of 2006, the IRS made an additional $400 million in CREBs financing available for 2008 through Notice 2007-26. In November 2006, the IRS announced that the original $800 million allocation had been reserved for a total of 610 projects. The additional $400 million (plus surrendered volume from the previous allocation) was allocated to 312 projects in February 2008. Of the $1.2 billion total of tax-credit bond volume cap allocated to fund renewable-energy projects, state and local government borrowers were limited to $750 million of the volume cap, with the rest reserved for qualified municipal or cooperative electric companies. The Energy Improvement and Extension Act of 2008 (Div. A, Section107) allocated $800 million for New CREBs. In February 2009, the American Recovery and Reinvestment Act of 2009 (Div. B, Section 1111) allocated an additional $1.6 billion to expand the total New CREBs allocation to $2.4 billion. IRS Notice 2015-12 announced the availability of close to $1.4 billion in remaining volume cap for New CREBs. On March 5, 2015, the IRS opened the rolling volume-cap application window for governmental bodies and cooperative utilities, as well as a closed-end application period for public power providers.

Scheduled Termination
December 31, 2017

Description
CREBs were used to finance renewable energy projects and were issued, theoretically, with a 0% interest rate. The borrower paid back only the principal of the bond and the bondholder received federal tax credits in lieu of the traditional bond interest. P.L. 115-97 permanently repealed several tax credit bonds, including CREBs.

Qualified Applicant(s)
State, local, and tribal governments; municipal utility; rural electric cooperative

Qualified Technologies
Solar thermal electric; photovoltaics; landfill gas; wind; biomass; hydroelectric; geothermal electric; municipal solid waste; hydrokinetic power; anaerobic digestion; tidal energy; wave energy; ocean thermal

For More Information

4. Energy Efficiency and Conservation Block Grants Program (EECBG)

Administered by
EERE

Authority

Annual Funding
$0 for FY2008
$3.2 billion for FY2009 from ARRA
$0 for FY2010-FY2012

Scheduled Termination
This program was authorized through FY2012. An act of Congress is required to reauthorize this program.

Description
This program was part of DOE’s Weather and Intergovernmental Program. The EECBG Program provided formula and competitive grants to empower local communities to make strategic investments to meet the nation’s long-term goals for energy independence and leadership on climate change. Grants could be used for energy efficiency and conservation programs and projects community-wide, as well as renewable energy installations on government buildings.

Qualified Applicant(s)
State, local, and tribal governments, including U.S. territories

Qualified Technologies
Energy efficient equipment and lighting; combined heating and cooling systems; combined heat and power systems; solar; wind; fuel cells; biomass
For More Information See EERE’s Energy Efficiency and Conservation Block Grants Program website; and program number 81.128 at beta.SAM.gov website.

5. Energy Efficiency and Renewable Energy Technology Deployment, Demonstration, and Commercialization Grant Program

Administered by EERE
Energy Independence and Security Act of 2007 (EISA; P.L. 110-140)
American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)
Annual Funding $0 for FY2008
$21.8 million for FY2009
$7.2 million for FY2010. All funds obligated under this program in FY2010 were Recovery Act funds.
$1 million for FY2011
$0 for FY2012-FY2018; all obligations under this program were made with Recovery Act (P.L. 111-5) funds. This program expired on 9/30/2015 and all awarded funds had to be expended by that date.

Scheduled Termination None
Description This program provided financial assistance for the technology deployment, demonstration, and commercialization of energy efficiency and renewable energy technologies. This included biomass, building technologies, federal energy management, geothermal technologies, projects involving hydrogen, fuel cells and infrastructure technologies, industrial technologies, solar energy technologies, vehicle technologies, weatherization and intergovernmental technologies, and wind and hydropower technologies.
Qualified Applicant(s) State governments; profit organizations
Qualified Technologies Biomass; geothermal; hydrogen and fuel cell technologies; solar; hydropower
For More Information See program number 81.129 at the beta.SAM.gov website

6. Energy Efficient Appliance Rebate Program (EEARP)

Administered by EERE
Title I, Part B; American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5)
Annual Funding $0 for FY2008
$298.5 million in FY2009 from ARRA
$0 for FY2010-FY2013

Scheduled Termination This program was authorized through FY2010. An act of Congress is required to reauthorize this program.
Description The program provided financial and technical assistance to states to establish residential Energy Star rated appliance rebate programs. The program’s objectives were to reduce fossil fuel emissions created as a result of activities within the jurisdictions of eligible entities, and to improve energy efficiency in the residential sector.
Qualified Applicant(s) State governments, including U.S. territories and possessions
Qualified Technologies Energy efficient appliances
For More Information See program number 81.127 at the beta.SAM.gov website.
7. Energy Efficient Appliance Tax Credit for Manufacturers

Administered by: Internal Revenue Service

Authority: 26 U.S.C. §45M

- Energy Improvement and Extension Act of 2008 (P.L. 110-343), Division B, Section 305
- Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010 (P.L. 111-312)
- American Taxpayer Relief Act of 2012 (ATRA, P.L. 112-240)

Scheduled Termination: December 31, 2013

Description: A tax credit for each manufacturer was limited to a total of $25 million for 2011, 2012, and 2013 combined.

Qualified Applicant(s): Industrial; appliance manufacturers

Qualified Technologies: Clothes washers; dishwashers; refrigerators

For More Information: See the IRS website for this credit; IRS form 8909.

8. New Era Rural Technology Competitive Grants Program

Administered by: National Institute of Food and Agriculture (NIFA)


- Food, Conservation, and Energy Act of 2008 (P.L. 110-246)
- Agricultural Act of 2014 (P.L. 113-79)

Annual Funding: This program was not funded after FY2011. The program received $875,000 for FY2010 and an estimated $875,000 for FY2011. The Consolidated and Further Continuing Appropriations Act, P.L. 112-55, did not provide funding for the New Era Rural Technology Competitive Grants Program (RTP) in FY2012.

Scheduled Termination: Authorized through FY2013. The program was not funded after FY2011, but NIFA did not archive the program until grant awards had reached their Statutory Time Limit.

Description: This program provided grant funding for approved technology development, applied research, and training to develop an agriculture-based renewable energy workforce. The initiative supported bioenergy, pulp and paper manufacturing, and agriculture-based renewable energy resources.

Qualified Applicant(s): Public or private nonprofit community colleges; advanced technology centers

Qualified Technologies: Biomass; bioenergy

For More Information: See the archived CFDA web page for program number 10.314.

9. Program of Competitive Grants for Worker Training and Placement in High Growth and Emerging Industry Sectors

Administered by: Employment Training Administration

Authority: American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5), Title VIII

Annual Funding: Project Grants:

- $0 for FY2008
- $750 million for FY2009 (ARRA) which remained available through June 30, 2010
- $0 for FY2010-FY2015

Scheduled Termination: The program had no fixed termination date. It was established and funded by the Recovery Act, but the program has not been funded since 2009. It is no longer listed in the online federal Assistance Listings (formerly the Catalog of Federal Domestic Assistance) at the beta.SAM.gov website.
Renewable Energy and Energy Efficiency Incentives: A Summary of Federal Programs

10. Qualified Energy Conservation Bonds

Description
QECBs were used by state, local, and tribal governments to finance certain types of energy projects. QECBs, as tax credit bonds, provided federally subsidized financing to all issuers. The original limit on the volume of energy conservation tax credit bonds to be issued by state and local governments was $800 million. The American Recovery and Reinvestment Act of 2009 expanded the allowable bond volume to $3.2 billion. P.L. 115-97 permanently repealed several tax credit bonds, including QECBs.

Qualified Applicant(s)
State, local, and tribal governments

Qualified Technologies
Solar thermal electric; photovoltaics; landfill gas; wind; biomass; hydroelectric; geothermal electric; municipal solid waste; hydrokinetic power; anaerobic digestion; tidal energy; wave energy; ocean thermal

For More Information

11. Qualifying Advanced Energy Manufacturing Investment Tax Credit

Description
This tax credit was designed to encourage a U.S.-based renewable energy manufacturing sector. Projects receiving awards were eligible for a tax credit of 30% of the qualified investment required for an advanced energy project.

Qualified Applicant(s)
Commercial; industrial; manufacturing

Qualified Technologies
Lighting; lighting controls/sensors; energy conservation technologies: smart grid; solar water heat; solar thermal electric; photovoltaics; wind; geothermal electric; fuel cells; geothermal heat pumps; batteries and energy storage; advanced transmission technologies that support renewable energy generation; renewable fuels; fuel cells using renewable fuels; microturbines

For More Information
See DOE's 48C Manufacturing Tax Credits Fact Sheet; EERE's FAQ web page for 48C Phase II Program; and the IRS's 48C web page.
12. Renewable Energy Grants (1603 Program)

Administered by: U.S. Department of the Treasury
Authority: Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010 (P.L. 111-312), Section 707
American Recovery and Reinvestment Act of 2010 (ARRA; P.L. 111-5) Division B, Sections 1104 and 1603
U.S. Department of Treasury: Grant Program Guidance (amended)

Scheduled Termination: Construction must have begun by December 31, 2011. Applications must have been submitted before October 1, 2012.

Description: The purpose of the 1603 payment was to reimburse eligible applicants for a portion of the cost of installing specified energy property used in a trade or business or for the production of income.

Qualified Applicant(s): Commercial; Industrial; Agricultural

Qualified Technologies: Solar water heat; solar space heat; solar thermal electric; solar thermal process heat; photovoltaics; landfill gas; wind; biomass; hydroelectric; geothermal electric; fuel cells; geothermal heat pumps; municipal solid waste; CHP/cogeneration; solar hybrid lighting; hydrokinetic; anaerobic digestion; tidal energy; wave energy; ocean thermal; microturbines


13. Repowering Assistance Program (RAP)

Administered by: Rural Development (USDA)
Authority: Food, Conservation, and Energy Act of 2008 (P.L. 110-246), Title IX, Section 9004
Agricultural Act of 2014 (P.L. 113-79), Title IX, Section 9004
Agriculture Improvement Act of 2018 (P.L. 115-334)

Annual Funding:
• Mandatory: Under the 2014 farm bill, mandatory funding of $12 million for FY2014 was authorized, to remain available until expended (i.e., no new baseline funding after FY2014). For FY2015, Congress reduced available funds by $8 million through the FY2015 agricultural appropriations act, P.L. 113-235. Under the agricultural appropriations act for FY2013 (P.L. 113-6), Congress directed that funds available for this program be reduced by $28 million. Under the 2008 farm bill (P.L. 113-79) mandatory funding of $35 million for FY2009, was authorized to remain available until expended.
• Discretionary: The 2014 farm bill authorized discretionary funding of $10 million annually to be appropriated for FY2014-FY2018, but no discretionary funding has been appropriated through FY2018.

Discretionary funding of $15 million annually for FY2009-FY2013 was authorized to be appropriated under the 2008 farm bill and the American Taxpayer Relief Act of 2012 (ATRA; P.L. 112-240, §701) extension. Of this amount, $15 million was appropriated in FY2010 through FY2013.

Scheduled Termination: The program had no fixed termination date. It was authorized through FY2018, but then repealed by the 2018 farm bill.

Description: The Repowering Assistance Program (RAP) made payments to eligible biorefineries (those in existence on the June 18, 2008, enactment of the 2008 farm bill) to encourage the use of renewable biomass as a replacement for fossil fuels used to provide heat for processing or power in the operation of these eligible biorefineries. Not more than 5% of the funds were made available to eligible producers with a refining capacity exceeding 150 million gallons of advanced biofuel per year. RAP was repealed by the 2018 farm bill.

Qualified Applicant(s): Eligible biorefineries in existence on or before June 18, 2008.

Qualified Technologies: Renewable biomass
For More Information

See program number 10.866 on the beta.SAM.gov website; the USDA program website; CRS In Focus (IF10288), Overview of Bioenergy Programs in the 2018 Farm Bill, by Kelsi Bracmort; and CRS Report R43416, Energy Provisions in the 2014 Farm Bill: Status and Funding, by Kelsi Bracmort.
### Appendix D. Summary of Expired Federal Renewable Energy and Energy Efficiency Incentives/Index of Programs

**Table D-1. Expired Federal Incentives by Agency**

<table>
<thead>
<tr>
<th>Administering Agency</th>
<th>Program</th>
<th>Description</th>
<th>U.S. Code Citation</th>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department of Agriculture</td>
<td>New Era Rural Technology Competitive Grants Program</td>
<td>Provided grant funding for approved technology development, applied research, and training to develop bioenergy and agriculture-based renewable energy resources</td>
<td>7 U.S.C. §3319e</td>
<td>Authorized through FY2013</td>
</tr>
<tr>
<td>Department of Agriculture</td>
<td>Repowering Assistance Program</td>
<td>Provided financial incentives to biorefineries in existence on June 18, 2008, to replace the use of fossil fuels used to produce heat or power by installing new systems that use renewable biomass or to produce new energy from renewable biomass</td>
<td>7 U.S.C. §8104</td>
<td>Authorized through FY2018</td>
</tr>
<tr>
<td>Department of Energy</td>
<td>Energy Efficiency and Conservation Block Grants Program</td>
<td>Grants to finance energy efficiency and conservation programs/projects in local communities and renewable energy installations on government buildings</td>
<td>42 U.S.C. §17151-17158</td>
<td>Authorized through FY2012²</td>
</tr>
<tr>
<td>Department of Energy</td>
<td>Energy Efficient Appliance Rebate Program</td>
<td>Provided financial and technical assistance to states to establish residential Energy Star rated appliance rebate programs</td>
<td>42 U.S.C. §15821</td>
<td>Authorized through FY2010</td>
</tr>
</tbody>
</table>
## Administering Agency

<table>
<thead>
<tr>
<th>Program</th>
<th>Description</th>
<th>U.S. Code Citation</th>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy Efficient Appliance Tax Credit for Manufacturers</strong></td>
<td>A tax credit for each manufacturer was limited to a total of $25 million for 2011, 2012, and 2013 combined</td>
<td>26 U.S.C. §45M</td>
<td>12/31/2013</td>
</tr>
<tr>
<td><strong>Qualified Energy Conservation Bonds (QECBs)</strong></td>
<td>Bond authority is allocated to state, local, and tribal governments to finance a broad range of energy efficiency and renewable energy projects</td>
<td>26 U.S.C. §54A, §54D, §6431</td>
<td>12/31/2017</td>
</tr>
<tr>
<td><strong>Qualifying Advanced Energy Manufacturing Investment Credit</strong></td>
<td>This tax credit was designed to encourage a U.S.-based renewable energy manufacturing sector</td>
<td>26 U.S.C. §48C</td>
<td>7/23/2013</td>
</tr>
<tr>
<td><strong>Renewable Energy Grants (1603 Program)</strong></td>
<td>The purpose of the 1603 payment was to reimburse eligible applicants for a portion of the cost of installing specified energy property used in a trade or business or for the production of income.</td>
<td>No U.S. Code citation; see P.L. 111-5 (ARRA) §1603(a)</td>
<td>Construction had to begin by 12/31/2011; the last day to submit applications was 10/1/2012</td>
</tr>
<tr>
<td><strong>Alternative Motor Vehicle Credit</strong></td>
<td>Provides tax credit for hybrid and lean-burn vehicles</td>
<td>26 U.S.C. §30B</td>
<td>Varied by technology type: See Table D-2 below</td>
</tr>
<tr>
<td><strong>Assisted Housing Stability and Energy and Green Retrofit Investments Program (Recovery Act Funded)</strong></td>
<td>This program provided funding for energy and green retrofit investments to certain eligible assisted, affordable multifamily properties. Funding included incentives for participating property owners, a set-aside for administrative functions, and a set-aside for due diligence and underwriting support. Assistance was for specific retrofit purposes.</td>
<td>No U.S. Code citation; see P.L. 111-5 (ARRA)</td>
<td>End of FY2012</td>
</tr>
<tr>
<td><strong>Program of Competitive Grants for Worker Training and Placement in High Growth and Emerging Industry Sectors</strong></td>
<td>Intended to preserve and create jobs; promote economic recovery; assist those most impacted by the recession; provide investments; and invest in infrastructure</td>
<td>See Notes field</td>
<td>None</td>
</tr>
</tbody>
</table>

**Source:** CRS.

**Note:** Some programs are not specifically identified or codified in the United States Code.
a. The EECBG program was designed as a part of the Recovery Act (P.L. 111-5), with a one-time appropriation in FY2009. Due to the size of the appropriation, funds were let out over multiple fiscal years. DOE had an evaluation of the EECBG program. For more details, see DOE's evaluation results website.

<table>
<thead>
<tr>
<th>Type of Credit</th>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Cell Motor Vehicle Credit</td>
<td>December 31, 2017</td>
</tr>
<tr>
<td>Qualified Plug-In Electric Drive Motor Vehicle Credit</td>
<td>December 31, 2014</td>
</tr>
<tr>
<td>Qualified Plug-In Electric Motor Vehicle Conversion Credit</td>
<td>December 31, 2011</td>
</tr>
<tr>
<td>Advanced Lean Burn Technology Motor Vehicle Credit</td>
<td>December 31, 2010</td>
</tr>
<tr>
<td>Qualified Alternative Fuel Motor Vehicle Credit</td>
<td>December 31, 2010</td>
</tr>
<tr>
<td>Qualified Hybrid Motor Vehicle Credit</td>
<td>December 31, 2010</td>
</tr>
</tbody>
</table>

Source: U.S. Code and the Internal Revenue Service (IRS).

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