

## ENERGY-WATER APPROPRIATIONS REPORT LANGUAGE, CHARTED

Appropriations Committee Report Language Comparison, FY18 vs. FY19		
Energy & Water Development (E&W)		
<a href="#">FY18 Omnibus Explanatory Statement</a>	<a href="#">FY19 House Report</a>	<a href="#">FY19 Senate Report</a>
<b>ENERGY STAR</b>		
(H2482) Energy Star.  <b>The Department is directed to work with the Environmental Protection Agency to review its 2009 Memorandum of Understanding related to the Energy Star Program and report to the Committees on Appropriations of both Houses of Congress not later than 90 days after the enactment of this Act on whether the expected efficiencies for home appliance products have been achieved.</b>	(p. 82) <i>Energy Star.</i> —  <b>The Committee supports the Department’s ongoing role in the Energy Star program and its current structure. In November 2017, the Environmental Protection Agency (EPA) requested feedback from Energy Star program stakeholders about how to improve the program by developing updated standard operating procedures (SOPs). The Department is directed to support the EPA’s efforts to reexamine Energy Star guidelines and SOPs to ensure transparency, predictability, and consistency for all stakeholders.</b>	(p. 66) <i>Energy Star.</i> —  <b>The Department is encouraged to support the Environmental Protection Agency’s efforts to reexamine Energy Star guidelines and standard operating procedures to ensure transparency, predictability, and consistency for all stakeholders.</b>
<b>Advanced Research Projects Agency-Energy (ARPA-E)</b>		
(H2485) ADVANCED RESEARCH PROJECTS AGENCY-ENERGY The agreement provides \$353,314,000 for the Advanced Research Projects Agency-Energy.	(pp. 101-102) The Advanced Research Projects Agency-Energy (ARPA-E) supports research aimed at rapidly developing energy technologies whose development and commercialization are too risky to attract sufficient private sector investment but are capable of significantly changing the energy sector to address our critical economic and energy security challenges. Projects funded by ARPA-E include such wide-ranging areas as production processes for transportation fuel alternatives that can reduce our dependence on imported oil, heating and cooling technologies with exceptionally high energy efficiency, and improvements in petroleum refining processes.  <b>The Department is directed to disburse funds appropriated for ARPA-E on eligible projects within a reasonable time period, consistent with past practices.</b>	(p. 99) <b>The Committee definitively rejects the short-sighted proposal to terminate ARPA-E, and instead increases investment in this transformational program and directs the Department to continue to spend funds provided on research and development and program direction.</b>  <b>The Department shall not use any appropriated funds to plan or execute the termination of ARPA-E.</b>
<b>Weatherization and Intergovernmental Program</b>		
(H2483) <i>Weatherization and Intergovernmental Programs.</i> —  The Department is directed to make \$500,000 available to current Weatherization Assistance Program grant recipients via the	(p. 87) <i>Weatherization and Intergovernmental Programs.</i> —  <b>The Committee directs the Department to prioritize a timely distribution of Weatherization Assistance Program funds.</b>	(p. 77) WEATHERIZATION AND INTERGOVERNMENTAL PROGRAM  The Committee recommends \$306,000,000 for the Weatherization and Intergovernmental Program. Within this amount, <b>\$251,000,000 is</b>

<p>Weatherization Innovation Pilot Program to develop and implement strategies to treat harmful substances, including vermiculite.</p>	<p>The Committee recognizes that many individuals who would otherwise be eligible for the Weatherization Assistance Program have homes with structural deficiencies which preclude them from participating.</p> <p>The Department is directed to provide to the Committees on Appropriations of both Houses of Congress a briefing on the kinds of information that is collected from grantees and the potential for collecting additional information that discusses the kinds of structural deficiencies that make homes ineligible for the program.</p>	<p><b>recommended for the Weatherization Assistance Program [WAP],</b> including \$248,000,000 for Weatherization Assistance Grants and \$3,000,000 for Training and Technical Assistance; and \$55,000,000 is recommended for State Energy Program grants.</p> <p><b>The Committee recognizes the importance of providing Federal funds under the Weatherization and Intergovernmental Program to States and tribes in a timely manner to avoid any undue delay of services to eligible low-income households, and to encourage local high-impact energy efficiency and renewable energy initiatives and energy emergency preparedness. Therefore, the full amount of the funds recommended for WAP and the State Energy Program shall be obligated to States, tribes, and other direct grantees not later than 60 days after enactment of this act.</b></p> <p>Within available funds, \$500,000 is recommended for current WAP grant recipients via the Weatherization Innovation Pilot Program to develop and implement strategies to treat harmful substances, including vermiculite.</p> <p>The Committee supports WAP's continued participation in the interagency working group on Healthy Homes and Energy with the Department of Housing and Urban Development. The Department is encouraged to further coordinate with the Office of Lead Hazard Control and Healthy Homes on energy-related housing projects. The Committee directs the Department to begin tracking the occurrence of window replacements, which supports the reduction of lead-based paint hazards in homes.</p>
<p><b>Research &amp; Development</b></p>		
<p>(H2481) <b>The Department is expected to spend funds as provided for within this agreement in an expeditious manner, to include the issuance of funding opportunity announcements and awards of funds.</b></p>	<p>(pp. 76-77) <i>Research and Development Policy.</i></p> <p><b>The President's budget request proposes to refocus the Department on an early-stage research and development mission.</b> Early-stage research and development has an appropriate place in a balanced research portfolio.</p> <p><b>However, the Committee believes that a focus on only early-stage activities will forego the nation's scientific capabilities in medium and later-stage research and development and may not fully realize the technological advancements possible under the Department's applied energy activities.</b></p> <p><b>The Committee provides funding to support a more comprehensive approach that includes medium and later-stage research, development, deployment, and demonstration activities. The</b></p>	<p>(p. 62) DIRECTION ON RESEARCH AND DEVELOPMENT ACTIVITIES</p> <p><b>The budget request proposes a shift away from later-stage research and development activities to refocus the Department on an early-stage research and development mission.</b></p> <p><b>The Committee believes that such an approach will not successfully integrate the results of early-stage research and development into the U.S. energy system and thus will not adequately deliver innovative energy technologies, practices, and information to American consumers and companies.</b></p> <p><b>The Committee directs the Department to implement mid- and late-stage research and development activities as directed in this report in a timely manner.</b></p> <p style="text-align: right;">***</p>

<p style="text-align: center; font-size: 48px; opacity: 0.2;">OMNI HOUSE</p>	<p><b>Department is expected to follow this comprehensive approach and expend funding in an expeditious manner</b>, to include the issuance of funding opportunity announcements and awards of funds.</p>	<p>(p. 65) <i>Congressional Direction.</i>—<b>The Committee directs the Department to maintain a diverse portfolio of early-, mid-, and late-stage research, development, and market transformation activities.</b></p> <p>Regular consultation with industry is encouraged to avoid duplication of private-sector efforts.</p> <p><b>The Committee further directs the Department to fully execute the funds appropriated in this act, as directed in this report, in a timely manner</b> and to keep Congress apprised of progress in implementing funded programs, projects, and activities.</p> <p>Further, the Committee directs the Department to give priority to stewarding the assets and optimizing the operations of EERE-designated user facilities across the Department of Energy complex. In future budget requests, the Committee directs EERE to demonstrate a commitment to operations and maintenance of facilities that support the Department’s critical missions.</p> <p style="text-align: center;">***</p> <p>(p. 78) <i>Early-Stage Research, Electricity Sector.</i>—<b>The Committee rejects the budget’s sole focus on early-stage research.</b> Most utilities have limited research and development budgets, primarily due to regulatory constraints designed to keep electricity costs low for consumers. Additionally, utilities are unlikely to implement new concepts because most utilities would need to use their own systems for testing and evaluation, which could impact consumers. State public utility commissions also have limited budgets that do not support research and development. The States rely heavily on the Department’s technical assistance on assessments of data and tools to help them evaluate grid modernization alternatives. <b>The Department plays a vital role, not only in early-stage research, but also in deployment, field testing, and evaluation.</b></p>
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**Energy Programs**

**Building Technologies Office (BTO)**

<p>(H2482-H2483) <i>Building Technologies.</i>—The agreement provides \$23,000,000 for Residential Buildings Integration, \$32,000,000 for Commercial Buildings Integration, \$90,000,000 for Emerging Technologies, and \$50,000,000 for Equipment and Buildings Standards. Within available funds, \$25,000,000 is for transactive controls research and development, of which \$5,000,000 is to continue promoting regional demonstrations of new, utility-led, residential Connected Communities advancing smart grid systems.</p>	<p>(pp. 86-87) <i>Building Technologies.</i>—The Committee encourages the Department to continue work on transactive controls for the integration of buildings, the grid, and renewable energy assets, including photovoltaics, and encourages the continuation of this work.</p> <p>Within available funds, the recommendation includes up to \$25,000,000 for transactive controls research and development, of which \$5,000,000 is to continue promoting regional demonstrations of new, utility-led residential connected communities for advancing smart grid systems;</p>	<p>(pp. 75-77) <i>BUILDING TECHNOLOGIES</i></p> <p>The Committee recommends \$225,000,000 for Building Technologies.</p> <p>Within available funds, the Committee recommends \$39,000,000 for the Commercial Building Integration program for a program of core research and development of more cost-effective integration techniques and technologies that could help the transition toward deep retrofits.</p>
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<p>Within available funds, \$25,000,000 is for solid-state lighting technology development and, if the Secretary finds solid-state lighting technology eligible for the Twenty-First Century Lamp Prize specified under Section 655 of the Energy Independence and Security Act of 2007, \$5,000,000 is provided in addition to funds for solid-state lighting research and development.</p> <p>The agreement also provides \$10,000,000, within available funds, for research and development for energy efficiency efforts related to the direct use of natural gas in residential applications, including gas heat pump heating and water heating, on-site combined heat and power, and natural gas appliance venting.</p>	<p>\$28,000,000 for Commercial Buildings Integration; \$23,000,000 for Residential Buildings Integration; and \$25,000,000 for solid state lighting.</p> <p>If the Secretary finds solid-state lighting technology eligible for the twenty-first century lamp prize, specified under section 655 of the Energy Independence and Security Act of 2007, \$5,000,000 is provided in addition to funds recommended for lighting research and development.</p> <p>Within the Residential Buildings Integration program, the Committee encourages the Department to support industry teams to facilitate research, demonstrate and test new systems, and facilitate widespread deployment through direct engagement with builders, the construction trades, equipment manufacturers, smart grid technology and systems suppliers, integrators, and State and local governments.</p> <p>The Committee appreciates the Department's work in the area of mass composite timber technology and high-performance building insulation and sensor technologies.</p> <p>The Committee notes that natural gas plays an important role in meeting the energy needs of U.S. homes and commercial buildings. The Committee encourages the Department to explore research and development that can advance future natural gas systems and appliances to meet consumer demand for high efficiency and environmentally friendly products.</p> <p>The Committee recommends up to \$20,000,000 for research, development, and market transformation programs on energy efficiency efforts related to the direct use of natural gas in residential applications, including gas heat pump heating and water heating, on-site combined heat and power, and natural gas appliance venting.</p> <p>The Committee urges the Department to recognize the benefits of authorizing homebuilders through State energy codes to access on-site renewable generation prior to exhausting more expensive energy efficiency measures.</p>	<p>In addition, the Committee encourages the Department to increase engagement with private sector stakeholders to develop market-transforming policies and investments in commercial building retrofits.</p> <p>Within available funds, the Committee recommends \$28,000,000 for the Residential Building Integration program. The Committee encourages funding to be concentrated on industry teams to facilitate research, demonstrate and test new systems, and facilitate widespread deployment through direct engagement with builders, the construction trades, equipment manufacturers, smart grid technology and systems suppliers, integrators, and State and local governments.</p> <p>The Committee recommends \$108,000,000 for the Emerging Technologies subprogram. Within available funds, the Committee recommends not less than \$30,000,000 for building-grid integration research and development consistent with a transactive energy system, including development of advanced transactive control methodologies, field validation and testing in existing buildings, continuation of the Building-to-Grid Integration Demonstration, and coordination with the Office of Cybersecurity, Energy Security, and Emergency Response transactive energy systems activities.</p> <p>Within this amount, \$5,000,000 is recommended to continue promoting regional demonstrations of new, utility-led, residential Connected Communities advancing smart grid systems. Further, within available funds for Emerging Technologies, the Committee recommends not less than \$18,000,000 for HVAC &amp; Refrigeration R&amp;D, \$14,000,000 for Building Envelope and \$5,300,000 for Building Energy Modeling.</p> <p>Within available funds for Emerging Technologies, the Committee recommends \$25,000,000 for research, development, demonstration, and commercial application activities related to advanced solid-state lighting technology development.</p> <p>If the Secretary finds solid-state lighting technology eligible for the Twenty-First Century Lamp prize, specified under section 655 of the Energy Independence and Security Act of 2007, \$5,000,000 shall be made available to fund the prize or additional projects for solid-state lighting research and development.</p> <p>Within available funds, the Committee recommends \$10,000,000 for research and development for energy efficiency efforts related to the direct use of natural gas in residential applications, including gas heat pump heating and</p>
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water heating, onsite combined heat and power, natural gas appliance venting, green pilots, and micrometers.

Within available funds, the Committee recommends \$5,000,000 for novel earlier stage research, development, and demonstration of technologies to advance energy efficient, high-rise Cross-Laminated Timber [CLT] building systems. The Committee directs the Department to support university research, in partnership with national labs, for developing, building, and evaluating CLT wall systems for embodied energy content, operating energy efficiency, wall moisture profiles, structural connector durability, and health monitoring sensors.

**The Committee recommends \$50,000,000 for Equipment and Buildings Standards. The Department has missed two deadlines for reports to Congress mandated by section 305 of the Energy Independence and Security Act [EISA] of 2007. These reports are invaluable sources of information for the Committee and other stakeholders about the status of energy conservation standards and the Department's plans to comply with its statutory obligations.** The Department shall submit to the Committees on Appropriations of both Houses of Congress a status report within 30 days after enactment of this act.

**The Committee recommends \$7,000,000 for the Building Energy Codes Program to provide assistance to States and to organizations that develop model codes and standards to improve building resilience as well as efficiency.**

Energy efficiency is a critical component of infrastructure development strategies. The Committee recognizes the importance of the Transformation in Cities initiative for local government planning and directs the Department to continue to support the goals of the initiative.

The Committee is concerned with the Department's recently announced plans to cancel the 2019 Solar Decathlon, pending a reevaluation of the program. The Committee recommends not less than \$5,000,000 for the Solar Decathlon. The annual competition has engaged thousands of university students to apply energy research and development to the practical concerns of housing by balancing design excellence and smart energy production and innovation, energy efficiency, and market potential.

While the Committee understands that commercialization of technology is important, this should not become the sole or even the primary focus of the competition. Therefore, not later than 30 days after the enactment of this act,

		<p>the Department shall brief the Committees on Appropriations of both Houses of Congress on its plans for preserving the Solar Decathlon in its current form, any adjustments to the competition, and plans by the Department to accelerate adoption of suitable energy and water efficient technologies in the marketplace</p>
<b>Advanced Manufacturing Office (AMO)</b>		
<p>(H2482) ENERGY EFFICIENCY</p> <p>Advanced Manufacturing.—The following is the only direction for Advanced Manufacturing.</p> <p>The agreement provides not less than \$4,205,000 for improvements in the steel industry and \$5,000,000 for transient kinetic analysis for scaling of industrial processes and developing new catalysis programs for industrial applications.</p> <p>Within available funds, \$85,000,000 is for Advanced Manufacturing Research and Development Projects; \$153,000,000 is for Advanced Manufacturing Research and Development Facilities, of which \$70,000,000 is for five Clean Energy Manufacturing Innovation (CEMI) Institutes, including \$14,000,000 each for the Advanced Composites Manufacturing Innovation Institute, the Smart Manufacturing Innovation Institute, the Reducing Embodied-energy and Decreasing Emissions (REMADE) Institute, the Rapid Advancement in Process Intensification Deployment (RAPID) Institute, and a CEMI selection to be announced, \$20,000,000 is for the Manufacturing Demonstration Facility (MDF), \$20,000,000 is for the Energy-Water Desalination Hub, and \$25,000,000 is for the Critical Materials Hub; and \$30,000,000 is for Industrial Technical Assistance, of which \$5,000,000 is for the Combined Heat and Power Technical Assistance Partnerships and \$7,000,000 is for related combined heat and power activities.</p> <p>Within funds for the MDF, the Department is directed to continue its emphasis on assisting small- and medium-sized businesses to overcome the risks and challenges of investing in specialized, high-technology equipment at the MDF.</p> <p>Within available funds for Industrial Assessment Centers, the agreement provides not less than \$1,500,000 for wastewater treatment technical assistance.</p>	<p>(pp. 85-86) ENERGY EFFICIENCY</p> <p>The Advanced Manufacturing, Building Technologies, Federal Energy Management, and Weatherization and Intergovernmental programs advance cost-effective solutions to reduce energy consumption through increased efficiency.</p> <p>Research into cutting-edge technologies that enhance manufacturing processes; develop advanced materials; and reduce energy use in buildings, homes, and factories can serve the national interest by greatly reducing our energy needs, while also giving American manufacturers an advantage to compete in the global marketplace.</p> <p>The Committee encourages the Department to plan a workshop to explore ways to improve the adoption rate of energy efficient technologies.</p> <p>Advanced Manufacturing.—Within available funds, the recommendation provides \$80,000,000 for Advanced Manufacturing Research and Development Projects; not less than \$4,205,000 for improvements in the steel industry; \$20,000,000 for process informed science, design, and engineering of materials and devices operating in harsh environments; \$5,000,000 for research into the materials and manufacturing process development of high-strength, light-weight nano-crystalline metal alloys; and \$5,000,000 for process-informed catalyst science to direct chemical reactions in full-scale industrial manufacturing processes and to develop new industrial product applications.</p> <p>The recommendation provides \$56,000,000 for four Clean Energy Manufacturing Innovation (CEMI) Institutes, \$25,000,000 for the Critical Materials Institute, and \$20,000,000 for the Manufacturing Demonstration Facility (MDF) and the Carbon Fiber Test Facility.</p> <p>Within available funds for the MDF, up to \$5,000,000 is for the development of additive systems and automation technologies that have the potential to deposit multiple materials allowing for hybrid material solutions.</p>	<p>(pp. 72-75) ADVANCED MANUFACTURING</p> <p>The Committee recommends \$311,000,000 for Advanced Manufacturing. The Committee recommends \$80,000,000 for Advanced Manufacturing Research and Development Projects. The Committee recommends \$171,000,000 for Advanced Manufacturing Research and Development Facilities.</p> <p>The Committee recommends \$25,000,000 for the Manufacturing Demonstration Facility and the Carbon Fiber Technology Facility for early-stage research in additive manufacturing, carbon fiber and composites development, and manufacturing of multi-material systems to reduce the energy intensity and life-cycle energy consumption of domestic manufactured products, thereby increasing the competitiveness of U.S. manufacturing industries.</p> <p>Within funding for the Manufacturing Demonstration Facility, \$5,000,000 is recommended for the development of additive systems and automation technologies that have the potential to deposit multiple materials allowing for hybrid material solutions that enhance performance in extreme environments and enable precise property profiles.</p> <p>The Committee recognizes the important role large-area additive manufacturing can play in helping to advance the deployment of building, transportation, and clean energy technologies.</p> <p>The Committee directs the Department to further foster the partnership between the National Laboratories, universities, and industry to use bio-based thermoplastics composites, such as micro- and nano-cellulosic materials, and large-area 3-D printing to overcome challenges to the cost and deployment of building, transportation, and energy technologies.</p> <p>In addition, the Committee recommends \$20,000,000 to support the development of additive manufacturing involving nano-cellulosic feedstock materials made from forest products to overcome challenges to the cost and deployment of building, transportation, and energy technologies, and encourages the Department to leverage expertise and capabilities for large-</p>

<p>Within available funds, the agreement provides \$10,000,000 for district heating and directs the Department to collaborate with industry and provide to the Committees on Appropriations of both Houses of Congress not later than 90 days after the enactment of this Act a report that assesses the potential energy efficiency and energy security gains to be realized with district energy systems.</p> <p>The Department is directed to further foster the partnership between the national laboratories, universities, and industry to use thermoplastics composites and 3-D printing for renewable energy to overcome challenges to the development and implementation of innovative offshore wind technologies.</p>	<p>In addition, the Committee supports the Department’s ongoing efforts to work on bio-based composites, bio-derived materials, and nano/microcellulose research.</p> <p>The Committee supports the budget request for Research and Development Consortia to conduct early-stage research and development in high priority areas and also supports early-stage research in materials, process knowledge, and applications of modeling and simulation relevant to energy in manufacturing.</p> <p>The recommendation provides no funding for the Energy-Water Desalination Hub.</p> <p>The Committee notes that drying processes consume approximately 10 percent of the process energy used in the manufacturing sector. The recommendation provides up to \$10,000,000 to support research and development efforts to improve the efficiency of drying processes.</p>	<p>scale additive manufacturing through partnerships between universities and the Manufacturing Demonstration Facility.</p> <p>To ensure grid reliability and resiliency, energy storage at scale must be achieved.</p> <p>Validation of materials for production of energy storage is both slow and expensive, currently taking an average of 18 years from concept to commercialization.</p> <p>For technologies such as batteries, materials innovation is traditionally separate from scale-up and device integration, and this disconnect slows progress.</p> <p>Therefore, within the amounts recommended, the Committee recommends \$20,000,000 for a manufacturing demonstration facility specifically focused on accelerating the processes needed for clean energy materials to go from discovery to scale-up, which will drive manufacturing innovation, lower the cost of battery energy storage, and spur job creation by bringing down the timeline for validation from an average of 18 years to an average of 5 years.</p> <p>The Committee recommends \$25,000,000 for the third year of research and development efforts to lower the cost and energy intensity of technologies to provide clean, safe water through the Energy-Water Desalination Hub. The Committee is concerned that after 2 years of funding for this hub in fiscal years 2017 and 2018, the Department still has not completed the cooperative agreement solicitation and award process to begin work in this important research area. Therefore, upon enactment of this act, the Committee directs the Department to brief the Committees on Appropriations of both Houses of Congress on schedule and milestones for soliciting and evaluating proposals from qualified consortia and awarding a 5-year cooperative agreement.</p> <p>The Committee recommends \$56,000,000 to support four Clean Energy Manufacturing Institutes [CEMIs], including \$14,000,000 each for the Smart Manufacturing Innovation Institute, the Reducing Embodied-energy and Decreasing Emissions [REMADE] Institute, and the Rapid Advancement in Process Intensification Deployment [RAPID] Institute, and a CEMI selection to be announced.</p> <p>The Committee notes the PowerAmerica Next Generation Power Electronics Manufacturing Innovation Institute and the Advanced Composites Manufacturing Innovation Institute have both received \$70,000,000 over the past 5 years to stand up a sustainable effort, and encourages the Department</p>
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to work with one or more national laboratories and universities to build a sustainable plan for these institutes.

The Committee is pleased with the ongoing work of the innovative advanced manufacturing opportunities through the CEMIs, and directs the Department to issue a solicitation and make an award for the sixth CEMI not later than October 1, 2018.

The Committee recommends \$25,000,000 to continue Critical Materials Hub. The Committee notes many municipal recycling facilities where collected recyclables are separated, now use technologies which are aging and inefficient. The Committee directs the Department to conduct a study to determine if the eddy current technology, which is now in use by most facilities, might be upgraded to increase the supply of recycled aluminum and to make recommendations as to how this might be accomplished and report to the Committees on Appropriations of both Houses of Congress within 180 days after enactment of this act.

The Committee recommends \$40,000,000 for the Industrial Technical Assistance program. **Within this amount, the Committee recommends \$12,000,000 to provide ongoing support for the Combined Heat and Power [CHP] Technical Assistance Partnerships [TAPs] and related CHP Technical Partnership activities at the Department, including \$5,000,000 for the TAPs and \$7,000,000 for related CHP activities.**

**The Committee also encourages the Department to prioritize research, development, and demonstration of district energy systems, and work to accelerate greater deployment of district energy systems in communities, campuses, industries, and cities nationwide by supporting adaptive regional and local technology, and market opportunities.**

The Committee encourages the Department to continue its efforts of extending the Industrial Assessment Centers to underserved areas and furthering the geographic reach of the program to regions that are less likely to be adequately serviced because of their distance from the current Centers.

**Therefore, the Committee recommends \$10,000,000 to expand the technical assistance provided by the Industrial Assessment Centers and fund no fewer than two but no more than four additional centers.**

The Committee recognizes the great potential for energy savings in municipal, industrial, and agricultural wastewater treatment systems and encourages the Department to expand on the technical assistance provided by the Industrial Assessment Centers to address these needs.



		<p>Within the funds recommended for the Industrial Assessment Centers, the Committee recommends \$3,000,000 for wastewater treatment technical assistance.</p> <p><b>Within available funds, the Committee recommends \$10,000,000 for district heating. The Committee further directs the Department to collaborate with industry on the potential energy efficiency and energy security gains to be realized with district energy systems.</b></p> <p>The Committee supports research and development on improving foundational materials and processes applicable to aluminum and other primary metal industries. The Committee supports the issuance of a competitive solicitation for university/industry-led teams to improve the efficiency of drying processes, which consume approximately 10 percent of the energy used in the manufacturing sector.</p> <p>The Committee directs the Department to develop a national smart manufacturing plan that will identify areas where the Department can facilitate more rapid development, deployment and adoption of smart manufacturing technologies.</p> <p>The Department shall submit a plan to the Committees on Appropriations of both Houses of Congress not later than 180 days after the enactment of this act.</p>
<b>Federal Energy Management Program (FEMP)</b>		
	<p>(p. 85) ENERGY EFFICIENCY The Advanced Manufacturing, Building Technologies, Federal Energy Management, and Weatherization and Intergovernmental programs advance cost-effective solutions to reduce energy consumption through increased efficiency.</p>	<p>(p. 77) FEDERAL ENERGY MANAGEMENT PROGRAM The Committee recommends \$31,000,000 for the Federal Energy Management Program. The Committee encourages the continued use of the Assisting Federal Facilities with Energy Conservation Technologies grant program to leverage more private sector investment in aging Federal facilities and infrastructure.</p>
<b>Energy-Water Nexus</b>		
	<p>(pp. 81-82) The Committee recognizes the importance of the Department's work on the Energy-Water Nexus and as part of that effort, the Committee encourages the Department to enter into an interdepartmental agreement with the Department of Agriculture for research that explores how to integrate ongoing research projects at the various national laboratories and the Agricultural Research Service to develop effective, deployable, energy- and water-efficient food production platforms, beginning in food-insecure communities across the country. By working together, DOE and the Department of Agriculture can bring respective strengths and resources to designing the most desirable low-cost and efficient production system.</p>	<p>(p. 64) <i>Energy-Water Nexus.</i>— The Committee recognizes water and energy are critical resources that are reciprocally linked. The Energy-Water Nexus crosscut consists of a collaboration of agencies, national laboratories, State and local governments, utilities, industry, and the science community working collectively to address energy and water resource challenges, specifically as they relate to energy security and energy sector water needs.</p>

<b>Grid Modernization</b>		
<p>(H2481) <i>Grid Modernization.</i>—The Department is directed to continue to support ongoing work between the national laboratories, industry, and universities to improve grid reliability and resiliency.</p> <p>The Department is also directed to continue implementation of the Grid Modernization Multi-Year Program Plan.</p> <p>The National Academies of Sciences, Engineering, and Medicine is directed to conduct an evaluation of the expected medium- and long-term evolution of the grid. This evaluation shall focus on developments that include the emergence of new technologies, planning and operating techniques, grid architecture, and business models.</p>	<p>(p. 89) The Department is directed to continue the ongoing work between the national laboratories, industry, and universities to improve grid reliability and resiliency through the strategic goals of the Grid Modernization Initiative.</p> <p>The Committee encourages the Department to include all applied energy programs to ensure broad energy system resilience and modernization. In addition, the Committee supports the strategic goals of the Grid Modernization Laboratory Consortium and supports continued implementation of the Grid Multi-year Program Plan. The plan should include an emphasis on national grid resilience modeling and improved grid cyber resilience.</p> <p>The Committee is supportive of establishing a shared platform for understanding the interconnectedness of the North American grid, but lacks details on cost estimates for these efforts.</p> <p>The Department is directed to provide to the Committees on Appropriations of both Houses of Congress not later than 90 days after the enactment of this Act a report describing the activities and costs necessary to achieve a North American grid model.</p> <p>Within available funds the Department may build upon existing tools and modeling work done at the Department to explore a shared modeling platform across the national laboratories.</p> <p>The Committee supports the Department’s involvement in the grid restoration effort in Puerto Rico and encourages the Department to continue to provide technical assistance as Puerto Rico works to rebuild its energy infrastructure.</p> <p>In addition, the Electricity Delivery program is encouraged to collaborate with EERE to offer assistance in assessing the viability and implementation of a subsea electric cable interconnection and the use of micro grids in order to reduce electricity rates.</p>	<p>(p. 63) Grid Modernization.—The Department is directed to continue the ongoing work between the national laboratories, industry, and universities to improve grid reliability and resiliency through the strategic goals of the Grid Modernization Initiative and encourages the Department to include all applied energy programs to ensure broad energy system resilience and modernization. Further, the Committee supports the Grid Modernization Laboratory Consortium and supports continued implementation of the Grid Multi-Year Program Plan.</p> <p>The Committee directs the Department to emphasize national grid resilience modeling and improved grid cyber resilience to address emerging national resilience challenges of the grid and related energy systems, planned investments in energy storage to improve grid flexibility and resilience, and advanced sensors and control paradigms that promise to improve energy system resilience of the future smart grid.</p> <p>The Committee recognizes that the inaugural projects funded for a 3-year duration will be concluding in fiscal year 2019 and therefore the Department is directed to continue support for the Grid Modernization Initiative and the Grid Modernization Laboratory Consortium and provide a plan to Congress to extend the multi-year program plan to include priorities for field validation of the most successful research outcomes with industry and State stakeholders to accelerate adoption of the key Department results.</p>
<b>Sustainable Transportation – Vehicle Technologies</b>		
<p>(H2482) SUSTAINABLE TRANSPORTATION <i>Vehicle Technologies.</i>— Within available funds, the agreement provides not less than \$160,000,000 for Electric Drive Technologies Research and Development, not less than \$25,000,000 for Energy Efficient Mobility Systems, not less than \$42,988,000 for Advanced Combustion Engine Research and Development, not less than \$25,000,000 for</p>	<p>(pp. 82-83) SUSTAINABLE TRANSPORTATION The Vehicle, Bioenergy, and Hydrogen and Fuel Cell Technologies programs fund activities that can reduce American exposure to future high oil prices.</p>	<p>(pp. 66-67) VEHICLE TECHNOLOGIES The Committee recommends \$337,500,000 for Vehicle Technologies, including \$7,000,000 for operations and maintenance of the National Transportation Research Center. Within this amount, the Committee recommends not less than \$163,200,000 for Battery and Electrification Technologies to lower the cost of batteries across light-, medium- and heavy-duty vehicles through</p>

<p>Materials Technology, not less than \$16,000,000 for Vehicle Systems, and not less than \$10,000,000 to continue funding of Section 131 of the 2007 Energy Independence and Security Act for transportation electrification.</p> <p>The agreement provides \$20,000,000 for the SuperTruck II program to further improve the efficiency of heavy-duty class 8 long- and regional-haul vehicles and continue support of the five SuperTruck II awards.</p> <p>The agreement provides \$46,300,000 for Outreach, Deployment, and Analysis. Within this amount, \$37,800,000 is provided for Deployment through the Clean Cities Program and \$2,500,000 is for year four of EcoCAR3.</p> <p>Within available funds, the agreement provides up to \$15,000,000 for medium- and heavy-duty on-road natural gas engine research and development, including energy efficiency improvements, emission after-treatment technologies, fuel system enhancements, and new engine development and up to \$10,000,000 to continue to support improving the energy efficiency of commercial off-road vehicles, including fluid power systems.</p>	<p>Research into cutting-edge technologies that will increase the fuel economy of gasoline and diesel fuel vehicles—the vast majority of today’s fleet will allow Americans to spend less on fuel while traveling the same distance.</p> <p>Research into next-generation automotive and fuel cell technologies that power vehicles with domestic energy sources such as natural gas, electricity, biofuels, and hydrogen can likewise dramatically lower the impact of future high gas prices on Americans.</p> <p>Vehicle Technologies.—  Within available funds, the recommendation includes \$130,000,000 for Batteries and Electric Drive Technology, of which \$7,000,000 is to enable extreme fast charging and advanced battery analytics; \$25,000,000 for Energy Efficient Mobility Systems; \$25,000,000 for Materials Technology; \$2,500,000 for Advanced Vehicle Competitions; and <b>\$20,000,000 to continue the SuperTruck II program to further improve the efficiency of heavy-duty class 8 long- and regional-haul vehicles.</b></p> <p>The Committee also supports research and development to lower the cost of batteries for electric vehicles through cobalt-free materials and roll-to-roll manufacturing.</p> <p>The Committee directs the Department to continue to support the Clean Cities program, including providing competitive grants to support alternative fuel, infrastructure, and vehicle deployment activities. Within available funds, the recommendation provides \$34,000,000 for Deployment through the Clean Cities Program. When issuing competitive grants in support of these activities, the Department is encouraged to focus on awards that range from \$500,000 to \$1,000,000 each and include at least one Clean Cities coalition partner.</p> <p>The Committee encourages the Department to ensure balance in the award of funds to achieve varied aims in fostering broader adoption of clean vehicles and installation of supporting infrastructure. Within available funds, the recommendation includes up to \$15,000,000 for medium- and heavy-duty on-road natural gas engine research and development, including energy efficiency improvements, emission after-treatment technologies, fuel system enhancements, and new engine development.</p>	<p>battery processing science, advanced battery chemistries, materials research, and modeling and simulation of battery performance.</p> <p>The Committee recommends not less than \$38,100,000 for electric drive research and development including high power density electric drive systems, wireless charging and power electronic for extreme fast charging.</p> <p>The Committee also supports research and development to lower the cost of batteries for electric vehicles through cobalt-free materials and roll-to-roll manufacturing. Funding in this area shall also support research and development to improve electric motor technology through advanced material processing and the use of high-performance computing for multi-physics discovery to understand these new processes.</p> <p>The Committee further recommends \$25,000,000 for Energy Efficient Mobility Systems, including the Systems and Modeling for Accelerated Research in Transportation [SMART] Mobility, Big Data Solutions for Mobility [Big Data], and Advanced Computing for Energy [ACE] initiatives, including HPC4Mobility and HPC-enabled analytics.</p> <p>These investments are critical to expanding U.S. energy security, economic vitality, and quality of life. Therefore, the Committee supports continued funding for research that allows the U.S. to continue its leadership in advancing state-of-the-art transportation infrastructure.</p> <p>The Committee recommends \$43,000,000 for Advanced Engine and Fuel Technologies for research focused on advanced fuel formulations that optimize engine performance. Within this amount, \$24,500,000 is recommended for the Co-Optimization of Engine and Fuels Multi-Laboratory Consortium.</p> <p>The Committee recommends \$60,000,000 for Materials Technology. Within this amount, \$25,000,000 is recommended for early-stage research on multi-material joining and propulsion materials at the national laboratories, and carbon fiber-reinforced composites at the Carbon Fiber Technology Facility.</p> <p>Within available funds, the Committee recommends \$10,000,000 for continued funding of section 131 of the 2007 Energy Independence and Security Act for transportation electrification.  <b>The Committee recommends \$25,000,000 to continue the five awards under the SuperTruck II program and encourages the Department to provide additional early-stage research funding for heavy-duty vehicle technologies as part of the program.</b></p>
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<b>Workforce Development</b>		
		<i>(p. 65) Workforce Development.—</i>

		<p>The development of a skilled workforce is critical to the successful deployment and long-term sustainability of energy efficient and renewable energy technologies. The Committee encourages funding within EERE programs to be allocated to training and workforce development programs that assist and support workers in trades and activities required for the continued growth of the U.S. energy efficiency and clean energy sectors. Furthermore, the Committee encourages the Department to work with 2-year, public community, and technical colleges for job training programs that lead to an industry-recognized credential in the energy workforce.</p>
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