Fiscal Year 2018 Annual Report on Federal Government Energy Management and Conservation Programs

This report on Federal Government energy management for Fiscal Year (FY) 2018[1] provides information on energy consumption in Federal buildings, operations, and vehicles.[2] It summarizes the findings contained in data tables with agency-specific details located online at https://ctsedwweb.ee.doe.gov/Annual/2018/Report.

Federal agencies have a responsibility to meet legal obligations with respect to energy and environment and significant opportunities exist to make more efficient use of energy through improved operations and maintenance, the use of new energy efficient technologies, and the application and achievement of energy efficient design and construction.

During FY 2018, the total primary (source) energy consumption of the Government of the United States, including energy consumed to produce, process, and transport energy, was 1.29 quadrillion British Thermal Units (quads).[3] These 1.29 quads consumed by the Government in buildings and operations to provide essential services to its citizens, including the defense of the Nation, represent approximately 1.3 percent of the total 100.76 quads used in the United States.[4] In total, the Federal Government is the single largest energy consumer in the Nation, although its pattern of consumption is widely dispersed.

The Federal Government spent $16.6 billion in FY 2018 for energy used in more than 350,000 energy-consuming buildings and structures (comprising 3.2 billion square feet) and 600,000 over-the-road vehicles, as well as aircraft, ships, and other equipment.

Site-delivered energy consumption by the Federal Government was 0.90 quads in FY 2018.[5] Federal site-delivered energy use and costs are summarized below by end-use sector:

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[1] Responds to the requirements of section 548 of the National Energy Conservation Policy Act (NECPA), Pub. L. No. 95-619, as amended (42 U.S.C. § 8258)); section 203 of the Energy Policy Act of 2005 (EPACT 2005), Pub. L. No. 109-58 (42 U.S.C. § 15852(d)); section 308 of the Energy Policy Act of 1992 (42 U.S.C. § 13218); and Section 701 of EPACT 2005 (42 U.S.C. § 6374(a)(3)(E)(ii)).

[2] As required by section 548(b) of the National Energy Conservation Policy Act (NECPA), Pub. L. No. 95-619, as amended. See 42 U.S.C. § 8258(b).

[3] Primary or source energy consumption considers all energy resources used to generate and transport electricity and steam and transport natural gas.

[4] U.S. Energy Information Administration, *February 2020 Monthly Energy Review* Table 1.3 https://www.eia.gov/totalenergy/data/monthly/pdf/sec1_7.pdf

[5] Site-delivered energy is used in this report to describe Government and agency performance because it can be unambiguously measured. Unless otherwise noted, this report uses the site-measured conversion factors to convert common units for electricity and steam to British thermal units (Btu).

FY 2018	Trillion Btu	Percentage of Energy	$Billion	Percentage of Costs
Goal-Subject Buildings	317.2	35.4%	$5.5	33.2%
Excluded Facilities[6]	36.9	4.1%	$0.7	4.5%
Vehicles & Equipment	542.7	60.5%	$10.3	62.4%
Total	*896.8*	*100.0%*	*$16.6*	*100.0%*

Federal energy costs increased across all sectors by 6.0 percent compared to the prior year, from $15.7 billion to $16.6 billion. The one-year 6.0 percent increase in energy costs from FY 2017 is attributable mainly to a 12.2 percent increase in the unit price paid for vehicle and equipment fuels which rose from $16.98 to $19.06 per million Btu (in unadjusted, as-spent dollars). Energy use across all end-use sectors declined by 2.0 percent.

The National Energy Conservation Policy Act (NECPA), as amended, required that Federal buildings reduce their FY 2015 energy consumption by 30 percent as compared to FY 2003.[7] The Federal Government decreased energy consumption per gross square foot in FY 2018 by 25.5 percent relative to the FY 2003 baseline from 127,591 Btu per gross square foot (Btu/GSF) to 95,055 Btu/GSF. This is an increase of 1.7 percent compared to FY 2017.

Federal agencies reported purchasing or producing 5,595.8 gigawatt-hours of renewable electric energy in FY 2018, equivalent to 10.2 percent of the Federal Government's FY 2018 electricity use. The FY 2018 requirement was 7.5 percent of electricity use.[8] Of total renewable electric energy 56.0 percent was generated from qualified sources on Federal or Indian land (including 30.1 percent associated with the statutory bonus for sources generated on Federal or Indian land[9]), 35.8 percent was from renewable energy certificate (REC) purchases, and the remainder from agency-owned sources that are not on Federal or Indian land. In terms of total use of Federal goal-eligible renewable electricity, the Department of Defense consumed 31.7 percent of all renewable electricity utilized by Federal agencies, followed by Department of Energy (DOE) with 28.7 percent; Department of Veterans Affairs with 10.1 percent; General Services Administration with 4.3 percent; and NASA with 3.5 percent. In addition, renewable energy from non-hydropower sources supplied by the grid comprised an estimated 7.3 percent of the Federal Government's electricity use in FY 2018.[10]

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[6] The list of buildings excluded from the energy performance requirement of 42 U.S.C. § 8253(a) is available here: http://ctsedwweb.ee.doe.gov/Annual/2017/Report/EnergyGoalExcludedFacilities.aspx.
[7] 42 U.S.C. § 8253(a)(1).
[8] 42 U.S.C. § 15852(a)(3).
[9] 42 U.S.C. § 8253(c).
[10] Estimate of grid-supplied non-hydropower renewable electricity is calculated from agency-reported electricity use by Emissions & Generation Resource Integrated Database (eGRID) regions multiplied by

As reported by the agencies, the Federal Government as a whole used 121.4 billion gallons of water in FY 2018 at a cost of $587.3 million, for an average price of $4.84 per 1,000 gallons. Overall, the Federal Government's water intensity in FY 2018 was 38.4 gallons per gross square foot, a reduction of 27.2 percent from the 52.8 gallons per gross square foot reported in FY 2007.

Substantial opportunities exist for additional investment in efficiency and infrastructure improvement in Federal facilities. More than $8 billion of potential investment in cost-effective energy and water efficiency measures have been identified by agencies in their evaluations of facilities covered under the requirements of section 432 of the Energy Independence and Security Act of 2007.[11] Additionally, $147 billion is the estimated cost to bring Government owned property, plant and equipment to an acceptable condition.[12]

During FY 2018, Federal agencies had three primary options for funding energy efficiency, water conservation, and renewable energy projects in buildings: 1) direct obligations; 2) energy savings performance contracts (ESPCs); and 3) utility energy service contracts (UESCs). Known funding from the three sources totaled approximately $1,845.3 million in FY 2018 (29.6 percent of facility energy costs).

- Direct obligations accounted for approximately $735.1 million.
- ESPC awards by agencies resulted in approximately $996.2 million in project investment in FY 2017.
- Approximately $113.9 million in project investment came from UESCs.

FEMP facilitated interagency exchange of information concerning the conservation and efficient use of energy and water in following keyways in FY 2018:

- Convening Energy Exchange 2018 in Cleveland, Ohio;
- Recognizing recipients of the Federal Energy and Water Management Awards;
- Promoting energy-efficient products and energy-saving technologies.
- Providing on-line and in-person training for both the Federal workforce and other stakeholders.

All Federal agencies, per 42 U.S.C § 8262c, are required to establish and maintain a program to ensure that energy/facility managers are trained, and are required to encourage appropriate employees to participate in available training courses developed internally or by other Federal agencies. In addition, the Federal Buildings Personnel

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eGRID non-hydro renewable generation percentages for each region. eGRID is developed from three key data sources: 1) data reported to EPA by electric generating units to comply with 40 CFR Part 75, 2) EIA-860 data reported to EIA on electric generators, 3) EIA-923 data reported to EIA on fuel consumption and generation.

[11] 42 U.S.C. § 8253(f).

[12] Financial Statements of the United States Government for the Fiscal Years Ended September 30, 2019, and 2018
https://fiscal.treasury.gov/files/reports-statements/financial-report/2019/deferred-maintenance-repairs.pdf

Training Act of 2010[13] requires that all facility and building managers be trained on a comprehensive list of competencies, developed by GSA. The Energy Exchange training event is a 2.5 day workforce development conference which aims to address all these training requirements by providing federal and private personnel working in energy, water, and fleet management with globally accredited technical training. The 2018 Energy Exchange event in Cleveland, Ohio, delivered 17,119 training hours to 2,938 registrants across 120 technical sessions.

The 2018 Federal Energy and Water Management Awards honored 30 individuals and teams across the Federal Government. The winners' exceptional efforts in the Program, Project, and Laboratory/Data Center categories contributed to saving approximately 2.2 trillion Btu of energy, 146.7 million gallons of water, 831.6 thousand gallons of fuel oil, and $48.0 million in energy and water costs in the prior fiscal year. The winners helped offset about 333.6 billion Btu of electricity purchased from the grid through the generation and use of renewable energy. Winners of the Career Exceptional Service category are recognized for long-term efforts of developing and instituting innovative and effective programs and projects that, over their careers, have significantly helped their organizations meet energy and water management goals. Winners in the Contracting category are recognized for their efforts to improve performance contracting processes, implement advanced solutions to overcome performance contract barriers, and award an increased number of performance contracts.

During FY 2018, FEMP updated and published acquisition guidance for energy efficiency in 18 product categories, including 15 ENERGY STAR product categories, and 3 FEMP-designated product categories.

Section 109 of EPACT 2005, "Federal Building Performance Standards," requires that, if life-cycle cost-effective, all new Federal buildings must be designed to achieve energy consumption levels 30 percent below those of the current version of the applicable ASHRAE standard or the International Energy Conservation Code.[14] Overall, agencies reported over 89.6 percent of buildings designed since 2007 are 30 percent more efficient than the relevant code. Agencies also have an opportunity to revisit designs to bring them into compliance.

Section 303 of EPACT 1992 requires that the total number of alternative fuel vehicles (AFVs) acquired by a Federal agency fleet represent at least 75 percent of agency light-duty vehicle (LDV) acquisitions in metropolitan statistical areas (MSAs) each fiscal year.[15] In FY 2018, for the sixteenth consecutive year, the overall Federal fleet exceeded its EPACT AFV acquisition requirement − with 22 of the 31 covered agencies meeting and/or exceeding the requirement.[16] As a result of its AFV acquisitions (including

[13] Pub. L. 111-308, (40 U.S.C. § 581 (note)).
[14] 42 U.S.C. § 6834(a)(3)(A).
[15] 42 U.S.C. § 13212.
[16] https://www.energy.gov/eere/femp/federal-fleet-performance-data contains links to view data further down the webpage, for example: View data on waivered AFVs.

medium- and heavy-duty vehicles and those outside of MSAs) and biodiesel fuel use, the Federal Government, as a whole, earned AFV acquisition credits amounting to 84 percent of the Government's covered vehicle acquisitions.

In order to promote increased alternative fuel consumption by AFVs in the Federal fleet, Section 701 of EPACT 2005 requires Federal agencies to use only alternative fuel in all of its dual fueled AFVs unless the Secretary of Energy grants a waiver due to the unavailability of alternative fuel or if the fuel is unreasonably more expensive than gasoline.[17] In FY 2018, Federal fleets consumed a total of 11.6 million Gasoline Gallons Equivalent (GGE) of alternative fuel. Alternative fuel comprised 3.8 percent of total fuel consumed in covered fleets. Federal fleets consumed 14.0 million gallons (10.3 million GGE) of E85, which is approximately 13 percent of the U.S. Energy Information Administration's reported 2018 U.S. production of ethanol blends greater than 55 percent. These figures equate to using an average of 99 GGE of alternative fuel use per non-waivered dual-fuel AFV.

DOE is taking multiple actions to overcome the barriers limiting use of alternative fuel in the Federal fleet, including improving and streamlining the process to determine which dual-fueled AFVs must use alternative fuel, providing a web-based tool to monitor fuel consumption by dual fueled AFVs, offering another web-based tool for locating alternative fueling stations, assisting agencies to acquire AFVs in locations near alternative fuel, encouraging retail development of additional alternative fueling stations by providing the locations of vehicles receiving waivers, and assisting agencies with the installation of alternative fuel infrastructure. The 11.6 million GGE of alternative fuel consumed by Federal vehicles represents an increase of 138 percent from FY 2005, and an avoidance of petroleum consumption of equal magnitude.

[17] 42 U.S.C. § 6374(a)(3)(E).