

Annual Report on Federal Government Energy Management and Conservation Programs Fiscal Year 2021

This report on Federal Government energy management for Fiscal Year (FY) 2021¹ provides information on energy consumption and greenhouse gas (GHG) emissions in Federal buildings, operations, and vehicles.² It summarizes the findings contained in data tables with agency-specific details located online at <https://ctsedwebweb.ee.doe.gov/Annual/2021/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 2021, the total [primary \(source\) energy consumption of the Government of the United States, including energy consumed to produce, process, and transport energy, was 1.23 quadrillion British Thermal Units \(quads\).](#)³ These 1.23 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 97.0 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 \$15.0 billion in FY 2021 for energy used in approximately 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 0.85 quads in FY 2021, a decrease of 24.8 percent since FY 2003 and 0.3 percent since FY 2020.](#)⁵ This is equivalent to 1.2 percent of the 73.3 quads of end-use energy consumption used in the United States in FY 2021.⁶

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, *October 2022 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).

⁶ U.S. Energy Information Administration, *October 2022 Monthly Energy Review* Table 2.1b

Federal site-delivered energy use and costs are summarized below by [end-use sector](#):

FY 2021	Trillion Btu	Percentage of Energy	\$Billion	Percentage of Costs
Goal-Subject Buildings⁷	307.1	36.1%	\$5.1	34.0%
Excluded Facilities⁸	37.4	4.4%	\$0.7	4.8%
Vehicles & Equipment	507.1	59.5%	\$9.2	61.2%
Total	851.6	100.0%	\$15.0	100.0%

[Federal energy costs decreased across all sectors by 9.1 percent compared to the prior year, from \\$16.5 billion to \\$15.0 billion.](#) The one-year 9.1 percent decrease in energy costs from FY 2020 is attributable largely to a 12.5 percent decrease in the unit price paid for vehicle and equipment fuels which fell from \$20.64 to \$18.06 per million Btu (in unadjusted, as-spent dollars). Energy use across all end-use sectors increased by 0.3 percent.

[Detailed annual comprehensive greenhouse gas \(GHG\) inventories](#) are provided by Federal agencies along with their energy reports demonstrating [historical reductions in scope 1 and 2 GHG emissions](#) from standard operations.⁹ The Federal Government [reduced combined Scope 1 and 2 GHG emissions by 34.8 percent, from 51.4 million metric tons of carbon dioxide equivalent \(MMTCO_{2e}\) in FY 2008 to 33.5 MMTCO_{2e} in FY 2021.](#)

[By scope, direct scope 1 emissions from standard operations declined by 21.5 percent compared to FY 2008 and indirect scope 2 emissions from purchased electricity and thermal energy declined by 41.7 percent.](#) Net GHG emissions from electricity use declined by 13.3 MMTCO_{2e} or 41.5 percent from FY 2008. This reduction is attributable to lower electricity use (2.6 MMTCO_{2e}), grid decarbonization (9.0 MMTCO_{2e}), on-site renewable generation (0.6 MMTCO_{2e}), and the purchase of renewable energy certificates (1.1 MMTCO_{2e}). [By end-use sector, GHG from facility energy use declined by 36.9 percent since FY 2008, from 44.9 MMTCO_{2e} to 28.3 MMTCO_{2e}. Emissions from standard operations mobility energy use declined 19.7 percent to 4.0 MMTCO_{2e} and fugitive emissions declined 24 percent to 1.2 MMTCO_{2e}.](#)

The National Energy Conservation Policy Act (NECPA), as amended, required that Federal buildings reduce their FY 2015 energy consumption by 30 percent as compared

⁷ Buildings subject to the energy performance requirement of 42 U.S.C. § 8253(a)

⁸ 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/2021/Report/EnergyGoalExcludedFacilities.aspx>. The exclusion criteria are here: https://www.energy.gov/sites/default/files/2013/10/f3/exclusion_criteria.pdf.

⁹ Standard operations do not include vehicles, vessels, aircraft, and other equipment used in combat support, combat service support, tactical or relief operations, training for such operations, law enforcement, emergency response, or spaceflight (including associated ground-support equipment). Standard operations also do not include generation of electric power produced and sold commercially to other parties.

to FY 2003.¹⁰ [The Federal Government decreased energy consumption per gross square foot in FY 2021 by 26.6 percent relative to the FY 2003 baseline from 127,623 Btu per gross square foot \(Btu/GSF\) to 93,669 Btu/GSF.](#) This is a decrease of 0.1 percent compared to FY 2020.

Federal agencies reported purchasing or producing [5,256.4 gigawatt-hours of renewable electric energy in FY 2021, equivalent to 10.0 percent of the Federal Government's FY 2021 electricity use.](#) The FY 2021 requirement was 7.5 percent of electricity use.¹¹ Of total renewable electric energy, 50.3 percent was generated from qualified sources on Federal or Indian land (including 28.1 percent associated with the statutory bonus for sources on Federal or Indian land¹²), 40.1 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 36.4 percent of all renewable electricity utilized by Federal agencies, followed by the Department of Energy (DOE) with 18.4 percent; Department of Veterans Affairs with 13.7 percent; General Services Administration (GSA) with 7.5 percent; and U.S. Postal Service with 3.6 percent.

As reported by the agencies, the Federal Government as a whole used [118.9 billion gallons of water in FY 2021 at a cost of \\$572.1 million, for an average price of \\$4.81 per 1,000 gallons.](#) Overall, the Federal Government's water use intensity in FY 2021 was [37.5 gallons per gross square foot, a reduction of 29.0 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 \\$7 billion of potential investment in cost-effective energy and water efficiency measures have been identified by agencies](#) to date in their evaluations of facilities covered under the requirements of section 432 of the Energy Independence and Security Act of 2007.¹³

During FY 2021, Federal agencies had three primary methods 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 \$1,095.8 million in FY 2021 (18.9 percent of facility energy costs).

- Direct obligations accounted for approximately [\\$457.1 million](#) in FY 2021.
- ESPC awards by agencies resulted in approximately [\\$251.1 million](#) in project investment.
- Approximately [\\$387.6 million](#) in project investment came from UESCs.

¹⁰ 42 U.S.C. § 8253(a)(1).

¹¹ 42 U.S.C. § 15852(a)(3).

¹² 42 U.S.C. § 15852(c).

¹³ 42 U.S.C. § 8253(f).

On April 27, 2021, the Federal Energy Management Program (FEMP) issued a Federal Agency Call (FAC) titled Assisting Federal Facilities with Energy Conservation Technologies (AFFECT) 2021. [On November 30, 2021, FEMP selected 17 Federal agency projects to receive a combined total of \\$13 million in AFFECT funding.](#) The selected agencies' projects will address climate change mitigation and adaptation via energy and water efficiency, renewable energy, and operational resilience technologies at critical facilities across the federal government. Through the AFFECT 2021 FAC, selected agencies will use external, leveraged funds to increase their energy resilience, support the deployment of integrated energy systems, and improve the safety, health, and operations of federal facilities. When combined with cost-share from industry, the total investment in energy efficiency, renewable energy, and operational resilience will lead to total investment of over \$737 million.

Section 109 of EPACT 2005, "Federal Building Performance Standards," requires DOE to establish building energy efficiency standards that require, if life-cycle cost-effective, all new Federal buildings be designed to achieve energy consumption levels 30 percent below those of the current version of the applicable American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) standard or the International Energy Conservation Code.¹⁴ [Overall, agencies reported over 71.5 percent of buildings designed since 2007 are 30 percent more efficient than the relevant code.](#) Agencies may also revisit designs to bring them into compliance with the DOE standards.

FEMP facilitated interagency exchange of information concerning the conservation and efficient use of energy and water in the following key ways in FY 2021:

- Convening [Energy Exchange 2021](#);
- Recognizing the recipients of the [Federal Energy and Water Management Awards for their accomplishments in FY 2020](#);
- 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 Training Act of 2010¹⁵ requires that all facility and building managers be trained on a comprehensive list of competencies, developed by GSA. The Energy Exchange virtual training event was a 5-day workforce development conference which aimed 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 2021 Energy Exchange event was held virtually and delivered 12,584 training hours to 1,939 registrants across 49 technical sessions.

¹⁴ 42 U.S.C. § 6834(a)(3)(A).

¹⁵ Pub. L. 111-308, (40 U.S.C. § 581 (note)).

During FY 2021, [FEMP updated and published acquisition guidance for energy and water efficiency in 26 covered product categories, including 8 FEMP-designated product categories and 18 ENERGY STAR product categories](#). In addition, FEMP revised two purchasing guides: [Contracting for Efficiency](#), and [Incorporate Minimum Efficiency Requirements for Heating and Cooling Products into Federal Acquisition Documents](#), and provided direct links to ENERGY STAR product categories that are not high energy consumers in the Federal sector. FEMP also maintained the [Low Standby Power Products List](#) of qualified products that meet low standby requirements for Federal purchase.

Section 303 of EPACT 1992 requires that at least 75 percent of covered Federal agency light-duty vehicle acquisitions by a designated Federal fleet each fiscal year be alternative fuel vehicles (AFVs).^{16, 17} [In FY 2021, 19 of the 28 covered agencies \(68 percent\) met and/or exceeded the EPACT 1992 requirement](#).¹⁸ The Federal Government earned AFV acquisition credits amounting to 62 percent of the Government's covered vehicle acquisitions as a result of its overall AFV acquisitions and biodiesel fuel use (including medium- and heavy-duty vehicles and those outside of MSAs).

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.¹⁹ [In FY 2021, the Federal fleets consumed a total of 6.1 million gasoline gallon equivalents \(GGE\) of alternative fuel, including 5.5 million GGE \(7.6 million gallons\) of E85](#).²⁰ Federal fleet dual-fueled vehicles used alternative fuel 20% of the time that it was available and not unreasonably expensive. [The 6.1 million GGE of alternative fuel consumed by Federal vehicles represents an increase of 24 percent from alternative fuel use in FY 2005](#).

DOE has taken multiple actions to overcome the barriers that limit the 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 web-based tools to monitor fuel consumption by dual fueled AFVs and for locating alternative fueling stations, providing assistance to help agencies acquire AFVs in locations near alternative fueling centers, and assisting them with the installation of alternative fuel infrastructure. DOE is

¹⁶ "Federal fleet" is defined as "20 or more light-duty motor vehicles, located in a metropolitan statistical area [MSA] or consolidated metropolitan statistical area, as established by the Bureau of the Census, with a 1980 population of more than 250,000, that are centrally fueled or capable of being centrally fueled and are owned, operated, leased, or otherwise controlled by or assigned to any Federal executive department, military department, Government corporation, independent establishment, or executive agency, the United States Postal Service, the Congress, the courts of the United States, or the Executive Office of the President." 42 U.S.C. 13212(b)(3).

¹⁷ 42 U.S.C. § 13212 (b).

¹⁸ See <https://www.energy.gov/eere/femp/federal-fleet-performance-data> to view the data.

¹⁹ 42 U.S.C. § 6374(a)(3)(E).

²⁰ See <https://www.energy.gov/eere/femp/articles/federal-fleet-fuel-consumption-data> to view the data.

also supporting industry inquiries by identifying the largest Federal fleet alternative fueling opportunities by ZIP code.