Standards for Federal Buildings

KEY TAKEAWAYS

- The federal government is the largest building owner in the United States, and the president has broad authority over these buildings.
- The Department of Energy should update energy standards for new buildings, and the president should restore other energy requirements.
- An executive order could make the federal government a leader in cutting building greenhouse gas emissions.

INTRODUCTION

The federal government is the single largest building owner and manager in the United States, with a portfolio of more than 350,000 buildings (and thousands more leased) totaling more than 3 billion square feet of floor area, located in every state. These buildings cause more than 30 million metric tons of greenhouse gas (GHG) emissions each year (table 1). After years of improvement, energy intensity (energy use per square foot) and total GHG emissions have barely budged since 2016, and renewable energy use and energy efficiency investments have been slashed.[1]

Table 1. Facility energy use and GHG emissions in 2019 for the largest federal agencies

	Floor area (Msf)	Energy cost (million $)	GHG emissions (MMT)
Defense	1,912	3,473	19.12
Veterans Affairs	205	409	2.56
Postal Service	273	519	2.37
Energy	127	486	2.31
General Services Admin.	204	349	1.34
Government-wide	3,221	6,324	32.89

Msf is million square feet; MMT is million metric tons. Government-wide numbers include many other agencies.
Source: **U.S. Department of Energy.[2]**

Congress has established many energy requirements for federal buildings. Standards for new buildings require them to be 30% more efficient than model energy codes if lifecycle cost effective (the discounted lifetime energy savings are greater than the lifetime costs). Of the 4,077 buildings designed since the law was passed, 86% reportedly have met that standard.[3] Most existing large buildings are required to undergo energy audits and recommissioning every four years and to publicly benchmark their energy use (though compliance is much lower, as discussed below). Federal procurement is required to specify ENERGY STAR® or similarly efficient products. In addition to these and other broad government-wide requirements are requirements on the General Services Administration (GSA), which manages buildings for many agencies, the Department of Defense (DOD), and other agencies; requirements for leased building space; and more-specific provisions, including provisions on data centers and on advanced energy metering.

Other requirements have been abandoned or have never been implemented. Executive Order 13693 (signed by President Obama) included agency building energy intensity, water intensity, and GHG emissions targets, sustainability requirements, and other provisions. However, Executive Order 13834 (signed by President Trump) revoked it and replaced it with much vaguer direction. Earlier statutory energy intensity targets have run out (a fixed renewable energy target remains). And the Department of Energy (DOE) has never issued final regulations to implement a standard that would reduce "fossil fuel-generated energy use" in new buildings and major retrofits, required by Congress in 2007.

CURRENT STATUS

No overall energy intensity or GHG targets are currently in effect, but other requirements remain. DOE (the Federal Energy Management Program in the Office of Energy Efficiency and Renewable Energy) is two code cycles behind in updating the code reference for new buildings, which currently follows ASHRAE Standard 90.1-2013 (and the 2015 International Energy Conservation Code [IECC] for residential buildings). The audit and reporting requirements still apply, but only about one-third of covered buildings are reported to have had audits to date, only one-tenth of metered buildings have been benchmarked, many of the measures recommended by the audits have not implemented, and the largest agency, DOD, has exempted all its buildings from building-level reporting requirements.[4]

DOE released a second draft fossil fuel rule in 2014 but had trouble finding an approach that is both legally defensible and implementable. The requirement also remains controversial, with continued legislative attempts to repeal it.

RECOMMENDATIONS

We recommend the following actions that agencies can take now under current law:

DOE and GSA should update standards for new federal buildings: DOE should update the federal building standard to be 30% better than the current model codes, ASHRAE Standard 90.1-2019 and 2021 IECC. Such levels approach "zero-energy-ready" construction now being promoted by leading utilities.[5] In addition, GSA should update its P100 Facilities Standards for the Public Buildings Service to reflect the latest editions of the model codes, in both the general references and the technical specifications.

The Office of Management and Budget (OMB) should ensure agencies follow current energy efficiency requirements and should develop an exemption process for facilities: Compliance with some requirements appears to be spotty, including procurement, energy audits, and energy benchmarking. OMB should improve compliance using the agencies' sustainability reporting (and DOE's comprehensive data collection). OMB should also require agencies to justify and document exempting individual facilities from specific requirements and should approve or deny those exemptions. DOD should not be able to simply exempt the whole agency.

The president should issue a new sustainability executive order: The president has broad authority over federal facilities (within the constraints of appropriations). The president should issue a new federal sustainability order that requires the following:

- *Targets:* The order should restore agency building energy intensity (2.5% reduction each year), water intensity (2% per year), and GHG (set by agency) targets from Executive

Order 13693. Clean and renewable energy targets and other provisions, including on locational efficiency, should also be restored.

- *Zero-net-energy or zero-net-carbon new buildings:* New federal buildings should be highly efficient and supply enough zero-carbon energy to meet the building's needs, unless found not to be feasible for an individual building.
- *Deep energy retrofits:* Existing federal buildings that receive major renovations should be required to incorporate deep energy and water retrofits to save at least 30–50% of energy use unless not feasible (or reach zero-energy-ready efficiency levels).[6] Efficiency improvements are less expensive if made when other major work is done on the buildings.
- *Alterations:* Alterations to federal buildings should conform to model energy codes (and major rehabilitations should achieve 30% savings compared with the codes). The model codes apply to alterations to private buildings, but the statutory standards apply only to new buildings, likely because the law was passed before the codes included alterations in their scope.
- *Energy-saving measures:* Agencies should implement cost-effective measures identified in the required energy audits. They can use appropriated funds if available, Energy Savings Performance Contracts (ESPCs), or other private financing.

The executive order could also set new targets for ESPCs and other financing; include requirements for smart buildings and energy management systems, grid-interactive buildings, building electrification, and strategic energy management; set sustainability and green certification requirements, including encouraging more-stringent certifications such as Passive House and Living Building Challenge; include requirements for electric vehicle charging infrastructure; and expand provisions for leased buildings and spaces. The order could also include related areas such as climate resilience and zero-emission vehicles and other transportation initiatives.[7]

POTENTIAL SAVINGS

If these measures achieve and extend the former goal of 2.5% energy intensity reduction each year, then after 15 years they could save roughly $2 billion in energy bills and 10 MMT of GHG emissions a year. They could also improve the health and comfort of federal workers and create jobs. But they would be even more important in promoting more widespread adoption among commercial and public buildings of zero-net-energy buildings, deep energy retrofits, and effective building energy management.

CONCLUSION

The federal government should be a model building manager and leading adopter of efficient technologies and practices, showing the way for smaller owners and increasing industry experience implementing innovative technologies and practices. However, in the past few years progress appears to have stalled. The president's authority here is broad, and with greater focus the agencies can restore leadership and demonstrate how the building sector can slash GHG emissions.

LEGAL CITATIONS

	Legal authority	Regulations	Notes
New building standards	42 USC 6834	10 CFR 433–435	
Fossil fuel standard	42 USC 6834(a)(3)(D)	79 FR 61693	See EERE-2010-BT-STD-0031
Energy intensity targets	42 USC 8253(a)		
Energy audits and recommissioning	42 USC 8253(f)		See table notes for guidance
Energy benchmarking	42 USC 8253(f)(8)		

Many additional requirements are described at www4.eere.energy.gov/femp/requirements/. Facility management guidance is at www.energy.gov/eere/femp/eisa-federal-facility-management-and-benchmarking-reporting-requirements. Many former requirements are in Executive Order 13693, and current guidance in Executive Order 13834.

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ENDNOTES

[1] Council on Environmental Quality, Office of Federal Sustainability, "Federal Government-Wide Performance Data" (2020). www.sustainability.gov/government_data.html.

[2] DOE (Department of Energy), "Comprehensive Annual Energy Data and Sustainability Performance, Tables A-3 and E-3" (2020). ctsedwweb.ee.doe.gov/Annual/Report/Report.aspx.

[3] Ibid, table G-7.

[4] DOE, "FEMP EISA 432 Compliance Tracking System" (2020). ctsedwweb.ee.doe.gov/CTSDataAnalysis/ComplianceOverview.aspx. On compliance with procurement requirements, see Anna Scodel and Laurèn DeMates, *From Policy to Compliance: Federal Energy Efficient Product Procurement* (Prepared by the Lawrence Berkeley National Laboratory; Washington, DC: DOE, 2015). www.osti.gov/servlets/purl/1378568.

[5] Steven Nadel, *Programs to Promote Zero-Energy New Homes and Buildings* (Washington, DC: ACEEE, 2020). www.aceee.org/topic-brief/2020/09/programs-promote-zero-energy-new-homes-and-buildings.

[6] The GSA has already undertaken a variety of successful deep retrofit projects. See John Shonder, *Energy Savings from GSA's National Deep Energy Retrofit Program* (Prepared by Oak Ridge National Laboratory; Washington, DC: DOE, 2014). www.gsa.gov/cdnstatic/NDEREnergySavingsReport5.pdf.

[7] Another approach would be to finalize a rule on the fossil fuel standard. However, DOE has had trouble figuring out what "fossil fuel-generated energy" means and how buildings that are retrofitted could meet a stringent standard, among other issues. Thus we have instead proposed to try to achieve the same goals, while avoiding the drafting issues, through an executive order that would require GHG reductions, zero-net-energy new buildings, and deep energy retrofits.