DEPARTMENT OF ENERGY

10 CFR Parts 433 and 435

[EERE-2010-BT-STD-0031]

RIN 1904-AB96

Clean Energy for New Federal Buildings and Major Renovations of Federal Buildings

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Supplemental notice of proposed rulemaking.

SUMMARY: The Department of Energy ("DOE") is publishing a supplemental notice of proposed rulemaking ("SNOPR") to establish revised energy performance standards for the construction of new Federal buildings, including commercial buildings, multi-family high-rise residential buildings, and low-rise residential buildings per the Energy Conservation and Production Act ("ECPA"), as amended by the Energy Independence and Security Act ("EISA") of 2007. This document presents an updated proposal with a new focus that accounts for the needs of Federal agencies and the goals of President Biden's Administration and responds to comments received on prior notice of proposed rulemaking ("NOPR") and SNOPR documents. Consistent with the requirements of ECPA and EISA, this document presents revised Federal building energy performance standards that would require reductions in Federal agencies' on-site use of fossil fuels (which include coal, petroleum, natural gas, oil shales, bitumens, tar sands, and heavy oils) consistent with the targets of ECPA and EISA and provides processes by which agencies can petition DOE for the downward adjustment of said targets for buildings.

DATES: Meeting: DOE will hold a webinar on Thursday, January 5, 2023, from 1:00 p.m. to 4:00 p.m. See section VI, "Public Participation," for webinar registration

information, participant instructions, and information about the capabilities available to webinar participants.

Comments: DOE will accept comments, data, and information regarding this SNOPR no later than [**INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER***]. Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at *www.regulations.gov,* under docket number EERE–2010–BT–STD-0031. Follow the instructions for submitting comments. EERE–2010–BT–STD-0031. Alternatively, interested persons may submit comments, identified by docket number EERE–2010–BT–STD-0031, by any of the following methods:

(1) *Email: FossilFuelReduct-2010-STD-0031@ee.doe.gov.* Include the docket number EERE–2010–BT–STD-0031 in the subject line of the message.

(2) *Postal Mail: M*r. Jeremy Williams, U.S. Department of Energy, Building Technologies Program, Mailstop EE-5B, Fossil Fuel-Generated Energy Consumption Reduction for New Federal Buildings and Major Renovations of Federal Buildings, EERE-2010-BT-STD-0031 and/or RIN 1904-AB96, 1000 Independence Avenue SW., Washington, DC 20585-0121. Telephone: (202) 586-9138. If possible, please submit all items on a compact disc ("CD"), in which case it is not necessary to include printed copies.

(3) *Hand Delivery/Courier:* Mr. Jeremy Williams, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, EE-2J, 1000 Independence Avenue SW., Washington, DC 20585-0121. If possible, please submit all items on a CD, in which case it is not necessary to include printed copies.

No telefacsimiles ("faxes") will be accepted. For detailed instructions on submitting comments and additional information on this process, see section VI of this document.

FOR FURTHER INFORMATION CONTACT:

Mr. Jeremy Williams, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, EE-5B, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. Email: *Jeremy.Williams@ee.doe.gov*.

Mr. Matthew Ring, U.S. Department of Energy, Office of the General Counsel, GC-33, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. Telephone: (202) 586-2555. Email: *Matthew.Ring@hq.doe.gov*.

For further information on how to submit a comment, review other public comments and the docket, or participate in the public meeting, contact the Building Energy Codes Program staff at *BuildingEnergyCodes@ee.doe.gov*.

SUPPLEMENTARY INFORMATION:

DOE proposes to incorporate by reference the following industry standards:

ANSI/ASHRAE/IES 90.1-2019, Energy Standard for Buildings Except Low-Rise Residential Buildings, I-P Edition, copyright 2019 ("ASHRAE 90.1-2019"), into part 433.

ASHRAE 90.1-2019 is available from the American Society of Heating Refrigerating and Air-Conditioning Engineers, Inc., 180 Technology Parkway NW, Peachtree Corners, GA 30092; (404) 636-8400; *www.ashrae.org*.

ICC 2021, Redline Version, Copyright 2021, ("IECC 2021") into part 435.

IECC 2021 is available from the International Energy Conservation Code (IECC), 4051 West Flossmoor Road, Country Club Hills, IL 60478, 1-888-422-7233, or go to *https://www.iccsafe.org/*.

See section V.M of this document for a further discussion of these standards.

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I. Introduction

The following section briefly discusses the statutory authority underlying this proposed rule, as well as some of the relevant historical background related to the establishment of a fossil fuel-generated energy consumption reduction rule for Federal buildings.

A. Authority

Section 305 of the Energy Conservation and Production Act ("ECPA") established energy conservation requirements for Federal buildings. (42 U.S.C. 6834) Section 433(a) of the Energy Independence and Security Act of 2007 (Pub. L. 110-140) (EISA 2007) amended section 305 of ECPA and directed the Department of Energy ("DOE") to establish regulations that require fossil fuel-generated energy consumption reductions for certain new Federal buildings and Federal buildings undergoing major renovations. (42 U.S.C. 6834(a)(3)(D)(i)) The fossil-fuel generated energy consumption reductions only apply to Federal buildings that: (1) are "public buildings" (as defined in 40 U.S.C. 3301)[1] with respect to which the Administrator of General Services is required

[1] Under 40 U.S.C. 3301(a)(5), "public building" is a building, whether for single or multitenant occupancy, and its grounds, approaches, and appurtenances, which is generally suitable for use as office or storage space or both by one or more federal agencies or mixed-ownership Government corporations. "Public building" includes federal office buildings, post offices, customhouses, courthouses, appraisers stores, border inspection facilities, warehouses, record centers, relocation facilities, telecommuting centers, similar federal facilities, and any other buildings or construction projects the inclusion of which the President considers to be justified in the public interest. The definition does not include a building or construction project that is on the public domain (including that reserved for national forests and other purposes); that is on property of the Government in foreign countries; that is on Native American and Native Alaskan property held in trust by the Government; that is on land used in connection with federal programs for agricultural, recreational, and conservation purposes, including research in connection with the programs; that is on or used in connection with river, harbor, flood control, reclamation or power projects, for chemical manufacturing or development projects, or for nuclear production, research, or development projects; that is on or used in connection with housing and residential projects; that is on military installations (including any fort, camp, post, naval training station, airfield, proving ground, military supply depot, military school, or any similar facility of the Department of Defense); that is on installations of the Department of Veterans Affairs used for hospital or domiciliary purposes; or the exclusion of which the President considers to be justified in the public interest.

to transmit a prospectus to Congress under 40 U.S.C. 3307;[2] or (2) those that cost at least $2,500,000 in costs adjusted annually for inflation. (42 U.S.C. 6834(a)(3)(D)(i))

For these buildings, section 305 of ECPA, as amended by EISA 2007, mandates that the buildings be designed so that a building's fossil fuel-generated energy consumption is reduced as compared with such energy consumption by a similar building in fiscal year ("FY") 2003 (as measured by Commercial Buildings Energy Consumption Survey ("CBECS") or Residential Energy Consumption Survey ("RECS") data from the DOE's Energy Information Administration ("EIA") by 55 percent beginning in FY2010, 65 percent beginning in FY2015, 80 percent beginning in FY2020, 90 percent beginning in FY2025, and 100 percent beginning in FY2030, also shown in the Table I.1. (42 U.S.C. 6834(a)(3)(D)(i)(I))

Table I.1. Building Percentage Reduction Requirements by Fiscal Year

Fiscal Year	Percentage Reduction
2010	55
2015	65
2020	80
2025	90
2030	100

In addition, upon petition by an agency subject to the statutory requirements, ECPA, as amended by EISA 2007, permits DOE to adjust the applicable numeric reduction requirement downward with respect to a specific building, if the head of the agency designing the building certifies in writing that meeting such requirement would be technically impracticable in light of the agency's specified functional needs for that

[2] 40 U.S.C. 3307 describes the minimum construction, alteration and lease costs that would trigger a prospectus to Congress.

building and DOE concurs with the agency's conclusion. (42 U.S.C. 6834(a)(3)(D)(i)(II)) Such an adjustment does not apply to the General Services Administration ("GSA"). (*Id.*)

The term "fossil fuel-generated energy consumption" is not defined in section 433 of EISA 2007. In this SNOPR, DOE is proposing to apply the term "fossil fuel-generated energy consumption," for purposes of meeting the reduction targets in EISA section 433, as only energy consumption from on-site fossil fuel used by equipment and systems designed to support building operations (also referred to as Scope 1 uses). In this SNOPR, DOE proposes that these initial standards would not cover certain process loads, manufacturing/industrial activities, unique research activities or back-up emergency generators nor would the standards cover electricity or other purchased utility consumption supplied from the grid and generated using fossil fuels off-site. However, DOE may re-examine the scope of this term and coverage in future updates of these standards.

B. Background

This SNOPR proposes to amend certain portions of 10 CFR parts 433 and 435, the regulations governing energy efficiency in Federal buildings. DOE previously published a notice of proposed rulemaking ("NOPR") in the *Federal Register* on October 15, 2010, which outlined a proposal to implement section 433 of EISA. 75 FR 63404. A public meeting on the NOPR was held on November 12, 2010, and public comments were accepted through December 14, 2010. DOE received a number of comments expressing concern and encouraging DOE to re-examine the proposed regulations.[3] In response to these comments, DOE identified additional areas for clarification and consideration that would benefit from further public comment. DOE issued a

[3] Complete contents of the docket folder may be found at *www.regulations.gov/#!docketDetail;D=EERE-2010-BT-STD-0031*.

supplemental notice of proposed rulemaking (2014 SNOPR) on October 14, 2014. 79 FR 61694. Comments were accepted through December 15, 2014.[4] To ensure alignment with the decarbonization goals of the Biden Administration, DOE is revising its proposal and issuing a second SNOPR. This revised SNOPR will take into consideration previous relevant comments from the 2014 SNOPR as well as considerations of Administration objectives to reduce emissions across federal operations, as appropriate.

In this second SNOPR, DOE makes a number of changes from the 2014 SNOPR that would apply to both 10 CFR part 433 and 10 CFR part 435 unless otherwise noted. Details of these changes with a discussion of each are described in section III of this document. This second SNOPR:

- Converts the proposed rule from a kBtu per ft2 accounting of total fossil fuel use (including both on-site fossil fuel use and the embedded fossil fuels in on-site electricity use) to use kBtu per ft2 of on-site fossil fuel usage or Scope 1 GHG emissions in CO2e ("Carbon Dioxide Equivalent Gases") per ft2.
- Implements a shift multiplier for Federal buildings that operate on extended schedules compared to the private sector buildings sampled in CBECS. This multiplier will apply solely to Federal commercial buildings regulated in 10 CFR part 433 as residential buildings of all types in both the private sector and Federal sector are assumed to be operated 24 hours a day.
- Revises the calculation of fossil fuel usage for the proposed design to make it consistent with how DOE tracks fossil fuel usage and greenhouse gas emissions in reporting related to EISA 2007 section 432.
- Clarifies applicability of the rule to EISA-subject major renovations in three categories—renovations of all Scope 1 fossil fuel-using systems, Scope 1 fossil

[4] *Id*.

fuel-using system level renovations, and Scope 1 fossil fuel-using component level renovations.

- Clarifies applicability of the rule to leased facilities, noting that the only leases subject to this proposed rule are new leases for buildings built specifically for the purpose of being leased to the Federal government.
- Clarifies an approach to determine required fossil fuel-generated energy consumption levels for EISA-subject major renovations that are limited to system or component level retrofits.
- Clarifies an alternative compliance method for buildings with process loads that are not included in CBECS and RECS.
- Clarifies that process loads of building types not included in CBECS are not subject to the fossil fuel reductions, including, for example, process loads associated with the charging of electric vehicles and the fueling of natural gas fueled vehicles.
- Clarifies that renewable fossil fuels such as biomethane and biopropane qualify as exemptions from the calculation of fossil fuel usage.
- Clarifies the definition of Scope 1 fossil fuel-generated energy consumption as the metric being used for this rule (only including consumption for on-site fossil fuel use, not embedded fossil fuels in on-site electricity use).
- Clarifies the definition of technical impracticability for purposes of the petition process.
- Modifies definitions of major renovations to reflect focus on Scope 1 fossil fuel-generated energy consumption and fossil fuel-using systems as opposed to the whole building fossil-fuel generated energy consumption and all building systems.

Over the past few years, DOE has addressed energy efficiency requirements for Federal buildings as mandated in ECPA. DOE published a final rule updating Federal building energy efficiency standards for commercial or multi-family high-rise residential buildings to ASHRAE Standard 90.1-2019 on April 7, 2022. 87 FR 20293. DOE also published a final rule updating Federal building energy efficiency standards for low-rise residential buildings to the 2021 International Energy Conservation Code ("IECC") on April 5, 2022. 87 FR 19613. Prior to that, DOE published a final rule updating the Federal building energy efficiency standards for low-rise residential buildings to the 2015 IECC on January 10, 2017 (82 FR 2857), and a final rule updating Federal building energy efficiency standards for commercial and multi-family high-rise residential buildings to ASHRAE Standard 90.1-2013 on November 6, 2015. 80 FR 65749. DOE also published a final rule regarding green building certification systems for Federal buildings that applied to Federal commercial or multi-family high-rise residential buildings and low-rise residential buildings on October 14, 2014. 79 FR 61563.

C. Coverage of the Regulation

This SNOPR applies to a defined subset of new Federal buildings and major renovations to Federal buildings, as specified in section 433 of EISA 2007. (*See* 42 U.S.C. 6834(a)(3)(D)(i)) The term "Federal building" means any building to be constructed by, or for the use of, any Federal agency, including buildings built for the purpose of being leased by a Federal agency, and privatized military housing. (42 U.S.C. 6832(6)).

The subset of Federal buildings for which this rule will apply fall under two categories and will be referred collectively to as "EISA-subject buildings." The first qualifying category of EISA-subject buildings includes any new Federal buildings or

major renovations to Federal buildings that are public buildings, as defined in 40 U.S.C. 3301,[5] for which transmittal of a prospectus to Congress is required under 40 U.S.C. 3307. Under 40 U.S.C. 3307(a)(1), a transmittal of a prospectus to Congress is required if a total expenditure in excess of $1,500,000 is required to construct, alter, or acquire the public building.[6] Under 40 U.S.C. 3307(h), the GSA Administrator may adjust this value annually to account for construction cost increases. GSA's annual prospectus threshold for FY 2022 is $3,375,000.[7] GSA also provides a separate dollar threshold for alterations in leased public buildings for which a prospectus is required. In FY 2022, the cost threshold for alterations in leased buildings for public purposes is $1,687,500.

The second qualifying category of EISA-subject buildings covers any new Federal buildings or major renovations to Federal buildings that are not public buildings and for which the construction cost or major renovation cost is at least $2,500,000 (in 2007 dollars, adjusted for inflation). Agencies can calculate what that adjusted cost threshold would be currently by visiting (*https://data.bls.gov/cgi-bin/cpicalc.pl*). As

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[5] Under 40 U.S.C. 3301(a)(5), "public building" is a building, whether for single or multitenant occupancy, and its grounds, approaches, and appurtenances, which is generally suitable for use as office or storage space or both by one or more federal agencies or mixed-ownership Government corporations. "Public building" includes federal office buildings, post offices, customhouses, courthouses, appraisers stores, border inspection facilities, warehouses, record centers, relocation facilities, telecommuting centers, similar federal facilities, and any other buildings or construction projects the inclusion of which the President considers to be justified in the public interest. The definition does not include a building or construction project that is on the public domain (including that reserved for national forests and other purposes); that is on property of the Government in foreign countries; that is on Native American and native Alaskan property held in trust by the Government; that is on land used in connection with federal programs for agricultural, recreational, and conservation purposes, including research in connection with the programs; that is on or used in connection with river, harbor, flood control, reclamation or power projects, for chemical manufacturing or development projects, or for nuclear production, research, or development projects; that is on or used in connection with housing and residential projects; that is on military installations (including any fort, camp, post, naval training station, airfield, proving ground, military supply depot, military school, or any similar facility of the Department of Defense); that is on installations of the Department of Veterans Affairs used for hospital or domiciliary purposes; or the exclusion of which the President considers to be justified in the public interest.

[6] 40 U.S.C. 3307(a) also contains a second prospectus threshold in 40 U.S.C. 3307(a)(3) which applies to alterations of buildings which are under lease by the Federal Government for use for a public purpose if the cost of the alteration will exceed $750,000. This threshold is one-half of the threshold for all other new construction or alterations of existing buildings.

[7] *See* GSA Annual Prospectus Thresholds at *www.gsa.gov/real-estate/design-construction/gsa-annual-prospectus-thresholds*.

noted previously, GSA also provides a separate dollar threshold for alterations in leased public buildings ($1,687,500 in FY2022). DOE will use both of these thresholds (i.e., the $2,500,000 in FY 2007 dollars, and the $1,687,500 in FY2022, each adjusted for inflation) for this second category of EISA-subject buildings (i.e., buildings for which a prospectus is not required). With respect to the threshold for alterations in leased buildings, while section 433 of EISA prescribes a $2,500,000 (in 2007 dollars) threshold for major renovations for which a prospectus is not required, DOE proposes to use the lower GSA prospectus threshold for alterations in leased buildings for this second category of EISA-subject buildings because it is consistent with: (1) current agency practice for such buildings, and (2) the scheme Congress established in EISA section 433 where the prospectus dollar thresholds (*e.g.,* $2,500,000 in 2007 dollars) are nonetheless applied to buildings and renovations for which a prospectus is not required.

For example, a building in the first category would include a federal office building for which design for construction began in FY 2022 and with construction or renovation costs that are more than $3,375,000. A building in the second category would include a residential building (which is excluded from the definition of "public building" under 40 U.S.C. 3301) with construction or renovation costs of at least $3,375,000 in FY22 ($2,500,000 (in 2007 dollars, adjusted for inflation)). DOE expects that the majority of low-rise residential buildings that meet the cost threshold will be low-rise multi-family buildings or low-rise dormitories as Federal low-rise single-family homes are not likely to meet the cost threshold.

When identifying major renovation projects within an EISA-subject building which could be subject to this regulation because of the cost thresholds, agencies should consider any energy conservation measures ("ECMs") which have been identified in that

building and reported to DOE, as per 42 U.S.C. 8253(f)(3)(A). If identified ECMs include projects which would impact on-site fossil fuel usage, the agency should consider the total of those project costs bundled together when implementing those ECMs to determine whether the total cost triggers EISA compliance. ECMs that impact on-site fossil fuel usage may include, for example: adding new fossil fuel-using heating, hot water, or cooking systems to an existing building; direct replacement of existing fossil fuel-using heating, hot water, or cooking systems in an existing building; and modification or replacement of any building systems (including systems such as lighting or building envelope systems that do not use fossil fuel directly) that lead to an increase or decrease in fossil fuel use). Such an approach would address a situation where individual pieces of on-site fossil fuel consuming technology are replaced with similar technologies in a piecemeal approach instead of a more strategic and comprehensive way that furthers the goals of EISA along with the Administration's priorities to reduce Federal agencies' reliance on fossil fuels and reduce on-site Federal building emissions.

II. Discussion of Proposed Standards

A. Performance Standards for Fossil Fuel-Generated Energy Consumption

To provide flexibility while adhering to the statutory origins of the rule, DOE is proposing to keep the performance standards for fossil fuel-generated energy consumption metric from the 2014 SNOPR (expressed in kBtu per ft^2 of building gross area) while also providing an equivalent conversion of the energy metric measured in greenhouse gas (GHG) metrics. As mentioned earlier, DOE has chosen to focus on on-site fossil fuels or Scope 1 emissions, at least initially. This is a shift from the proposed scope of the 2014 SNOPR, which also included consideration of off-site fossil fuel consumption. DOE determined to focus this rule on onsite fossil fuel use in light of recent Federal building initiatives and efforts to address fossil fuel use and emissions generated

off-site (*e.g.*, Executive Order 14057). DOE may address emissions generated off-site (*i.e.*, Scope 2 emissions) at a later time.

This SNOPR provides agencies with two separate but equivalent sets of fossil fuel generated energy consumption targets – (1) fossil fuel-generated energy consumption based on a summation of on-site fossil fuel usage expressed in kBtu per ft2 of building gross area and (2) a new carbon dioxide equivalent ("CO2e") per ft2 metric based on the emissions associated with the on-site fossil fuel-generated energy consumption. Both metrics are based directly on the reported usage of fossil fuels in CBECS and RECS, with the fossil fuel-generated energy consumption metric simply adding up the fossil fuel usage and converting it to kBtu and the CO2e metric converting the amount of each fuel used to CO2e.

Agencies will be allowed to use either metric for their design targets. DOE opted to include the GHG metric, which will measure Scope 1 emissions, because agencies are already required to track and report their GHG emissions annually utilizing the "Federal Greenhouse Gas Accounting and Reporting Guidance" (Council on Environmental Quality ("CEQ"), January 17, 2016). DOE is proposing to align the quantifications and terminologies with those established in the Federal Greenhouse Gas Accounting and Reporting Guidance, which categorizes Scope 1 emissions into "Generation of electricity, heat, cooling, or steam", "Mobile sources", "Fugitive emissions", and "Process emissions". As mentioned earlier, at this time, DOE is proposing that the scope of this rule to be focused only on the on-site fossil fuel associated with the "Generation of electricity, heat, cooling, or steam".

DOE is proposing two exceptions to the scope of coverage of the standards in this SNOPR which differ from how emissions are instructed to be tracked by the Federal

Greenhouse Gas Accounting and Reporting Guidance. First, DOE is proposing to exclude on-site fossil fuel energy generation or Scope 1 emissions associated with emergency backup generation of electricity from the scope of this rule. The Federal Greenhouse Gas Accounting and Reporting Guidance for the category of Scope 1 emissions from "generation of electricity, heat, cooling, or steam" requires tracking and reporting for emergency generators. However, DOE intends for agencies to include all on-site fossil fuel use or Scope 1 emissions associated with non-emergency generation from backup generators (such as those for peak shaving or peak shifting) in the scope of this rule. DOE may revisit the issue of whether to include these on-site fossil fuel uses in the future. DOE also notes that if agencies use their backup generators for both purposes, they will be required to calculate what fraction of their backup generator Scope 1 emissions is associated with emergency use and what fraction is associated with non-emergency use.

Second, DOE proposes to exclude any energy generation or Scope 1 emissions associated with biomass fuels from this rule, as they are not fossil fuel based and thus fall outside the coverage of this rule. DOE acknowledges that CEQ's guidance is different on biomass but is complimentary to provide additional coverage outside the fossil fuel scope mandated by statute for this proposed rulemaking. The Federal Greenhouse Gas Accounting and Reporting Guidance, unlike this rule, is not limited to fossil fuel-based emissions, and states that Scope 1 emissions include "emissions from biomass combusted for production of electricity, heat, cooling, or steam". However, because EISA 2007 directed DOE to establish regulations that require fossil fuel-generated energy consumption reductions, and biomass is not a fossil fuel, DOE has intentionally left biomass out of the CBECS and RECS targets developed for this rule. Agencies therefore would not include any energy consumption or Scope 1 emissions from biomass in their calculations.

Also, at this time DOE is focusing the scope of the SNOPR to regulate on-site fossil fuel use or Scope 1 on-site emission from stationary combustion sources. As such, any emissions associated with natural gas for alternatively fueled vehicles ("AFVs") (or any other alternative fuel defined at 42 U.S.C. 13211 that is provided at a Federal building) would be excluded from coverage of these standards. In addition, for buildings with manufacturing or industrial process loads, DOE notes that the CBECS and RECS data that provide the targets for this rule do not contain manufacturing or industrial process loads. Therefore, DOE proposes to exclude these loads from coverage as well. For buildings with such process loads, the process loads will need to be accounted for in the analysis of the building's fossil fuel consumption and GHG emissions but would not be subject to the percentage reductions in fossil fuel-generated energy consumption (Scope 1 GHG emissions) required for the building related loads.

B. Compliance with Performance Standards for New Construction and Major Renovations of a Whole Building

DOE has developed quantitative requirements to determine compliance with the fossil fuel performance standards for new construction and major renovations (i.e., major renovation of all Scope 1 fossil fuel-using systems in a building) of EISA-subject buildings. Consistent with the changes proposed in this SNOPR, DOE is proposing to define the term "Major renovation of all Scope 1 fossil fuel-using systems in a building," which DOE proposes to define as a renovation of all Scope 1 fossil fuel-using systems on an existing building that is so extensive that it replaces all scope 1 fossil fuel-using systems in the building. This term includes, but is not limited to, comprehensive replacement or restoration of most or all major systems, interior work (such as ceilings, partitions, doors, floor finishes, etc.), or building elements and features. DOE also refers to such major renovations as "whole building" renovations throughout this preamble.

The proposed quantitative requirements would require agencies to calculate the on-site fossil fuel-generated energy consumption in kBtu of fossil fuels or the Scope 1 GHG emissions in CO2e of their proposed building design and compare that estimate to the allowable fiscal year percentage reduction target found in the target tables in appendix A. Per statute (42 U.S.C. 6834), DOE has provided three compliance years in this SNOPR, those EISA-subject buildings for which the design for construction or major renovation begins in the FY2024, FY2025 to FY2029, and for those which the design for construction or major renovation begins during or after FY2030.

Fundamentally, the calculation would require agencies to determine the allowable target (in either kBtu of on-site fossil fuels or Scope 1 greenhouse gas ("GHG") emissions attributed to the generation of electricity, heat, cooling, or steam) for stationary combustion sources as per "Federal Greenhouse Gas Accounting and Reporting Guidance" (Council on Environmental Quality ("CEQ"), January 17, 2016). The kBtu values or the metric tons of CO2e from the Scope 1 emissions can then be divided by the floor area of the building and converted to per square foot (metric tons of CO2e per square foot) value that can be compared with the target values in appendix A. For buildings that combine two or more building types, area-weighted averaging by square footage for each building type would be used to calculate the maximum allowable fossil fuel-generated energy consumption of the combined building.

For EISA-subject buildings for which design for construction or whole building renovation begins in the FY2024 to FY2029, tables of the proposed maximum allowable on-site fossil fuel-generated energy consumption (expressed in both kBtu per ft2 and Scope 1 GHG emissions in CO2e per ft2) by building type and climate zone are provided. The proposed values in the tables come from DOE's EIA CBECS (for commercial

buildings) and RECS (for multi-family high-rise and low-rise residential buildings), both of which are converted from site energy consumption to kBtu and Scope 1 GHG emissions in CO2e. As noted previously, DOE is proposing to define the term "Major renovation of all Scope 1 fossil fuel-using systems in a building" as a major renovation of all scope 1 fossil fuel-using systems in a building that is so extensive that it replaces all scope 1 fossil fuel-using systems in the building. This term includes, but is not limited to, comprehensive replacement or restoration of most or all major systems, interior work (such as ceilings, partitions, doors, floor finishes, etc.), or building elements and features. DOE also uses the term "whole building renovation" in reference to these types of renovations throughout this preamble.

For EISA-subject buildings for which design for construction or whole building renovation begins in fiscal year 2030 or beyond, the fossil fuel-generated energy consumption of the building must be zero for all building types and climate zones, based on the calculation established in the regulations.

C. Compliance with Performance Standards for Major Renovations within a Building

To determine compliance with the fossil fuel performance standards for major renovations of systems or components within EISA-subject buildings, DOE has developed streamlined proposed prescriptive requirements. The proposed prescriptive requirements in this case would be that the systems within the building undergoing major renovation would be brought up to the performance requirements of the individual sections of ASHRAE 90.1-2019 (chapters 5-10). DOE is not proposing fiscal year timeframes for these requirements to apply, but rather, agencies would begin implementing them upon effective date of the rule. For major renovations in EISA-subject buildings which meet the project cost threshold and coverage requirements that

are less than whole building renovations (*i.e.*, projects within the existing building comprising of retrofits to a single system or component such as a HVAC system or a chiller), agencies would be required to follow the following prescriptive requirements.

A major renovation within a building is defined as a major renovation of a scope 1 fossil fuel-using building system or scope 1 fossil fuel-using component that provide significant opportunities for energy efficiency or reduction in fossil fuel-related energy consumption. This includes, but is not limited to, replacement of the HVAC system, hot water system, or cooking system, or other fossil fuel-using systems or components of the building that have a major impact on fossil fuel usage. For component level renovations, meaning just a product or piece of equipment, agencies would be required to utilize electric or non-fossil fuel using Federal Energy Management Program ("FEMP") designated or ENERGY STAR equipment, which follow existing Federal requirements for equipment efficiency (found in 10 CFR part 436, subpart C, "Agency Procurement of Energy Efficient Products").

For system level renovations, agencies would be required to utilize electric or non-fossil fuel using FEMP designated or ENERGY STAR equipment, in alignment with 10 CFR part 436, subpart C and would also be required to meet the system level requirements for the systems being renovated in the model energy codes used to establish baseline energy efficiency standards for Federal buildings (*i.e.*, the current ASHRAE Standard 90.1 for Federal commercial and high-rise multi-family buildings covered under 10 CFR part 433 or the current IECC for Federal low-rise buildings covered under 10 CFR part 435.)

While this SNOPR would only cover systems and components that utilize on-site fossil fuels, agencies should ensure that projects that could have secondary impacts on fossil fuel using equipment, such as lighting or window replacement projects are considered. DOE encourages agencies to consider whole building optimization for any type of major renovation project to ensure no adverse impacts to on-site fossil fuel use. DOE also encourages on-site renewables such as solar and storage as good practice. DOE is not including on-site solar as a means to offset on-site fossil fuel consumption because it will not reduce the overall on-site contribution even though it is a means to reduce emissions from the electricity use of Federal building. DOE requests that agencies provide comments on how to ensure major renovations which do not directly replace on-site fossil fuel using equipment could be incorporated in this rule (*e.g.*, lighting replacement projects that indirectly increase onsite fossil fuel usage through decreased internal gains and higher subsequent heating loads).

D. Development of Fossil Fuel-Generated Energy Consumption Target

To develop the target values in appendix A, DOE utilized CBECS and RECS data to determine the on-site fossil fuel usage by fossil fuel type for each building in CBECS or RECS and then applied two transformations to that data.

The CBECS and RECS data was parsed into the 19 climate zones used in the current Federal baseline standards for commercial and multi-family high-rise residential buildings, which rely on ASHRAE Standard 90.1-2019. The same 19 climate zones are used in the current Federal baseline standards for low-rise residential buildings, which rely on the 2021 IECC.

The first transformation DOE performed was converting the fossil fuel consumption data collected and reported in CBECS and RECS by building and by fossil fuel into kBtu, dividing by the building area, applying the weighting factors associated with the building, and assigning each building to one of the building type/climate zone bins. The resulting target is expressed in terms of allowable kBtu per square foot by building type and climate zone.

The second transformation was taking the same fossil fuel consumption data reported in CBECS and RECS for each building, multiplying the fossil fuel usage for each fuel type by the applicable GHG coefficient from the CEQ guidance for each fuel type, dividing by the building area, applying the weighting factors associated with the building, and assigning each building to one of the building type/climate zone bins. The resulting target is expressed in terms of allowable CO2e (in metric tons of CO2e) per square foot by building type and climate zone. The resulting targets are shown in appendix A to subpart B of parts 433 and 435 in Table A-1a and Table A-1b.

E. Petitions for Downward Adjustment

Under section 433 of EISA 2007, agencies other than GSA may petition DOE for an adjustment to the fossil fuel-generated energy consumption requirement with respect to a specific building if meeting the requirement is technically impracticable in light of the agency's functional needs for the building. The 2014 SNOPR proposed allowing GSA tenant agencies with significant control over building design to petition DOE, and that proposal is carried forward into this second SNOPR. This SNOPR proposes a list of what information would be required in a petition for a downward adjustment for a new building and for major renovations that are whole building renovations. This includes a description of the building and associated components and equipment, an explanation of

why compliance with the requirements is technically impracticable considering the functional needs of the building, a demonstration that all cost-effective energy efficiency and on-site renewable energy measures were included in the building design, the largest feasible reduction in fossil fuel-generated energy consumption that can reasonably be achieved, and a description of measures that were evaluated but rejected. As proposed, the Director of FEMP will review the petition and make a best effort to return the complete petition in 45 calendar days of submittal (*see* 42 U.S.C. 8253(i)(3)(B)(iv))*;* incomplete petitions will not be subject to this timeframe and may result in delays.

Additionally, this rulemaking proposes a separate downward adjustment process for major renovations that are system or component level retrofits. Upon application, a major renovation that is limited to a component level retrofit will receive a downward adjustment equal to the energy efficiency level that would be achieved through the use of products that represent a level of energy efficiency that is life-cycle cost-effective if such products are commercially available. This would be demonstrated using ENERGY STAR or FEMP designated products. Upon application, a major renovation that is limited to a single system or multiple systems will receive a downward adjustment equal to the energy efficiency level that would be achieved through the use of the same ENERGY STAR or FEMP designated products as required for component renovations and through use of the system level requirements for renovations found in the baseline energy efficiency standards in 10 CFR part 433 (ASHRAE Standard 90.1-2019) or 10 CFR part 435 (the 2021 IECC). If the petition only contains component level retrofits for adjustment consideration, the Director of FEMP will review the petition and make a best effort to return the complete petition within 20 calendar days of submittal (*see* 42 U.S.C. 8253(i)(3)(B)(iv)); incomplete petitions will not be subject to this timeframe and may result in delays. DOE is also considering a separate petition process for Department of

Defense projects that serve critical national security functions. Under this separate process, the head of the agency designing the building (or his or her designee) must certify that meeting the Scope 1 fossil fuel-based energy consumption targets would be technically impracticable because the building, system, or component serves a critical national security function and providing basic facility or project design information may divulge sensitive national security information. The petition must be accompanied by a statement that the agency has reduced the fossil fuel-based energy consumption of the building, system or component and complied with the other requirements of this part to the maximum extent practicable. DOE believes this separate process would be protective of critical national security projects and information, while also ensuring that DOE meets its petition obligations under 42 U.S.C. 6834. However, DOE recognizes that the term "critical national security function" is potentially ambiguous. DOE also recognizes that agencies may need flexibility in defining what buildings or projects serve critical national security functions, and that a pending petition may delay projects that serve critical national security functions.

DOE requests comment on (i) a separate petition process for buildings and projects serving critical national security functions, (ii) if and how DOE should define "critical national security functions", (iii) whether such buildings or projects (or some of them) should be exempt from the scope of the proposed rule, and (iv) how agencies should use their own discretion in determining what buildings or projects serve critical national security functions.

F. Terminology to Be Defined in this Rulemaking

This SNOPR adds definitions for "construction cost," "design for renovation," "fiscal year ("FY")," "major renovation," "major renovation cost," "major renovation of

a whole building," "major renovation of a building system or component," "multi-family high-rise residential building," and revises the definition for "proposed building." For the purposes of establishing the targets, this proposed rulemaking establishes the definitions of 16 categories of commercial buildings and 5 categories of residential dwelling units which cover all residential buildings, including low-rise (single-family and multi-family), mid-rise apartment buildings, and high-rise apartment building.

The 16 categories of commercial buildings defined are education, food sales, food service, health care (inpatient), health care (outpatient), laboratory, lodging, mercantile (enclosed and strip shopping malls), office, public assembly, public order and safety, religious worship (not applicable), retail (other than mall), service, and warehouse and storage. Many of these commercial building categories are further divided into building types, providing a total of 48 commercial building types. These building categories and building types represent the high-level Principle Building Activity ("PBA") and low-level Principle Building Activity Plus categories in the 2003 CBECS.

The five categories of residential buildings are divided into five building/activity types: mobile, multi-family in 2–4-unit buildings, multi-family in 5 or more unit buildings, single-family attached, and single-family detached. These building types represent the housing unit types in the 2005 RECS. Residential buildings that fall under 10 CFR part 435 and multi-family mid-rise and high-rise buildings that fall under 10 CFR part 433 will use these same categories. For the purposes of analysis of the rule, DOE assumes that most multi-family high-rise residential buildings will fall into the "multi-family in 5 or more unit buildings" based on the most typical buildings representative of the Federal building.

Federal agencies would be required to select from these 53 categories to identify the fossil fuel-generated energy consumption target (expressed in both kBtu per ft2 and Scope 1 GHG emissions in CO2e per ft2), for their new construction or building undergoing a major renovation. DOE notes that the building types available from CBECS and RECS do not correspond directly to the building types used in the Federal Real Property Profile ("FRPP"). Thus, agencies may need to area-weight the floor space these CBECS and RECS targets for Federal buildings that do not correspond directly to the CBECS or RECS building types. For example, a DOD Post Exchange building might have aspects of Food Sales, Food Service, and Mercantile, necessitating the development of an area-weighted target. Similarly, a DOD barracks building might include aspects of Lodging or Residential, Education, and Warehouse, again necessitating the use of an area-weighted mapping.

III. Additional Discussion including Related Comments

DOE received 179 comments on the 2014 SNOPR from 27 different entities.[8] The comments were analyzed and categorized into the same six major categories used to categorize comments on the NOPR: Scope and Applicability of the Proposed Rule, Baseline, Methodology, Impacts, Petition for Downward Adjustment, Impacts of the Rule, and Guidance. Each major category of comment was broken down into multiple subcategories for discussion purposes.

DOE believes that many of the prior comments may no longer be appropriate or applicable given recent Federal building initiatives (*e.g.*, Executive Order 14057) and the significant change in the scope of the rule in this second SNOPR. Therefore, in this SNOPR, DOE only discusses comments relevant to DOE's current proposal, and only in a

[8] Comments received on the proposed rule are designated by the commenter or commenting organization, the DOE assigned number of the individual comment, and the page number of the commenters or commenting organizations submission.

manner applicable to this proposal. DOE encourages those agencies and other stakeholders who commented on the 2014 SNOPR to read this proposed rule and provide further comment on this updated proposal.

A. Scope and Applicability of the Proposed Rule

This section discusses the scope and applicability of the proposed rule and the comments received on the 2014 SNOPR regarding that topic. The subcategories of comments are determining the $2.5 million threshold for applicability of the rule, compliance date of the rule, major renovations, multiple buildings, leased buildings, Federal buildings overseas, residential buildings, privatized military housing, and other relevant comments.

1. Determining the $2.5 Million Threshold for Applicability of the Rule

DOE received four comments including the Clean Energy Rule" should apply to all new construction without consideration of the $2.5 million threshold," "the $2.5 million threshold implies that low-rise residential buildings (such as military family housing) will not be included," "replace the mention of the $2.5 million in 2007 dollars with a table of year by year amounts," and "do not use the $2.5 million threshold for major renovations as the definition of those renovations already mentions 'significant opportunities'". In light of the comment to provide tables with the year-by-year the $2.5 million in 2007 dollars, DOE has provided a link to the GSA website where such a table resides. See *www.gsa.gov/real-estate/design-construction/gsa-annual-prospectus-thresholds*. In response to comments suggesting different cost thresholds, the cost threshold at 42 U.S.C. 6834(3)(D)(I) forms the basis of the $2.5 million in 2007 cost threshold. DOE maintained use of this threshold in this SNOPR for consistency with the statutory requirement.

2. Compliance Date of the Rule

DOE received two comments on this topic, including a comment that the rule is overdue and another that DOE should finalize this rule only when DOE feels that agencies can meet the requirements in the rule, especially for the requirements in year 2030 and beyond. DOE is issuing this SNOPR with the intent of establishing these standards expeditiously. DOE also believes that agencies can now meet the requirements of this revised SNOPR as the new proposal would simply require elimination of on-site fossil fuel usage in the years 2030 and beyond.

3. Major Renovations

DOE received four comments on the 2014 SNOPR related to major renovations, including (1) agencies might break up their renovations into smaller pieces to avoid the rule's scope, (2) DOE should eliminate requirements for major renovations that involve single components or systems, (3) DOE should provide instructions for how to deal with major renovations for part of a building, and (4) agreement with DOE's previous decision to drop a 25 percent replacement cost threshold that appeared in the original NOPR. In response, DOE accepted the first, third, and fourth comments, but rejected the second comment. DOE will attempt to discourage the possibility of "breaking up renovation projects to get around the cost threshold" in the guidance document that will accompany this rule. DOE notes that section 433 states that "[i]n establishing criteria for identifying major renovations that are subject to the requirements of this subparagraph, [DOE] shall take into account the scope, degree, and types of renovations that are likely to provide significant opportunities for substantial improvements in energy efficiency." 42 U.S.C. 6834(a)(3)(D)(ii). This indicates Congressional intent that the term "major renovations" should be construed broadly to include projects for which agencies can practicably implement the energy efficiency and fossil fuel reduction goals of ECPA and EISA. DOE believes that major renovations that are less than whole building renovations, *i.e.*,

component and system level renovations, can provide significant opportunities for substantial improvements in efficiency and reduction of fossil fuel usage across the Federal building portfolio. Accordingly, this proposed rule addresses how building systems and components should be addressed if only part of the building is renovated, and the requirements for these renovations are not based on the whole building targets that apply to new construction and major renovations of the whole building.

4. Multiple Buildings

DOE received one comment in this category supporting DOE's decision to apply the $2.5 million threshold to individual buildings rather than to multiple buildings in a single project. DOE concludes that the $2.5 million threshold should apply to individual buildings in order to determine whether they are covered buildings under this rule. The statute mandates that the requirements apply to "buildings," not "projects" or "developments." (42 U.S.C. 6834(a)(3)(D)(i))

5. Leased Buildings

DOE asked for and received two comments on leased buildings. One comment pointed out that applying this rule to short term leases would preclude the use of Utility Energy Service Contracts ("UESCs") or Energy Savings Performance Contracts ("ESPCs"). DOE notes that agencies may implement UESCs and ESPCs in leased buildings.[9] . Therefore, the rule's requirements would apply to renovations of such leased buildings where the cost thresholds are met. However, DOE does not anticipate that many, if any, agencies would implement such renovations in short-term leases, and expects that most renovations of short-term leases would likely fall under the cost

[9] More guidance on considerations and implementation of ESPCs and UESCs in leased spaces may be found on FEMP's webpage. For ESPCs: *https://www.energy.gov/sites/default/files/2022-07/espc_faq_42-usc-8287-0622.pdf*. For UESCs: *https://www.energy.gov/eere/femp/frequently-asked-questions-about-federal-utility-energy-service-contracts*.

thresholds of the rule. However, the rule would not apply in cases of Federal agencies leasing space in buildings where the entire building is not leased to the Federal Government. This proposed rule only applies to major renovations of buildings originally built to be leased to the Federal Government with the exclusion that if the building at issue is not entirely leased to the Federal Government at the time of renovation, this proposed rule does not apply. DOE also received a comment objecting to DOE removing mention of "significant design control" as a limitation to the rule. In response to this comment, DOE points out that it addressed a similar comment in the issuance of the Green Building Certification Rule. (79 FR 61563) In that rule, DOE stated that it has not expressly added the significant control restriction to the rule for leased buildings because the ECPA definition of Federal building is limited to buildings that are built specifically for the Federal government. *See* 42 U.S.C. 6832. Construction design for a building built specifically for use of the Federal government, including under lease to a Federal agency, is, presumably, under the significant control of the Federal owner or Federal lessee. DOE reaffirms its previous decision on significant control in this proposed rule.

6. Federal Buildings Overseas

DOE received no comments on this topic in the 2014 SNOPR. DOE re-affirms its statement that this proposed rule will apply to the extent that the requirements are consistent with applicable law. DOE does not intend for the rule to cause any Federal agency to violate other legal authorities. This proposed rule does not expressly address the extent to which it may be applicable to buildings overseas, as each individual agency is best positioned to understand the various and sometimes unique authorities that may be applicable to overseas buildings of that agency. In applying the proposed rule to any given building, Federal agencies must also decide whether the building meets the definition of Federal building at 42 U.S.C. 6832(6) and either the requirement that the

building be a “public building” for which a prospectus is required, or the requirement that the building or major renovation cost at least $2.5 million. (42 U.S.C. 6834(a)(3)(D)(i)).

7. Residential Buildings

DOE received no comments on residential buildings in the 2014 SNOPR. Therefore, DOE does not believe any changes to the proposed language in the 2014 SNOPR are needed. The statute requires the inclusion of all Federal buildings, including residential buildings that are EISA-subject buildings.

8. Privatized Military Housing

DOE received no comments on this topic in the 2014 SNOPR. Therefore, DOE will confirm its use of the EISA 2007-modified ECPA definition of “Federal building” to apply to any building to be constructed by, or for the use of, any Federal agency. Such term includes buildings built for the purpose of being leased by a Federal agency, and privatized military housing. (42 U.S.C. 6832(6)) In addition, Congress again mentioned privatized military housing in ECPA when it specified that, "with respect to privatized military housing, the Secretary of Defense, after consultation with the Secretary [of Energy] may, through rulemaking, develop alternative criteria to those established in subclauses (I) [fossil fuel reduction requirements] and (III) [sustainable design requirements] of clause (i)" of section 433 of EISA. (42 U.S.C. 6834(a)(3)(D)(vi)) Although privatized military housing may not meet the definition of “public building” at 40 U.S.C. 3301(a)(5), the rule will apply to privatized military housing with construction costs of at least $2.5 million. As described in this preamble, this cost threshold applies on an individual building basis.

9. Other Relevant Comments

DOE received three comments in this category. One comment from electric utilities indicated that fossil fuel generated energy consumption of a building should only apply to on-site energy consumption. DOE agrees with this comment and this proposed rule is based solely on on-site fossil fuel usage. A second comment indicated that the rule should include all Federal buildings due to the long term ecological and economic benefits of the rule. DOE notes that under section 433 of EISA 2007, there is a clear limit to the application of this rule to larger and costlier buildings and major renovations so DOE declines to expand the rule to additional Federal buildings. A third comment indicated that the use of energy efficient buildings is not only ecologically sound but also of great strategic value, due to the increases in energy costs and the reduction of government funds to pay for programs and these costs. DOE agrees with this comment.

B. Establishing and Using the Baseline

This category was divided into nine subcategories: CBECS and RECS baselines, climate adjustment, plug and process loads, differentiating between fossil fuels, regional fossil fuel factors, marginal source of electricity, residential common areas, major renovations, and other relevant comments.

1. CBECS and RECS Baselines

DOE received two comments in this category – one asking if DOE was planning to update the rule to refer to the 2012 CBECS when that data became available and another questioning the statistical significance of the CBECS data when it is split at the building category level. In response, DOE notes that EISA 2007 requires the use of 2003 CBECS and RECS as a baseline. DOE also notes that because this proposed rule includes a gradual increase to 100 percent fossil fuel-based energy consumption reduction in 2030, the use of a single, unchanging baseline is necessary.

DOE believes that while there may be some loss of statistical significance by using disaggregated building types and climate zones, the flexibility the disaggregation provides agencies in terms of selecting a building type and climate zone that much more accurately reflects an agency's building and its location outweighs the loss of statistical significance.

2. Climate Adjustment

DOE received no comments on this topic in the 2014 SNOPR. Therefore, DOE re-affirms its commitment to including fossil fuel-based energy consumption reduction targets based on both building type and climate zone in the rule.

3. Plug and Process Loads

DOE requested comments on how the proposed rule could be designed such that the assumptions used in the whole building simulations would accurately reflect the final building design and operation, including plug and process loads. In response, DOE received 15 comments on plug and process loads. Given that DOE has revised the scope of this proposed rule to apply only to on-site fossil fuel usage associated with heating, hot water, generation of electricity, and cooking, virtually all these comments are no longer applicable. Plug loads (entirely electric) are excluded from this proposed rule. Certain process loads that use fossil fuel may be applicable in the petition process.

4. Differentiating Between Fossil Fuels

DOE received several comments on the NOPR about differentiating between fossil fuels *i.e.*, natural gas versus crude oil. The comments varied, although most favored differentiating between fossil fuels. DOE received three comments on the 2014 SNOPR on this topic, with two comments agreeing that not differentiating between fossil fuel was appropriate and one comment focusing on the source emissions factors used by DOE. In

response, DOE notes that this proposed rule focuses on only on-site fossil fuel emissions. DOE notes that the targets, while based on the actual fossil fuels used in CBECS and RECS buildings, are expressed only in terms of overall kBtu per ft^2 of fossil fuels or $CO2_e$ per ft^2 of emissions, thus keeping with DOE's original intent of not differentiating between fossil fuels. DOE also notes that since the rule is now focused on on-site fossil fuel use only, the issue of source emission factors for electricity is now less important as DOE is no longer proposing to regulate the fossil fuel content of electricity used in Federal buildings. DOE does acknowledge that the source emission factors related to electricity are used in DOE's analysis of the impacts of the rule and that DOE will use the latest available source emission factors from DOE and EPA.

5. Regional Fossil Fuel Factors

DOE indicated in the 2010 NOPR that it was considering a regional approach to establishing the fossil fuel fraction associated with electricity and asked for comments. In the 2014 SNOPR, DOE decided to use the national electric power mix in determining the fossil fuel portion of electricity consumption in the rule. DOE received no comments on this topic in the 2014 SNOPR, so DOE re-affirms those decisions in this second SNOPR. DOE also notes that this issue is much less important in this proposed rule as DOE is no longer regulating the fossil fuel content of grid electricity used in Federal buildings. DOE does acknowledge that the source emission factors related to electricity are used in DOE's analysis of the impacts of the rule and that DOE will use the latest available source emission factors from DOE and EPA.

6. Marginal Source of Electricity

DOE received a number of comments on this topic in the NOPR and proposed in the 2014 SNOPR to not use marginal electric source factors. DOE received two

comments on this topic in the 2014 SNOPR, both agreeing with DOE's decision not to use marginal electrical rates. Receiving no other comments, DOE re-affirms its tentative decision to not use marginal electricity rates in second SNOPR.

7. Residential Common Areas

The NOPR stated that the RECS baseline for multi-family residential buildings only includes the energy use for individual dwelling units, not any associated conditioned common areas. DOE proposed applying the RECS-derived fossil fuel requirements to all applicable floor space, including both common and non-common areas. Because common areas often have a lower energy intensity than individual dwelling units, using only non-common areas in the calculation for the proposed design's fossil fuel consumption is likely to result in a slightly higher maximum allowable fossil fuel-generated energy requirement than using both common areas and non-common areas in the calculation. This approach will make it easier for building designers to demonstrate compliance for a residential building overall. Because common areas account for only a small fraction of the floor space in multi-family residential buildings, however, the actual effect on fossil fuel reductions would be minimal. DOE received no comments on this topic in the 2014 SNOPR and re-affirms the approach taken in the NOPR and 2014 SNOPR in this second SNOPR.

8. Major Renovations

As noted previously in this document, the CBECS and RECS data that provide the baseline for this proposed requirement are building level data. For major renovations that are whole building renovations, the maximum fossil fuel-generated energy consumption values generated from CBECS and RECS provide requirements that are comparable to the energy consumption of the whole building renovation. However, DOE believes that the maximum consumption levels presented in the proposed tables may not be

appropriate for major renovations that are system or component level retrofits. As such, in the 2014 SNOPR, DOE proposed that the requirements for system and component level retrofits be based on the percentage of whole building fossil fuel consumption represented by the retrofitted system or component. The applicable table value would be multiplied by this percentage to arrive at the maximum allowable energy use of the retrofitted system or component. DOE requested comment on this approach, as well as comment on other approaches that could be used to determine the requirement for system and component level retrofits. DOE received five comments on this topic in the 2014 SNOPR. Comments ranged from agreement with DOE's approach to not require major renovations of systems or components to meet the full target to opposition to DOE's approach because it did not require specific evaluation of the renovation petitions, to comments that DOE should expand the scope of the rule to all renovations, even those that did meet the cost threshold, and other comments that DOE should apply the requirements of ASHRAE Standard 90.1 and the IECC to renovations, and comments that DOE should not even consider major renovations that do not involve the whole building, but which happen to meet the cost-threshold.

In response, DOE notes major renovations are required to be part of this proposed rule by statute, and that DOE believes any renovation that meets the cost-threshold of the rule and falls within the scope of the rule should comply with the rule unless agencies go through the petition process for specific considerations of a given project. DOE is proposing this approach to allow agencies to take a more holistic view of their renovation projects over time, so that projects resulting in load reductions (such as insulation improvements) as well as electrifying end-uses can be implemented in a complimentary fashion. DOE also notes that for major renovations involving only replacement of equipment (such as boilers), there is little else DOE can direct agencies to do other than to use high efficiency equipment (as is required under 10 CFR part 436, subpart C) and to

require that that equipment uses electricity and not fossil fuels. DOE cannot require agencies to renovate other parts of the building. For major renovations that involve renovation of individual systems (such as hot water or heating, ventilation, and air-conditioning ("HVAC") systems), DOE is requiring agencies to use high efficiency equipment that uses electricity and not fossil fuels and meet the renovation requirements of the baseline standards in 10 CFR part 433 (ASHRAE Standard 90.1-2019) or 10 CFR part 435 (the 2021 IECC), as appropriate. DOE notes and encourages on-site renewables such as solar and storage as good practice.

9. Other Relevant Comments

Three additional comments were submitted that do not fit into one of the scope subcategories. One comment recommended using embodied energy in the rule. DOE noted that it was required to use CBECS and RECS data per statute and that CBECS and RECS do not contain embodied energy. Two other comments recommended that DOE implement a multiplier based on hours of operation for Federal buildings that are in operation longer than corresponding private sector buildings found in CBECS. DOE found these two comments persuasive because many types of Federal buildings are operated longer hours than typical buildings covered in CBECS and RECS. In addition, DOE notes that hours of operation are already considered in tools such as ENERGY STAR Portfolio Manager which agencies are required to use as part of their building benchmarking activities. (42 U.S.C. 8253(f)(8)) The hours of operation of a building are also implicit in any whole building simulation done on a building design, with longer hours of operation typically leading to higher energy usage. The proposed shift multiplier in this proposed rule is based on analysis by Oak Ridge National Laboratory and was originally developed for ASHRAE Standard 100-2018 and is expressed in "number of operating shifts" as opposed to actual hours of operation. Shift multipliers provided are

both less than and greater than 1 depending on building type. For government offices, for example, operating the building for 2 shifts does not increase the energy usage, but operating the building 3 shifts increases the energy use by a multiplier of 1.4. DOE notes that residential buildings, by their very nature, are already considered to be 24-hour operation and, therefore, this multiplier will only apply to Federal commercial buildings regulated under 10 CFR part 433.

C. Methodology to Determine Compliance

DOE categorized comments on the methodology to determine compliance in six subcategories: whole building simulation, off-site and on-site renewable energy and renewable energy certificates, use of source energy, fuel conversion efficiency, and on-site energy generation from natural gas. Each of these subcategories is discussed below.

1. Whole Building Simulation

To determine energy use in the proposed building design, DOE proposed in the 2010 NOPR and re-affirmed in the 2014 SNOPR that the fossil fuel-generated energy consumption of a proposed new Federal building or major renovation of a Federal building be estimated using the Performance Rating Method found in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2004 for commercial and multi-family high-rise residential buildings, and the IECC 2004 Supplement for low-rise buildings. 75 FR 63409. Because of the complexity involved in estimating fossil fuel-generated energy consumption, this requirement would effectively require the use of a whole building simulation tool, which can be difficult and increases cost.

In the 2014 SNOPR, DOE recognized that the whole building approach is likely not appropriate for major renovations that are limited to system or component level retrofits. For major renovations that are less than whole building renovations (i.e., system

or component level-retrofits) DOE proposed establishing the maximum allowable fossil fuel consumption in fiscal years 2018 through 2029 based on the percentage of whole building consumption represented by retrofitted system or component. The applicable table value would be multiplied by this percentage value to arrive at the maximum allowable fossil fuel consumption of the retrofitted system or component. For determining compliance, DOE proposed basing the subject fossil fuel-generated energy consumption on the system or component as retrofitted. This will require the design engineer to estimate both the energy consumption of the systems or components as renovated and the energy consumption of the entire building as renovated.

DOE received no comments on the use of whole building simulation, but DOE has changed its adopted approach to major renovations to system and components in a manner which will no longer require whole building simulation, as described in this section. Instead, component and system level renovations will be required to use electric or non-fossil fuel using FEMP designated or ENERGY STAR equipment and system level major renovations will be required to use the same electric or non-fossil fuel using FEMP designated or ENERGY STAR equipment and major renovation requirements in the baseline standards for 10 CFR part 433 and 10 CFR part 435. (ASHRAE 90.1-2019 is the current baseline standard for 10 CFR part 433 and the 2021 IECC is the current baseline standard for 10 CFR part 435.)

2. Off-Site and On-Site Renewable Energy and Renewable Energy Certificates

In the NOPR and 2014 SNOPR for this rule, DOE considered both the on-site fossil fuel usage and the fossil fuel use associated with the electricity used on site. As part of compliance with the NOPR and 2014 SNOPR versions of the rule, renewable energy and renewable energy certificates were allowed for compliance with this rule. This topic

area was the single most commented on topic area in the 2014 SNOPR, with 51 comments being received. However, given that DOE has chosen to refocus this rule on just on-site fossil fuel usage, the entire concept of using (or not using) renewable energy or renewable energy certificates to meet this rule is no longer relevant. Therefore, DOE will not list all the comments related to the use of renewable energy and renewable energy certificates from the 2014 SNOPR.

3. Use of Source Energy

DOE previously made use of source energy for both on-site fossil fuel usage and electrical usage in the NOPR and 2014 SNOPR. DOE received six comments on this topic in response to the 2014 SNOPR. However, with the refocus of the rule to just on-site fossil fuel usage, consideration of source energy is no longer relevant. DOE will use on-site fossil fuel usage using the directions provided for Federal greenhouse gas emission calculation as noted previously in this proposed rule. The six comments will not be discussed in this SNOPR.

4. Fuel Conversion Efficiency

In the NOPR, DOE proposed that the electricity source energy factor would be based on the average utility delivery ratio in Table 6.2.4 of the 2010 DOE Building Energy Data Book (*See https://buildingsdatabook.eere.energy.gov*). 75 FR 63410. The ratio accounts for fuel conversion losses to produce electricity, as well as transmission and distribution losses. DOE used the electricity source energy factor of 0.316 from the most recent year data was available, 2008.

DOE made several definition changes in the 2014 SNOPR and added a new source energy multiplier for other fuels. DOE received no comments on this topic on the

2014 SNOPR, but DOE has made one further refinement to its treatment of fuel conversion efficiency in this proposed rule. DOE has added reference to "coke[10]" and used the same source energy multiplier as for coal and other fossil fuels. This action brings this proposed rule more into alignment with how fossil fuel usage is reported to FEMP under the requirements of EISA 2007 Section 432. The new fuel conversion efficiencies are taken from FEMP's Annual Reporting Template for agencies.

5. On-Site Energy Generation from Natural Gas

The 2010 NOPR indicated DOE's interest in the effect of the fossil fuel-generated energy consumption reduction requirements on distributed energy technologies that provide on-site electrical generation from natural gas, such as Combined Heat and Power ("CHP") systems, to generate both heat and electricity. A building with a CHP system could potentially be an all-gas building in terms of utility purchases and would, therefore, be required to reduce natural gas consumption in accordance with the fossil fuel-generated energy consumption reduction requirements. DOE indicated its interest in minimizing the penalty in order to not discourage the use of on-site CHP systems, within the limits of the statutory language. DOE invited comments on the NOPR on how appropriate credit may be given for CHP systems through the compliance determination methodology. 75 FR 63410.

DOE received several comments related to distributed energy technologies on the 2010 NOPR. Based on the comments received and a technical review of the issues raised, DOE proposed specificity on how CHP and district heating systems should be considered

[10] Coke is defined as a solid carbonaceous residue derived from low-ash, low-sulfur bituminous coal from which the volatile constituents are driven off by baking in an oven at temperatures as high as 2,000 degrees Fahrenheit so that the fixed carbon and residual ash are fused together. Coke is used as a fuel and as a reducing agent in smelting iron ore in a blast furnace.

in the 2014 SNOPR. Under this proposed rule, for district heating or cooling systems using fossil fuel as the source, the fossil fuel-generated energy consumption would be determined by adjusting the building load for the plant fuel conversion efficiency and estimated distribution losses as reflected in the Other Fuels Energy Source Multiplier. If a non-fossil fuel is used as the sole source (*e.g.,* geothermal) of energy for the district heating system, there would be no contribution to fossil fuel-generated energy consumption.

For CHP district heating systems, the electricity attributed to the proposed building would be determined by multiplying the building's pro-rated share of the total delivered heat from the system times the total electricity produced by the CHP system. For CHP systems serving only one building, fossil fuel consumption of the CHP system would be added to the direct fossil fuel consumption in Equation 1 proposed below. Because the electricity is produced from waste heat, the amount of electricity produced by either the CHP system serving a single building or a CHP district heating system, as determined previously, would be deducted from the proposed design site electricity in Equation 1 under the renewable energy and CHP deduction.

In response to the 2014 SNOPR, DOE received 22 comments from natural gas associations, utilities, and manufacturers of gas turbines and fuel cells, most opposing the application of this rule to natural gas as doing so would will preclude the use of natural gas in the future which is problematic not only because it is an economical and environmentally beneficial domestic fuel, but also because doing so would be fundamentally inconsistent with the then Administration’s support of CHP and the then Administration’s goals to promote greater use of alternative fuels by Federal agencies. This subcategory was the second most commented on topic in the 2014 SNOPR.

In response to these comments, DOE emphasizes, once again, that this proposed rule is based directly on congressionally mandated language in section 433 of EISA 2007, which governs fossil fuel-generated energy consumption. DOE notes that the use of natural gas, CHP, and alternative fuels is not entirely prohibited by this rule (until 2030), although all fossil fuel usage must be accounted for and is regulated by this proposed rule.

6. Other Relevant Comments

DOE received fourteen additional comments relating to methodology that did not fit into one of the other subcategories in this larger topic. These comments covered potential exclusions for thermal and electrical energy storage systems, making this rule be based on an agency portfolio (as opposed to on a building-by-building basis), exemption of emergency backup systems, exemptions for fuel use for alternatively fueled vehicles ("AFVs"), potential credits for nuclear and hydropower electricity, and the need to rewrite the main equation in the rule.

In response to the comments about energy storage systems, DOE's rewrite of the rule to focus only on on-site combustion of fossil fuels makes any discussion of electrical energy storage moot. If agencies choose to burn fossil fuels to store heat in a thermal energy storage system, that fossil fuel would be counted as part of the consumption of the building. DOE notes that this rule applies to individual buildings based on statutory requirements, so DOE cannot change this rule to a portfolio approach. DOE notes that while emergency backup systems are part of the Scope 1 emissions covered by this rule, DOE has implemented a specific exemption for emergency backup generators that are used solely for emergency backup. Any use of these backup generators for peak shaving,

peak shifting, or other demand management activities must be included in the building consumption.

With respect to mobile sources, section 433 of EISA refers to the fossil fuel-generated energy use of "Federal buildings." 42 U.S.C. 6834(a)(3)(D)(i). Under ECPA, the term "building" means "any structure to be constructed which includes provision for a heating or cooling system, or both, or for a hot water system." 42 U.S.C. 6832. This does not include mobile sources. Accordingly, mobile sources are excluded from the scope of this rule. Finally, DOE notes that credits for nuclear and hydropower electricity are no longer relevant to this proposed rule and that the governing equation in this proposed rule has been extensively rewritten and simplified in accordance with the change of scope.

D. Petitions for Downward Adjustment

Upon petition by an agency subject to the statutory requirements, ECPA permits DOE to adjust the applicable numeric fossil fuel-generated energy consumption percentage reduction requirement downward with respect to a specific building, if the head of the agency designing the building certifies in writing that meeting the requirement would be technically impracticable in light of the agency's specified functional needs for the building and DOE concurs with the agency's conclusion. (42 U.S.C. 6834(a)(3)(D)(i)(II)) ECPA further directs that such an adjustment does not apply to GSA, however, DOE proposes that GSA tenant agencies that have design control over their buildings and make significant design decisions that will allow for compliance with the rule may petition DOE for a downward adjustment, even if that building is owned by GSA. DOE also proposes a downward adjustment process for new construction and major renovations that are whole building renovations, as well as for major renovations that are limited to system or component level renovations.

1. Technical Impracticability as a Basis for Downward Adjustment

Technical impracticability is defined as a situation in which achieving the Scope 1 fossil fuel-based energy consumption targets would: (1) not be feasible from an engineering design or execution standpoint due to existing physical or site constraints that prohibit modification or addition of elements or spaces; (2) significantly obstruct building operations and the functional needs of a building, specifically for industrial process loads, research operations, and critical national security functions, mission critical information systems as defined in NIST SP 800-60 Vol. 2 Rev. 1; or 3) significantly degrade energy resiliency and energy security of building operations as defined in 10 U.S.C. 101(e)(6) and 10 U.S.C. 101(e)(7), respectively. Upon determination that complying with these standards is technically impracticable, the building would still be required to reduce fossil fuel consumption to the maximum extent practicable. Technical impracticability may include technology availability and cost considerations but may not be based solely on cost considerations.

The 2010 NOPR noted that the downward adjustment provision of ECPA does not expressly include cost considerations, but that DOE was considering incorporating cost considerations as part of a "technically impracticable" determination. Cost would not be the sole rationale for a determination of "technically impracticable," but high costs could be part of the evaluation. 75 FR 63412. DOE also invited comments on what kind of technical impracticability would constitute grounds for a petition for downward adjustment. DOE received a number of comments on this topic in the NOPR and restated its position in the 2014 SNOPR that cost could not be the sole rationale for a determination of "technically impracticable." DOE also emphasized in the 2014 SNOPR that it would be appropriate and permissible to consider a petition for downward adjustment based on the impact to an agency's functional needs for the building of

achieving the fossil fuel-generated energy consumption reductions. DOE recognizes that an agency's functional needs for a building may be inextricably linked with costs, but cost should not be the primary basis for a petition for downward adjustment. DOE received no further comments on this topic in the 2014 SNOPR and thus reaffirms its intent to not allow cost as the sole rationale for a determination of technically impracticable, but also to consider an agency's functional needs in that determination.

2. Bundling of Petitions

The bundling of petitions was not an issue addressed in the NOPR. However, three comments were submitted on whether an agency could submit a single petition for downward adjustment for multiple agency buildings of the same building type, rather than requiring a petition for each building separately, to minimize agency burden.

DOE agreed that bundling of petitions by an agency for buildings of the same building type and function would help streamline the petitioning process and relieve the burden on agencies and DOE by avoiding duplication of effort. In the 2014 SNOPR, DOE stated that although DOE would require an individual petition containing the information required under this proposed rule for each building, if the petitions for similar buildings are submitted jointly, a petition may reference the downward adjustment justification in another petition in the bundle. DOE also noted in the 2014 SNOPR that DOE is considering allowing agencies to bundle petitions for new buildings or whole renovations to buildings: (1) that are of the same building type and of similar size and location; (2) that are being designed and constructed to the same set of targets for fossil fuel-generated energy consumption reduction; and (3) that would require similar measures to reduce fossil fuel-generated energy consumption and similar adjustment to the numeric reduction requirement. The bundled petitions should clearly

state any differences between the buildings and explain why the differences do not warrant the submission of separate evaluations. Projects involving multiple new buildings would need to submit separate petitions for each building if they do not meet criteria (1)-(3) previously listed. For component-level major renovations, the 2014 SNOPR stated that DOE is considering allowing bundling petitions that are of the same component and building type.

In response, DOE received one comment on bundling of petitions. AGA and other utilities supported the concept of bundling of petitions. (AGA et al No. 18 at p.6). DOE agrees that bundling of petitions for buildings of the same building type and function in a similar location is a useful feature of the process and bundling is being proposed. DOE encourages agencies to submit a singular petition with all of the information on groups of similarly situated buildings to help streamline the review process.

3. DOE Review Process

The 2010 NOPR stated that DOE will review petitions in a timely manner and if the petitioning agency has successfully demonstrated the need for a downward adjustment per the previous discussion, DOE will concur with the agency's conclusion and notify the agency in writing. If DOE does not concur, it will forward its reasons to the petitioning agency with suggestions as to how the fossil fuel-generated energy consumption percentage reduction requirement may be achieved. 75 FR 63412.

Several comments were submitted about the DOE review process in the NOPR. In response, DOE recognized that agencies want assurance that DOE will respond to petitions in a timely manner in order to avoid project delays. For petitions for new construction, DOE proposes to make a best effort to notify an agency in 45 calendar days

of submittal whether a petition is approved or rejected, granted the petition is complete. If DOE rejects the petition, it would include its reasons for doing so in its response to the agency. Additionally, for new construction, DOE proposed a provision under which DOE could establish an adjusted value, other than the one presented in a petition, if DOE finds that the petition does not support the conclusion of the submitting agency but that the statutorily required level was nonetheless technically impracticable in light of the agency's specific functional needs for the building. This provision is intended to provide flexibility in the petition process and reduce the need for agencies to resubmit in the instance of a rejection. For petitions for downward adjustments to the requirements applicable to major renovations, DOE proposed that the downward adjustment would be granted upon submission of specified certifications. The necessary certifications are discussed in greater detail in section III.D.5 in this document. In response, DOE received five comments on its review process.

The Department of Defenses ("DOD's") Office of the Under Secretary of Defense ("OUSD")[11] and the Office of the Deputy Under Secretary of Defense (Installations and Environment) ("ODUSD(I&E)") stated that regardless of project type, all petitions for downward adjustments should be deemed approved upon submittal to DOE. (OUSD-AF 9 at p.6 and ODUSD(I&E) 16 at p.4) In response, DOE notes that approving all petitions for downward adjustment without reviewing the petitions to ensure that the Secretary of DOE concurs with the petition would be contrary to the statutory requirement that DOE review and concur on each petition submitted. (42 U.S.C. 6834(a)(3)(D)(i)(II)) The American Gas Association ("AGA") and other utilities commented that they support DOE's proposed review process (AGA et al No. 18 at p.6) and they also requested that

[11] OUSD submitted 4 sets of comments – one set on behalf of the Air Force (marked "-AF"), another set on behalf of the US Army Corps of Engineers (marked "-USACE"), a third set on behalf of the Army (marked "-Army"), and a final set on behalf of OUSD's Facility Energy and Privatization director (marked "-FEP").

DOE consider the cost-effectiveness of fossil fuel energy reduction measures to the greatest extent possible in the downward reduction process. (AGA et al No. 17 at p.6) In response, DOE notes that the statutory requirement for adjusting the fossil fuel-generated energy consumption requirements is technical impracticability. As previously noted, DOE will consider cost and cost-effectiveness through that lens; however, cost or cost-effectiveness impacts cannot be the only reason a petition is approved. (*See* section E.1 of this proposed rule for additional discussion of cost.)

Earthjustice noted that despite mention in the preamble, the regulatory text of the 2014 SNOPR fails to recognize that, to evaluate petitions for downward adjustments, DOE needs a description of all technologies and practices that an agency evaluated and rejected, including a justification as to why the technologies were not included in the design. (Earthjustice No. 4 at p.3)

DOE agrees with Earthjustice with respect to documentation requirements for downward petitions for whole building renovations. This documentation should be identical to that required for new construction petitions. This change was made in this proposed rule. DOE expanded the type of building specific information that DOE is requesting in petitions as requested by Earthjustice but is doing so in a manner that allows DOE to analyze what possibilities each petitioner has to meet the rule in its renovation. DOE changed the rule to require the director of FEMP to approve each petition after reviewing this building-specific information.

4. Information Required in Petitions for New Construction

The NOPR proposed that a petition for downward adjustment of the numeric requirement should include an explanation of what measures would be required to meet

the fossil fuel-generated energy consumption reduction requirement, and why those measures would be technically impracticable in light of the agency's specified functional needs for the building. DOE also proposed that the petition should demonstrate that the adjustment requested by the agency represents the largest feasible reduction in fossil fuel-generated energy consumption that can reasonably be achieved. DOE solicited comments on those issues. 75 FR 63412.

DOE received several comments on the NOPR and provided more detailed petition requirements in the 2014 SNOPR that allows DOE to determine more comprehensively whether a downward adjustment should be approved. DOE proposed a modified provision that requires a Federal agency to demonstrate that the requested adjustment represents the largest feasible fossil fuel reduction that the agency can reasonably achieve by providing evidence that the agency included all life-cycle cost-effective energy efficiency and on-site renewable energy measures in the design and by providing a description of the technologies and practices that the agency evaluated and rejected, including a justification as to why these technologies and practices were rejected. Finally, agencies would also be permitted to provide additional information they think will help justify the request for downward adjustment.

As per the 2014 SNOPR, petitions would also be required to include the maximum allowable fossil fuel-generated energy consumption for the proposed building, the estimated fossil fuel-generated energy consumption of the proposed building, the total estimated project cost, and a description of the building and the building energy systems. A description of the building would include, but would not be limited to, location, use type, floor area, stories, expected number of occupants and occupant schedule, and functional needs of the building, and any other information the agency deems pertinent.

The building energy Federal agencies must describe includes the HVAC systems and service water heating system, as well as the loads in the building, including any specialized process, specialized research loads, electric vehicle charging stations, alternatively fueled vehicle fueling stations, and emergency backup generators. This information should provide DOE the necessary information to review petitions, and help agencies ensure key questions and options are addressed in the design process.

DOE received one comment on the information required in petitions for new construction. An individual commenter suggested that to discourage excessive petitions for downward adjustment, DOE should require a comprehensive analysis of the selected and rejected energy efficiency measures or technologies, similar to methods employed in a Level II energy audit as defined by the American Society of Heating, Refrigeration and Air-Conditioning Engineers ("ASHRAE"). In response, DOE notes that Federal agencies are already required to perform audits on 25 percent of their buildings every year under the provisions of section 432 of EISA 2007. DOE believes that dividing major renovations into three categories that each have their own threshold for DOE granting of a petition for downward adjustment (*e.g.,* whole building renovations, system level renovation, and component level renovations) should keep the number of petitions submitted by agencies to a minimum.

5. Downward Adjustments for Major Renovations

As noted previously, for major renovations, DOE proposes that the fossil fuel reduction requirements apply only to the energy use associated with the portions of the building or building systems that are being renovated and only to the extent that the scope of the renovation provides an opportunity for compliance with the applicable fossil fuel-generated energy consumption reduction requirements.

Recognizing the practical limitations on improving energy efficiency through retrofits, DOE proposes separate downward adjustment processes for major renovations. For major renovations that are whole building renovations, a downward adjustment will be provided at a level equal to the energy efficiency level that would be achieved were the proposed building designed to meet the baseline energy efficiency standard applicable to new construction in 10 CFR parts 433 or 435. DOE proposed in the 2014 SNOPR that this adjustment would be available to GSA-tenant agencies with significant control over building design and DOE re-affirms this proposal.

The energy efficiency standards for new construction are established in 10 CFR part 433, for commercial and multi-family high-rise residential buildings, and 10 CFR part 435, for low-rise residential buildings. The energy efficiency standards require a building be designed to, at minimum, achieve the energy efficiency levels of the applicable referenced voluntary consensus code: ASHRAE 90.1 for commercial buildings multi-family high-rise residential buildings and IECC for low-rise residential buildings. The energy efficiency standards for new Federal buildings further require that buildings be designed to achieve energy efficiency levels that are at least 30 percent beyond the levels established in the referenced codes, if life-cycle cost-effective.

For major renovations that are limited to system or component level retrofits, DOE proposed in the 2014 SNOPR to provide downward adjustments at a level equal to the energy efficiency level that would be achieved through the use of commercially available systems and/or components that provide a level of energy efficiency that is life cycle cost effective, i.e., ENERGY STAR or FEMP designated products. For system level renovations, agencies would adopt as renovation requirements the relevant parts of new building baseline energy efficiency standard in 10 CFR part 433 or 435 on a system

level (*i.e.*, brought up to the performance requirements of the individual sections of ASHRAE 90.1-2019 (chapters 5-10)) where appropriate and cost effective, and additionally would follow the replacement guidance for all equipment that is included in the renovation with ENERGY STAR or FEMP designated products, per 10 CFR part 436, subpart C. For component level retrofits, agencies will replace all equipment that is part of the renovation with ENERGY STAR or FEMP designated products as defined at 10 CFR part 436, subpart C.

In setting efficiency requirements, both FEMP and ENERGY STAR choose levels that are among the highest 25 percent of efficiency for a given product category. ENERGY STAR estimates that its program saves more than 200 billion kWh of electricity each year, and FEMP estimates that compliance with its efficiency requirements can save the government more than 30 trillion BTUs each year. Both programs have integrated life-cycle cost effectiveness into their guiding principles and, as such, Federal buyers can have confidence that required products have both good energy performance and a total cost of ownership that is equal to or less than products below set efficiencies. Prescriptive requirements of ASHRAE 90.1 and IECC demonstrate similarly high levels of efficiency. Together, these requirements cover more than 70 product types and will help ensure that the products used within Federal facilities are among the highest energy efficiencies available. Federal buildings that install and use these products will realize lower energy intensities compared to using non-compliant products.

6. Make Information Publicly Available

DOE received some comments on the NOPR that petitions for downward adjustment should be made publicly available on a DOE website. Commenters stated that making this information publicly available would make the process transparent, hold

agencies accountable, and could reduce unsupported petitions. As a result of these comments on the NOPR, DOE proposed in the 2014 SNOPR to report petition summary level information in the DOE Annual Report to Congress on Federal Energy Management and Conservation Programs (See *www.energy.gov/about/budget.htm*).

DOE received two comments on its proposal. Earthjustice commented that to ensure public accountability, all petitions and DOE responses should be made publicly available. (Earthjustice No. 9 at p.7) An individual commenter commented that transparency is an important factor that will influence the effectiveness of this regulation and create accountability for meeting the target requirements and deadlines. (Dirogene No. 3 at p.1) DOE agrees that transparency is important and will publish any petitions that are filed, deemed complete, and screened for national security reasons for downward adjustment that are received (subject to potential filtering for national security reasons) on the DOE website.

7. Narrow the Use of Petitions

DOE received a few comments on the NOPR related to narrowing the use of petitions for downward adjustment. In response to these comments, DOE proposed changes in the 2014 SNOPR that would reduce the number of petitions submitted for downward adjustment and improve the content of submitted petitions. DOE expanded the number of building types covered in Tables A-1a and A-1b to A-2a and A-2b in appendix A of part 433 and added a methodology for calculating the maximum allowable fossil fuel-generated consumption values for buildings with process loads. This was expected to greatly reduce the number of building types without baselines and fossil fuel reduction targets, eliminating a significant potential source of petitions. In addition, in response to some of the public comments received, the 2014 SNOPR proposed that additional

information be provided as part of the petition process, including that Federal agencies must: (1) demonstrate that the requested adjustment represents the largest feasible fossil fuel reduction that can be achieved, given agency mission and building purpose; and (2) describe all technologies and practices that were evaluated and rejected, including a justification as to why they were not included in the design. The rule requires Federal agencies to provide specific information about the energy efficiency and on-site renewable energy measures included in the proposed building design to enable DOE to evaluate the request for downward adjustment.

DOE received no comments on this topic in the 2014 SNOPR, so DOE proposes to require evidence of these additional criteria in petitions for downward adjustments.

8. GSA Tenant Agencies

ECPA, as amended, does not provide GSA the option of petitioning DOE for a downward adjustment of the applicable percentage reduction requirement. (42 U.S.C. 6834(a)(3)(D)(i)(II)) In the NOPR, DOE proposed that a new Federal building or a Federal building undergoing major renovations for which a GSA tenant that is a Federal agency is providing substantive and significant design criteria may be the subject of a petition. 75 FR 63412. Under this approach, DOE proposed that a GSA building that is designed to meet the specifications provided by a tenant agency may be considered for a downward adjustment if a petition is submitted by the head of the tenant agency.

In response to the NOPR, DOE received one comment on this issue stating that allowing GSA tenant agencies to petition for downward adjustments contradicts the statute. DOE noted in the 2014 SNOPR that while the statute prohibits GSA from petitioning DOE for a downward adjustment, it makes no reference to GSA tenant

agencies. DOE will allow GSA tenant agencies that have significant control over building design to submit a petition. In such cases, it will be the tenant agency, not GSA, that is making the design choices that will allow for compliance with the rule. Allowing GSA tenant agencies to submit a petition for downward adjustment will provide an option for some buildings for which the required fossil fuel reductions may be technically impracticable in light of the building's functional needs, but for which GSA may not submit a petition.

DOE received one comment on this topic in response to the 2014 SNOPR. Earthjustice commented that DOE may not allow tenants of GSA buildings to petition for downward adjustments of the fossil fuel reductions because the statute specifically excludes only GSA from the downward adjustment petition process, expanding the number of buildings eligible for such adjustments in a manner that directly contravenes the plain statutory language and that is arbitrary and capricious. (Earthjustice No. 8 at p.6) DOE reiterates that while the statute prohibits GSA from petitioning DOE for a downward adjustment, it makes no reference to GSA tenant agencies. The statute allows for an "agency" to petition for a downward adjustment. The term “Federal agency” means any department, agency, corporation, or other entity or instrumentality of the executive branch of the Federal Government, including the United States Postal Service, the Federal National Mortgage Association, and the Federal Home Loan Mortgage Corporation. 42 U.S.C. 6832(5). As the commenter notes, the statute only prohibits GSA from submitting a petition. Thus, in cases in which the tenant agency exercises significant control of design choices in the building, and GSA does not, it makes little sense to prohibit the tenant agency form petitioning for an adjustment where the statute does not expressly require it. Moreover, these petitions are still subject to the same criteria and review process as other petitions and would need to justify any downward adjustment in

accordance with such. Accordingly, in this SNOPR, DOE has decided to continue to allow GSA tenant agencies to petition in those cases where GSA tenants have design control.

9. Other Relevant Comments

In this category, DOE received two comments on the 2014 SNOPR. Earthjustice commented that it is unnecessary to limit the scope of major renovations covered by the rule to the extent that the renovation permits compliance with applicable requirements. Earthjustice argues that as the rule does not apply to unaltered portions of buildings or buildings systems that are undergoing major renovations it is not necessary to further limit the scope. Moreover, because "the scope of the renovation" is not a defined term, it may be subject to a broad interpretation by agencies subject to the fossil fuel reduction requirement. (Earthjustice No. 5 at p.4)

In response, DOE also notes that this rule is not the only requirement that mandates that Agencies implement and upgrade their facilities. Per 42 U.S.C. 8253(f), agencies are required to complete their annual comprehensive energy and water evaluation for approximately 25 percent of their covered facilities each calendar year and through those evaluations agencies will identify and plan for significant updates and modifications to those covered facilities. This proposed rule is not the appropriate vehicle for requiring significant facility upgrades beyond the portions being replaced.

ODUSD(I&E) also commented that requiring individual renovation projects that have difficulty in meeting the requirements, (regardless of size, renovation type, scope, funding, climatic conditions, etc.) to petition DOE for downward adjustment may pose significant challenges. (ODUSD(I&E) No. 1 at p.1) DOE recognizes that petition

submittals may add burden for agencies undertaking major renovations in buildings. However, EISA provides no recourse to agencies other than petitioning DOE for major renovations subject to the scope of these standards. As noted previously, pursuant to the intent indicated by EISA, DOE construes the term "major renovations" broadly to include projects for which agencies can practicably implement the energy efficiency and fossil fuel reduction goals of ECPA and EISA, including component and system level renovations subject to the $2.5 million threshold. Accordingly, agencies will need to submit a petition to adjust the relevant reduction targets for such projects. DOE notes that, in this SNOPR, DOE is proposing to make best efforts to complete review of petitions within 45 calendar days of receipt for new construction and major building retrofits and 20 calendar days for component level retrofits for adjustment consideration. DOE believes this will help obviate any burden experienced by agencies that submit petitions.

E. Impacts of the Rule

As part of the 2014 SNOPR, DOE requested comments on the impacts of the proposed rule. DOE received comments in two categories – Cost Impacts and Other Impacts.

1. Cost Impacts

In response to the 2014 SNOPR, DOE received eight comments on cost impacts. Several comments recommended referring to the Office of Management and Budget ("OMB") Circular A-94 to the rule. In response, DOE notes that while OMB Circular A-94 is an important document, section 544 of the National Energy Conservation Policy Act ("NECPA"), as amended by section 441 of EISA 2007, directed DOE to establish practical and effective present value methods for estimating and comparing life-cycle

costs for Federal buildings, based on capital and operating costs during a period of the expected life of the building's energy system or 40 years, whichever is shorter. *See* 42 U.S.C. 8254. Further, Federal agencies must use the DOE-established methods in the design of new Federal buildings and the application of energy conservation measures to existing Federal buildings. *Id.* at (b)(1). DOE established life-cycle cost analyses methodologies and procedures in 10 CFR part 436, subpart A. Federal agencies are already using the methodologies and procedures in 10 CFR part 436, subpart A when meeting the energy efficiency obligations in 10 CFR parts 433 and 435. To ensure consistency across Federal buildings regulations, DOE will continue to use the same methodologies and procedures.

Other comments suggested that the life-cycle costs of implementing new requirements under the fossil energy reduction rule are underestimated and that costs for compliance should be more closely examined. In response to these comments, DOE based its costs on the best available estimates it had at the time.

Several comments stated that while the 2014 SNOPR explicitly did not consider costs, because of the obligations imposed by the statute, exorbitant additional expenditures remain unjustified. Further comments implied that because of the inherent efficiency of natural gas used directly on site, the overall impact of displacing natural gas use with electrically powered alternatives will be an increase in total GHG emissions, a decrease in energy productivity of Federal buildings, and increased energy costs to Federal agencies and ultimately to taxpayers. In response, DOE notes that had Congress intended for DOE to consider costs in establishing the fossil fuel use reduction targets in this rule or in adjudicating petitions it would have specified to do so. Instead, Congress directed DOE to use the specific reduction targets contained in 42 U.S.C.

6834(a)(3)(d)(i)(I), and base DOE's petition adjudication decisions on agency determinations of technical impracticability.

However, while DOE did not consider costs in setting the reduction targets or petition requirements, as part of its obligations under Executive Order 12866 to inform the public of the impacts of the proposed rule, DOE analyzed the costs and benefits of the rule proposed in the 2014 SNOPR and in this proposed rule, and has tentatively concluded that the rule as a whole saves both site energy and life-cycle cost.

Other commenters also requested that DOE present its construction cost increases as a percentage of total cost on both a year and cumulative basis and provide more detail about DOE's assumptions underlying the analysis. The commenters further requested that DOE also explain why its year 2020 costs and beyond are relatively constant, stating that they believe that compliance costs will grow much more significantly as permitted fossil fuel energy consumption nears zero. All assumptions used in the RIA are documented in the RIA document. The costs for year 2020 and beyond are relatively constant because DOE assumed that by 2020, agencies would be able to achieve the maximum estimated savings for major renovations by that time.

Another comment was made that a problem with the cost estimate is that the RIA makes no reference to life cycle costs, even though section 109 of Energy Policy Act of 2005 ("EPAct 2005") requires technologies employed be life-cycle cost- effective. (ODUSD(I&E) No. 4 at p.1) DOE notes that section 109 of EPAct 2005 amended section 305 of ECPA, which was later amended by section 433 of EISA, which provides the authority for this rulemaking. The amendments made by section 433 of EISA did not include requirements or references to life-cycle cost-effectiveness with respect to the

fossil fuel-generated energy consumption reduction targets of EISA section 433. If Congress intended for life-cycle cost-effectiveness to be considered as part of these reduction targets, it would have specifically stated so in section 433 of EISA as it did in the amendments in section 109 of EPAct 2005. Moreover, DOE does not see a conflict between this rule and the Federal building energy efficiency rules in 10 CFR parts 433 and 435 in terms of life-cycle cost-effectiveness.

2. Other Impacts

DOE also received eighteen comments on other impacts of the rule. One comment stated this rule is an action that would have a significant adverse effect on energy, and therefore DOE must prepare a Statement of Energy Effects pursuant to E.O. 13211. *See* 79 FR 61722. In response, DOE states that this rule is not a significant energy action requiring a Statement of Energy Effects pursuant to E.O. 13211, because it is not expected to have a significant adverse effect on the supply, distribution, or use of energy. According to the Office of Management and Budget, “adverse effects” requiring a statement under E.O. 13211 include significant (1) reductions in the production or supply of crude oil, coal, natural gas, or other fuel; (2) increases in energy use; or (3) increases in the cost of energy production or distribution. The current action implements a statutory mandate to reduce fossil fuel energy use in Federal buildings. As such, this action cannot reasonably be expected to reduce the production or supply of fuel, increase energy use, or significantly increase the cost of energy production.

Several other comments suggested that the proposed mandate is not only costly and impractical, but also infeasible, not flexible enough, or absolutely unattainable. In response, DOE notes that DOE's rule is based directly on Congressionally mandated language in section 433 of EISA 2007, which governs fossil fuel-generated energy

consumption. Per the statute, however, the rule does allow for the downward adjustments of the required reductions in some cases.

Other comments supported the rule, by pointing out that this rule presents DOE with a significant opportunity not only to reduce the Federal Government's own energy costs and environmental footprint, but also to influence the design of both state and local government buildings as well as all new residential and commercial buildings. Therefore, this proposed rulemaking is an opportunity for the Federal Government to use its large purchasing power to drive and transform markets for greater efficiency and reduced fossil fuel consumption in all buildings. Two additional supportive comments commended DOE for working with stakeholders to craft the 2014 SNOPR and pointed out that the rule will increase the ability to design and build facilities that use less energy, save energy, save taxpayers money, and protect the environment; and also that stakeholders from varying industries have been working with the Department of Energy to implement this rule in a way that is smart, efficient, and effective, noting that some have argued that these targets are not achievable, but building and sustainability professionals are already succeeding in making Federal facilities meet sustainability targets, including DOE's new Research Support Facilities ("RSF") in Colorado, which opened in 2010. More importantly, private sector owners are increasingly adopting these technologies and strategies for their buildings.

DOE also received six comments on the use of the social cost of carbon ("SCC"). DOE is presenting monetized benefits in accordance with the applicable Executive Orders and DOE would reach the same tentative conclusion presented in this SNOPR in the absence of the social cost of greenhouse gases, including the February 2021 Interim

Estimates presented by the Interagency Working Group on the Social Cost of Greenhouse Gases.

F. Guidance and Other Topics

DOE requested specific comment in the 2010 NOPR and 2014 SNOPR on what additional training and guidance would help agencies meet the reductions called for by this statute. DOE received a single comment on this topic in the 2014 SNOPR. That comment focused on the fact that DOE had not included implementation of sub-metering as a requirement for new Federal buildings and major renovations for Federal buildings because the compulsory implementation of sub-metering should alleviate future stresses related to clarification of major renovations, improve accuracy of process load baselines for future Federal building construction, and aid in verification of building simulation models developed during the design stage (especially since they are enforced under this rule for current and future projects). The commenter further stated that dissemination of sub-metering in Federal buildings is instrumental in achieving an intelligent grid capable of improving delivered power quality and inducing energy efficient behavior from building owners and operators. In response, DOE notes that agencies are already subject to certain metering and advanced metering requirements. 42 U.S.C. 8253(e). DOE has issued metering guidance for Federal agencies in accordance with the Energy Policy Act of 2005, EISA 2007, and the Presidential Memorandum "Federal Leadership on Energy Management". See *www.energy.gov/eere/femp/articles/doe-releases-Federal-building-metering-guidance* for more details. DOE notes this guidance addresses metering, and not sub-metering, in accordance with Congressional and Presidential direction. Neither sub-metering nor metering is expressly mentioned in section 433 of EISA 2007. Therefore, those topics are not addressed in this SNOPR.

IV. Methodology, Analytical Results, and Conclusion

DOE acknowledges exchanging on-site fossil fuel generated energy for reliance on the electric grid, which may still be generating energy with fossil fuels, doesn't necessarily lead to an immediate reduction in emissions of GHGs and SO_2 and in some cases (and as a whole) may result in increased energy costs. However, this proposed rule is intended to prepare federal buildings for a green energy future. By ensuring that federal buildings are designed—either from the ground up, or when being renovated—to rely on the electric grid, the rule ensures that long-term, as the grid integrates more carbon free energies, emissions will be reduced. In addition, DOE expects emerging and improving technological advancements in electric equipment such as heat pumps will lead to additional and dramatic site energy savings further improving the emissions and cost savings cases for this rule.

A. Cost-Effectiveness

DOE's assumptions and methodology for the cost-effectiveness of this rule are built upon the cost-effectiveness analysis of ASHRAE Standard 90.1-2019 conducted by DOE's State building energy codes program,[12] as well as DOE's Environmental Assessment (EA) for this proposed rulemaking.[13] As described in the EA, DOE identified a rate of new Federal commercial construction of 13.3 million square feet per year with a distribution of building types as shown in Table IV.1. Starting in the year 2030, section 205(c)(ii) of Executive Order 14057, "Catalyzing Clean Energy Industries and Jobs

[12] *See* DOE's analysis of the cost savings of the 2016 and 2019 ASHRAE 90.1 Standards at *www.energycodes.gov/sites/default/files/2020-07/90.1-2016_National_Cost-Effectiveness.pdf* and *www.energycodes.gov/sites/default/files/2021-07/90.1-2019_National_Cost-Effectiveness.pdf*, respectively.
[13] The Environmental Assessment (EA) (DOE/EA-2165) is entitled, "Environmental Assessment for Final Rule, 10 CFR part 433, `Energy Efficiency Standards for New Federal Commercial and Multi-Family High-Rise Residential Buildings' Baseline Standards Update". The EA may be found in the docket for this proposed rulemaking and at *www.energy.gov/node/472482*.

Through Federal Sustainability." (December 8, 2021) requires to "design new construction and modernization projects greater than 25,000 gross square feet to be net-zero emissions by 2030". This effectively reduces the impact of this rule to apply to new construction and major renovation projects that fall above the cost threshold but are also below 25,000 gross square feet. For the year 2030 and beyond the estimated new Federal commercial and multi-family high-rise residential building construction volume per year will be 2.2 million square feet per year with a distribution of building types as shown in Table IV.2. The distribution of building types is based on an extraction of the latest 10 years of new construction data entered into the Federal Real Property Portfolio Management System ("FRPP MS") that meets the required cost threshold of the proposed rule for cases both before and after the 25,000 Sf minimum triggering EO 14057 compliance.[14] Additionally DOE identified an estimated rate of federal major renovation projects that would be influenced by this rule. To do so DOE utilized data from the Federal Compliance Tracking System ("CTS") where agencies report data on building efficiency improvement projects. The data from CTS was queried to include only those projects which would meet the cost threshold and have impacts on site fossil fuel energy consumption. As not all agencies are compliant in reporting data into CTS, results were scaled up to account for agencies out of compliance. CTS does not supply data on the types of buildings for the reported projects, as such the distribution of eligible federal buildings for a renovation that would meet the cost threshold was applied to the estimated project square footage. DOE identified a rate of new Federal major renovation construction of 1.36 million square feet per year with a distribution of building types as shown in Table IV.1. Starting in the year 2030, section 205(c)(ii) of Executive Order 14057 "Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability." (December 8, 2021) requires agencies to "design new construction and modernization

[14] See *www.realpropertyprofile.gov/FRPPMS/FRPP_Login*.

projects greater than 25,000 gross square feet to be net-zero emissions by 2030". This part of the Executive Order effectively reduces the impact of this rule to apply only to new construction and major renovation projects that fall above the cost threshold but are also below 25,000 gross square feet. Taking this into account for the year 2030 and beyond, the estimated new Federal commercial and multi-family high-rise residential building major renovation construction volume per year will be 0.4 million square feet per year with a distribution of building types as shown in Table IV.1 and Table IV.2 of this document. These tables also show the prototype buildings incorporated into computer simulations that are used to estimate energy use in each building type. DOE derived these prototype buildings from 16 building types in 17 climate zones[15] using its Commercial Prototype Building models.[16] Of the 16 prototype buildings, DOE developed costs for 6 prototype buildings to determine the cost effectiveness of ASHRAE Standard 90.1-2016 and ASHRAE Standard 90.1-2019. DOE then extracted the cost-effectiveness information for those prototype buildings and weighted those values as appropriate to obtain an average cost effectiveness value for building types found in the Federal commercial sector.

[15] Briggs, R.S., R.G. Lucas, and Z.T. Taylor. 2003. "Climate classification for building energy codes and standards: Part 1—Development Process." ASHRAE Transactions 109(1): 109:121. American Society of Heating, Refrigerating and Air-Conditioning Engineers. Atlanta, Georgia.
[16] DOE's prototype buildings are described at *www.energycodes.gov/prototype-building-models*.

Table IV.1 New Federal Commercial and High-Rise Multi-Family Construction Volume by Building Type for buildings constructed in years 2025-2029

Building Type	Fraction of Federal Construction Volume (by floor area)	Assumed BECP Prototypes for Energy Savings	Assumed BECP Prototypes for Cost Effectiveness
Office	17.77%	Small Office, Medium Office, Large Office	Small Office, Large Office
Dormitories and Barracks	14.57%	Small Hotel, Mid-rise Apartment, High-rise Apartment	Small Hotel, Mid-rise Apartment
School	15.65%	Secondary School	Primary School
Service	15.16%	Stand-alone Retail, Non-refrigerated Warehouse	Stand-alone Retail
Other Institutional Uses	5.76%	None*	None
Hospital	7.80%	Hospital	Small Office, Large Office
Warehouses	2.95%	Non-Refrigerated Warehouse	None
Laboratories	4.24%	Medium Office, Hospital	Small Office, Large Office
All Other	2.74%	None	None
Outpatient Healthcare Facility	5.00%	Outpatient Healthcare	Small Office
Industrial	1.63%	None	None
Child Care Center	0.89%	Primary School	Primary School
Communications Systems	1.42%	None	None
Prisons and Detention Centers	0.18%	None	None
Family Housing	1.06%	Mid-rise Apartment	Mid-rise Apartment
Navigation and Traffic Aids	0.53%	None	None
Land Port of Entry	0.68%	Non-refrigerated Warehouse	None
Border/Inspection Station	0.64%	Small Office, Non-refrigerated Warehouse	Small Office
Facility Security	0.25%	Small Office	Small Office
Data Centers	0.34%	None	None
Museum	0.74%	None	None
Comfort Station/Restrooms	0.01%	Non-refrigerated Warehouse	None
Public Facing Facility	0.02%	Stand-alone Retail	Stand-alone Retail
Aviation Security Related	0.00%	Small Office	Small Office
Post Office	0.00%	Stand-alone Retail	Stand-alone Retail

* Note that energy savings and cost-effectiveness mapping are not available for a number of Federal building types, with other institutional uses, warehouses, and all other being the largest Federal building types with no reliable mapping. As described in this section, DOE considered energy savings and costs for these unmapped Federal building types to be equivalent to the weighted energy savings and cost for the mapped Federal building types.

Table IV.2 New Federal Commercial and High-Rise Multi-Family Construction Volume by Building Type for buildings constructed in years 2030-2054

Building Type	Fraction of Federal Construction Volume (by floor area)	Assumed BECP Prototypes for Energy Savings	Assumed BECP Prototypes for Cost Effectiveness
Office	14.24%	Small Office, Medium Office	Small Office, Large Office
Dormitories and Barracks	4.02%	Small Hotel, Mid-rise Apartment, High-rise Apartment	Small Hotel, Mid-rise Apartment
School	10.88%	Secondary School	Primary School
Service	18.34%	Stand-alone Retail, Non-refrigerated Warehouse	Stand-alone Retail
Other Institutional Uses	12.63%	None*	None
Hospital	2.97%	Hospital	Small Office, Large Office
Warehouses	6.88%	Non-Refrigerated Warehouse	None
Laboratories	4.37%	Medium Office, Hospital	Small Office, Large Office
All Other	5.58%	None	None
Outpatient Healthcare Facility	7.66%	Outpatient Healthcare	Small Office
Industrial	2.05%	None	None
Child Care Center	2.67%	Primary School	Primary School
Communications Systems	0.87%	None	None
Prisons and Detention Centers	0.26%	None	None
Family Housing	1.49%	Mid-rise Apartment	Mid-rise Apartment
Navigation and Traffic Aids	1.95%	None	None
Land Port of Entry	0.99%	Non-refrigerated Warehouse	None
Border/Inspection Station	0.36%	Small Office, Non-refrigerated Warehouse	Small Office
Facility Security	1.36%	Small Office	Small Office
Data Centers	0.19%	None	None
Museum	0.10%	None	None
Comfort Station/Restrooms	0.03%	Non-refrigerated Warehouse	None
Public Facing Facility	0.09%	Stand-alone Retail	Stand-alone Retail
Aviation Security Related	0.00%	Small Office	Small Office
Post Office	0.00%	Stand-alone Retail	Stand-alone Retail

* Note that energy savings and cost-effectiveness mapping are not available for a number of Federal building types, with other institutional uses, warehouses, and all other being the largest Federal building types with no reliable mapping. As described in this section, DOE considered energy savings and costs for these unmapped Federal building types to be equivalent to the weighted energy savings and cost for the mapped Federal building types.

DOE has determined incremental construction first cost information for the building types and climate zones analyzed for buildings compliant with this proposed rule

("Clean Energy Rule Compliant" buildings) versus ASHRAE Standard 90.1-2019 (see Table IV.3)[17].

Table IV.3 Incremental Construction First Cost (2021$) for ASHRAE Standard 90.1-2019 vs. Fossil Fuel Compliant Building Design

Prototype	Value	ASHRAE Climate Zone*				
		2A	3A	3B	4A	5A
Small Office	First Cost	$673	$584	$515	$1,666	$641
	$/ft2	$0.12	$0.11	$0.09	$0.30	$0.12
Large Office	First Cost	$261,781	$268,194	$196,408	$354,808	$223,553
	$/ft2	$0.52	$0.54	$0.39	$0.71	$0.45
Stand-alone Retail	First Cost	$19,608	$20,240	$19,740	$21,563	$19,363
	$/ft2	$0.79	$0.82	$0.80	$0.87	$0.78
Primary School	First Cost	($126,946)	($121,994)	($116,139)	($94,722)	($122,894)
	$/ft2	($1.72)	($1.65)	($1.57)	($1.28)	($1.66)
Small Hotel	First Cost	($104,866)	($104,624)	($104,396)	($101,194)	($103,044)
	$/ft2	($2.43)	($2.42)	($2.42)	($2.34)	($2.38)
Mid-rise Apartment	First Cost	($18,343)	($17,490)	($18,113)	($12,445)	($25,126)
	$/ft2	($0.54)	($0.52)	($0.54)	($0.37)	($0.74)

***** Negative costs (shown in parentheses) indicate a reduction in cost due to changes in the code, usually due to reduced HVAC capital cost and reduction of venting required for onsite combustion.

DOE used data from Table IV.3 to calculate preliminary values for overall incremental first cost of construction for Federal commercial and high-rise, multi-family residential buildings. DOE calculated the incremental first cost of the Federal building types based on the DOE cost prototypes shown in the far-right column of Table IV.1 of this document. DOE then calculated the weighted average incremental cost for mapped Federal building types based on their corresponding BECP prototypes, which represent an estimated 79.3 percent of new Federal construction. This weighted incremental cost was assigned to un-mapped Federal building types, and a total weighted incremental cost

[17] Note that the values in Table IV.3 have been adjusted to reflect 2021$ from the table that appears in DOE's determination of energy savings for Standard 90.1-2016, which were in 2018$. This adjustment was made using the GDP deflator value to correct for inflation between 2018 and 2021. Organization for Economic Co-operation and Development, GDP Implicit Price Deflator in United States, retrieved from FRED, Federal Reserve Bank of St. Louis; *fred.stlouisfed.org/series/USAGDPDEFAISMEI*, Updated February 17, 2021. These values have also been adjusted to reflect the same underlying economic assumptions as the 2019 version, and sales tax has also been removed.

was calculated by multiplying the incremental cost for each Federal building type by the fraction of Federal construction shown in Table IV.1.

The national incremental first cost for building types was developed by multiplying the average (across climate zones) incremental first cost of the prototypes (determined from the DOE State building energy codes program ASHRAE Standard 90.1 cost-effectiveness analysis) by the fraction of the Federal sector construction volume shown in Table IV.1, and then multiplying that by the total estimate of Federal new construction floorspace.[18] DOE estimates that total first cost outlays for new Federal buildings will be less under Clean Energy Rule compliant designs than ASHRAE Standard 90.1-2019, primarily due to lower HVAC equipment costs for some building types (See Table IV.3). The resulting total incremental first cost estimate is a savings of $8.62 million per year. The average first cost decrease is $1.86 per square foot. These first cost decreases are a result of the lower capital costs of the assumed electric equipment types as dictated in the ASHRAE and IECC energy codes (as mandated in 10 CFR part 433 and 10 CFR part 435 and are the baseline for this modified building efficiency standard). Minimally compliant electric equipment was assumed in the proposed case as hitting the 30% better than baseline performance goal as generally required by regulation and does include a cost effectiveness caveat that can reduce the goal down to minimal compliance. As can be seen in Table IV.4, most building types switch their space heating systems from a fossil fuel burning system over to an electric resistance-based system. DOE seeks comment on the efficiency of the electric equipment used in its analyses.

[18] For the Federal office building, the small and large office prototype first costs were averaged. For the Federal education building, the primary school prototype first cost was used. For the Federal dormitories/barracks building type, the small hotel and mid-rise apartment prototype first costs were averaged.

Table IV.4 Breakdown of proposed heating system by building protype

Building Prototype	Yearly Constructed SF - Post 2030	Yearly Constructed SF - Pre 2030	Baseline Gas Unit Efficiency	Proposed Electric Unit Efficiency	Space Heat Notes
Small Office	12.8%	14.8%	0.81	99% Electric Boilers	Convert using AFUE for gas furnace and AFUE Estimate for Electric Furnace
Medium Office	2.6%	5.5%	0.79	99% Electric Furnaces	Convert using pre 1/1/2023 Et estimated Et for Furnaces assuming 0.75 % casing loss
Large Office	0.0%	2.3%	0.82	99% Electric Boilers	Convert using Et Estimate for boilers
Stand-Alone Retail	13.2%	8.8%	0.79	1.76 COP RTU Heat Pump	Convert using national weight heat pump efficiency from office analysis
Primary School	3.8%	1.0%	0.81	99% ¼ Furnaces, ¾ boilers	¼ Furnaces, ¾ boilers. Convert both to electric equivalents
Secondary School	15.5%	18.1%	0.82	99% Electric Boilers	Convert using Et Estimate for boilers
Outpatient Health Care	10.9%	5.8%	0.82	99% Electric Boilers	Convert using Et Estimate for boilers
Hospital	8.9%	12.7%	0.82	99% Electric Boilers	Convert using Et Estimate for boilers
Small Hotel	0.4%	1.2%	0.81	99% Electric Furnaces	Convert using AFUE for Gas and AFUE Estimate for Electric
Warehouse	24.4%	13.1%	0.79	99% Electric Furnaces	Note Model uses a 0.8 gas AFUE for office space, but 0.7925 for Fine storage and unit heater.
Mid-Rise Apartment	4.7%	8.7%	0.81	2.4 COP Residential Heat Pump	Convert using AFUE Estimate to residential HSPF
High-Rise Apartment	2.7%	8.2%	0.82	99% Electric Boilers	Convert using Et Estimate for boilers

An estimated 17.7 percent of the projects would utilize heat pumps in their proposed “all electric” case (those that map to Stand Alone Retail and Mid-Rise Apartment prototype models) with assumed efficiency performance metrics as noted. Service hot water systems (when not already specified as an electric system per 10 CFR parts 433 and 435 requirement) are similarly assumed to be minimally compliant electric resistance systems with 99 percent efficiencies. Cooking systems where present are

assumed to switch from 40 percent efficient gas systems to 70 percent standard efficiency electric systems.

It should be noted that in all cases higher efficiency electric equipment is available on the market, but the statutory authority of this rule is limited to total building reduction targets and does not specify specific equipment types or efficiency levels. An agency is free to design a project per their own site, cost, and usage specific needs, while complying with the applicable efficiency targets. As such, the analysis presented in this SNOPR intends to capture the base-level compliance cases only. An agency is free and encouraged to select higher efficiency equipment (such as even higher efficiency heat pumps and/or more widespread adoption) as project details accommodate. DOE encourages the higher efficiency equipment to be carefully considered by agencies as it can often provide projects with a lifecycle cost effective solution that saves even more energy and emissions (albeit usually with higher up-front capital costs) than presented for base compliance with this rule.

DOE is seeking comment with regard to heat pump pricing, availability, efficiency levels, and weather incentivizing higher performing equipment is likely to increase utilization amongst federal facilities.

DOE also analyzed the relative impact of the final rule on the first cost of new constructed Federal buildings as a percentage of the overall annual cost of newly constructed Federal commercial and high-rise buildings. In order to estimate the total cost of construction for new Federal buildings, DOE obtained estimated construction costs for new Federal commercial and high-rise multifamily buildings were obtained from RS

Means (2020)[19] for the six building types analyzed in DOE's cost-effectiveness report. These new construction costs were weighted by the percent of Federal floorspace to develop an average cost of a new Federal building of $198 per square foot, as shown in Table IV.5. This average construction cost may be multiplied by the overall total of 19.54 million square feet of new Federal construction per year used in this rulemaking to estimate the annual total cost of all new Federal commercial and high-rise multi-family construction of $3.86 billion. As previously noted, first cost savings associated with this rulemaking are estimated at $8.62 million per year, indicating a potential cost reduction in new Federal construction costs of 0.223 percent ($8.62 million divided by $3.86 billion).

Table IV.5 First Cost of Typical New Federal Building in $/ft2

Federal Building Type	Weight	First Cost*	Weighted Cost
Office	20.74%	$210	$43.51
Barracks and Dormitories	14.85%	$217	$32.18
School	14.33%	$225	$32.25
Service	13.31%	$116	$15.44
Hospital	5.57%	$200	$11.14
Laboratories	4.37%	$200	$8.73
Outpatient Healthcare Facility	3.35%	$220	$7.38
Child Care Center	1.18%	$225	$2.67
Family Housing >3 Stories	0.68%	$218	$1.48
Border/Inspection Station	0.49%	$220	$1.07
Facility Security	0.31%	$220	$0.69
Aviation Security Related	0.01%	$220	$0.02
Public Facing Facility	0.05%	$116	$0.06
Post Office	0.01%	$116	$0.01
Remaining Federal Stock	20.75%	$198	$41.00
Federal Average	100.00%	$198	$197.62

*All building first cost data from RS Means 2020.

DOE determined that the total incremental first cost estimate for Federal buildings (as mapped to the prototype buildings in Table IV.1) is a savings of $139.4 million (at a 3 percent discount rate) and a cost of $85.5 million (based on a 7 percent discount rate),

[19] RS Means. 2020. RS Means Building Construction Cost Data, 78th Ed. Construction Publishers & Consultants. Norwell, MA.

with an average first cost decrease of $1.0 per square foot (at a 3 percent discount rate) and $0.61 per square foot (at a 3 percent discount rate).

For annualized energy cost savings, DOE used a similar approach to that used for incremental first cost. That is, DOE developed the national annualized energy cost savings[20] for building types by multiplying the average (across climate zones) energy cost savings (determined from the DOE ASHRAE Standard 90.1 cost-effectiveness analysis) by the fraction of the Federal sector construction volume shown in Table IV.1, and then multiplying that by the total estimate of Federal new construction floorspace.[21] Table IV.6[22] shows the annual energy cost savings by prototype buildings for a Clean Energy Rule compliant building compared to ASHRAE Standard 90.1-2019. There are increases in energy costs across the board, this is because despite the increases in equipment efficiency and overall site energy savings the difference between the cost of fossil fuels (primarily natural gas) and purchased electricity at a national level are too high for the improvements to overcome. The EIA AEO 2021 energy outlook rate projections indicate that per the same amount of site energy consumed, electricity is about 4.3x more

[20] The energy costs used were the national average energy costs used by ASHRAE in the development of Standard 90.1-2019. To quote the cost-effectiveness analysis report "Energy rates used to calculate the energy costs from the modeled energy usage were $0.98/therm for fossil fuel and $0.1063/kWh for electricity. These rates were used for the 90.1-2019 energy analysis and derived from the EIA data. These were the values approved by the SSPC 90.1 for cost-effectiveness for the evaluation of individual addenda during the development of 90.1-2019."

[21] For the Federal office building, the small and large office prototype LCCs were weighted by estimated fraction of small and large offices observed in the FRPP MS database over the past 10 years of construction. For the Federal education building, the primary school prototype LCC was used. For the Federal dorm/barracks building type, the small office, small hotel and mid-rise apartment prototype LCCs were averaged.

[22] Note that the values in Table IV.5 have been adjusted to reflect 2020$ from the table that appears in DOE's determination of energy savings for Standard 90.1-2016, which were in 2018$. This adjustment was made using the GDP deflator value to correct for inflation between 2018 and 2020. Organization for Economic Co-operation and Development, GDP Implicit Price Deflator in United States, retrieved from FRED, Federal Reserve Bank of St. Louis; *fred.stlouisfed.org/series/USAGDPDEFAISMEI*, Updated February 17, 2021. These values have also been adjusted to reflect the same underlying economic assumptions as the 2019 version.

expensive than natural gas, this number gradually reduces over time per this projection down to 3.2x by the year 2050.

As was done for the incremental cost analysis, the 2019 energy cost savings analysis was adjusted to use the same underlying economic assumptions as the Clean Energy Rule Compliant version, including fuel prices, fuel price escalations, labor and material costs, and the removal of sales tax. The resulting total annualized energy cost impacts for the Clean Energy Rule affected buildings' 14.7 million square feet of annual construction for years 2025-2029 and 2.6 million square feet of annual construction for years 2030-2054 was estimated to be an additional cost of $10.6 million/yr (at a 3 percent discount rate) and $8.3 million/yr (at a 7 percent discount rate). The annualized energy cost impacts were estimated to be an additional $2.28 per square foot (at a 3 percent discount rate) and -1.78 per square foot (at a 3 percent discount rate). Note the annual energy cost impacts are for one year of Federal commercial and high-rise multi-family residential construction and that those impacts accumulate over the evaluation period.

Table IV.6 Annualized Energy Costs (2021$) for ASHRAE Standard 90.1-2019 vs. Fossil Fuel Compliant Building Design

Building Prototype	Total Prototype Usage	Annualized Energy Cost Savings (M$2021)		Annualized Energy Cost Savings Intensity (M$2021/SF)	
		3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Small Office	14.78%	($1.57)	($1.23)	($0.34)	($0.26)
Medium Office	5.53%	($0.59)	($0.46)	($0.13)	($0.10)
Large Office	2.26%	($0.24)	($0.19)	($0.05)	($0.04)
Stand-Alone Retail	8.76%	($0.93)	($0.73)	($0.20)	($0.16)
Strip Mall	0.00%	$0.00	$0.00	$0.00	$0.00
Primary School	1.02%	($0.11)	($0.08)	($0.02)	($0.02)
Secondary School	18.06%	($1.91)	($1.50)	($0.41)	($0.32)
Outpatient Health Care	5.76%	($0.61)	($0.48)	($0.13)	($0.10)
Hospital	12.68%	($1.34)	($1.05)	($0.29)	($0.23)
Small Hotel	1.18%	($0.12)	($0.10)	($0.03)	($0.02)
Large Hotel	0.00%	$0.00	$0.00	$0.00	$0.00
Quick-service Restaurant	0.00%	$0.00	$0.00	$0.00	$0.00
Full-service Restaurant	0.00%	$0.00	$0.00	$0.00	$0.00
Mid-Rise Apartment	8.95%	($0.95)	($0.74)	($0.20)	($0.16)
High-Rise Apartment	7.90%	($0.84)	($0.66)	($0.18)	($0.14)
Non-Refrigerated Warehouse	13.12%	($1.39)	($1.09)	($0.30)	($0.23)
Total	100.00%	($10.60)	($8.30)	($2.28)	($1.78)

Note: Negative numbers represent an increase cost

For LCC net savings, DOE used a similar approach to that used for incremental first cost and first year energy cost savings. That is, DOE developed the national annual LCC net savings[23] for the entire rule by multiplying the average (across climate zones)

[23] The energy costs used were the national average energy costs used by ASHRAE in the development of Standard 90.1-2019. To quote the cost-effectiveness analysis report "Energy rates used to calculate the

LCC net savings (determined from the DOE ASHRAE Standard 90.1 cost-effectiveness analysis) by the fraction of the Federal sector construction volume shown in Table IV.1, and then multiplying that by the total estimate of Federal new construction floorspace.[24] Table IV.7 shows annual LCC net savings by prototype buildings for the Clean Energy Rule Compliant Case compared to ASHRAE Standard 90.1-2019. As was done for the incremental cost analysis, the 2019 LCC analysis was adjusted to use the same underlying economic assumptions as the Clean Energy Rule Compliant Case, including fuel prices, fuel price escalations, labor and material costs, and the removal of sales tax. The resulting total LCC net savings for 14.7 million square feet of annual construction for years 2025-2029 and 2.6 million square feet of annual construction for years 2030-2054 was estimated to be a cost of $56.13 million (at a 3 percent discount rate) and a cost of $4.07 million (based on a 7 percent discount rate). The average LCC net impacts in year 1 was estimated to be a cost of $12.09 million (at a 3 percent discount rate) and a cost of $0.88 million (based on a 7 percent discount rate. Note the annual LCC savings are for one year of Federal commercial and high-rise multi-family residential construction and that those savings would accumulate over the LCC evaluation period. For the purpose of this analysis, DOE relied on a 30-year period.[25]

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energy costs from the modeled energy usage were $0.98/therm for fossil fuel and $0.1063/kWh for electricity. These rates were used for the 90.1-2019 energy analysis and derived from the EIA data. These were the values approved by the SSPC 90.1 for cost-effectiveness for the evaluation of individual addenda during the development of 90.1-2019."

[24] For the Federal office building, the small and large office prototype LCCs were weighted by estimated fraction of small and large offices observed in the FRPP MS database over the past 10 years of construction. For the Federal education building, the primary school prototype LCC was used. For the Federal dorm/barracks building type, the small office, small hotel and mid-rise apartment prototype LCCs were averaged.

[25] Lavappa, P and J Kneifel. 2021. Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis-2021 Annual Supplement to NIST Handbook 135.

Table IV.7 Annual Net Life-Cycle Cost (LCC) (2021$) for ASHRAE Standard 90.1-2019 vs. Fossil Fuel Compliant Building Design

Building Prototype	Total Prototype Usage	Cumulative LCC Cost Savings, (M$2021)		Annualized LCC Cost Savings, Annualized (M$2021)	
		3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Small Office	14.78%	($8.30)	($0.60)	($0.45)	($0.13)
Medium Office	5.53%	($3.10)	($0.23)	($0.17)	($0.05)
Large Office	2.26%	($1.27)	($0.09)	($0.07)	($0.02)
Stand-Alone Retail	8.76%	($4.92)	($0.36)	($0.27)	($0.08)
Strip Mall	0.00%	$0.00	$0.00	$0.00	$0.00
Primary School	1.02%	($0.57)	($0.04)	($0.03)	($0.01)
Secondary School	18.06%	($10.13)	($0.73)	($0.55)	($0.16)
Outpatient Health Care	5.76%	($3.24)	($0.23)	($0.17)	($0.05)
Hospital	12.68%	($7.12)	($0.52)	($0.38)	($0.11)
Small Hotel	1.18%	($0.66)	($0.05)	($0.04)	($0.01)
Large Hotel	0.00%	$0.00	$0.00	$0.00	$0.00
Quick-service Restaurant	0.00%	$0.00	$0.00	$0.00	$0.00
Full-service Restaurant	0.00%	$0.00	$0.00	$0.00	$0.00
Mid-Rise Apartment	8.95%	($5.02)	($0.36)	($0.27)	($0.08)
High-Rise Apartment	7.90%	($4.43)	($0.32)	($0.24)	($0.07)
Non-Refrigerated Warehouse	13.12%	($7.37)	($0.53)	($0.40)	($0.12)
Total	100.00%	($56.13)	($4.07)	($0.45)	($0.88)

Note: Negative numbers represent an increase cost or disbenefit.

DOE also conducted a net benefits and costs analysis using a 30-year analysis period and an assumed building lifetime of 30 years. The building lifetime assumption was made to correspond with availability of underlying data from the cost-effectiveness analysis conducted by DOE's State building energy codes program.

DOE calculated the net present value ("NPV") of the change in equipment cost and reduced operating cost associated with the difference between the Clean Energy Rule

compliant case and ASHRAE 90.1-2019. The NPV is the value in the present of a time-series of costs and savings, equal to the present value of savings in operating cost minus the present value of the increased total equipment cost.

DOE determined the total increased equipment cost for each year of the analysis period (2024-2053) using the incremental construction cost described previously. DOE determined the present value of operating cost savings for each year from the beginning of the analysis period to the year when all Federal buildings constructed by 2054 have been retired, assuming a 30-year lifetime of the building.

The average annual operating cost includes the costs for energy, repair, or replacement of building components (*e.g.,* heating and cooling equipment, lighting, and envelope measures), and maintenance of the building. DOE determined the per-unit annual increase in operating cost based on the differences in energy costs plus replacement and maintenance cost savings, which were calculated in the underlying cost-effectiveness analysis by DOE's State building energy codes program. While DOE used the methodology and prices described above to calculate first year energy cost savings and LCC net savings, for the NPV calculations, DOE determined the per-unit annual savings in operating cost by multiplying the per square foot annual electricity and natural gas savings in energy consumption by the appropriate energy price from EIA's *AEO2021*.[26] DOE forecasted energy prices based on projected average annual price changes in EIA's *AEO2021* to develop the operating cost savings through the analysis period.

[26] DOE – U.S. Department of Energy. 2022. Annual Energy Outlook 2022 with Projections to 2050. Washington, D.C. Available at *www.eia.gov/outlooks/aeo/*.

DOE uses national discount rates to calculate national NPV. DOE estimated NPV using both a 3-percent and a 7-percent real discount rate, in accordance with the Office of Management and Budget's guidance to Federal agencies on the development of regulatory analysis, particularly section E therein: *Identifying and Measuring Benefits and Costs*.[27] The NPV is the sum over time of the discounted net savings.

The present value of increased equipment costs is the annual total cost increase in each year (the difference between The Clean Energy Rule Compliant Case and ASHRAE 90.1-2019), discounted to the present, and summed throughout the analysis period (2024 through 2053) plus 30-year lifetime. Because new construction is held constant through the analysis period, the installed cost is constant.

The present value of savings in operating cost is the annual savings in operating cost (the difference between The Clean Energy Rule Compliant Case and ASHRAE 90.1-2019), discounted to the present and summed through the analysis period (2024 through 2053) plus 30-year lifetime. Savings are decreases in operating cost associated with the higher energy efficiency associated with buildings designed to the Clean Energy Rule Compliant Case compared to ASHRAE 90.1-2019. Total annual savings in operating cost are the savings per square foot multiplied by the number of square feet that survive in a particular year through the lifetime of the buildings constructed in the last year of the analysis period.

B. Emissions Analysis

The emissions analysis consists of two components. The first component estimates the effect of potential Federal building energy standards on power sector and

[27] Office of Management and Budget. OMB Circular A-4, Regulatory Analysis. 2003. OMB: Washington, D.C. September 17, 2003. *www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A4/a-4.pdf*.

site (where applicable) combustion emissions of CO_2, NO_X, SO_2, and Hg. The second component estimates the impacts of potential Federal building energy standards on emissions of two additional greenhouse gases, CH_4 and N_2O, as well as the changes to emissions of other gases due to "upstream" activities in the fuel production chain. These upstream activities comprise extraction, processing, and transporting fuels to the site of combustion.

The analysis of electric power sector emissions of CO_2, NO_X, SO_2, and Hg uses emissions factors intended to represent the marginal impacts of the change in electricity consumption associated with Federal building energy standards. The methodology is based on results published for the *AEO*, including a set of side cases that implement a variety of efficiency-related policies. The analysis presented in this notice uses projections from *AEO2022*. Power sector emissions of CH_4 and N_2O from fuel combustion are estimated using Emission Factors for Greenhouse Gas Inventories published by the Environmental Protection Agency ("EPA").[28]

Until 2030, the on-site operation of construction subject to this proposed rule allows combustion of fossil fuels and results in emissions of CO_2, NO_X, SO_2, CH_4, and N_2O where these products are used. Site emissions of these gases were estimated using Emission Factors for Greenhouse Gas Inventories and, for NO_X and SO_2 emissions intensity factors from an EPA publication.[29]

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[28] Available at *www.epa.gov/sites/production/files/2021-04/documents/emission-factors_apr2021.pdf* (last accessed July 12, 2021).

[29] U.S. Environmental Protection Agency. External Combustion Sources. In *Compilation of Air Pollutant Emission Factors*. AP-42. Fifth Edition. Volume I: Stationary Point and Area Sources. Chapter 1. Available at *https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors* (last accessed April 15, 2022).

FFC upstream emissions, which include emissions from fuel combustion during extraction, processing, and transportation of fuels, and "fugitive" emissions (direct leakage to the atmosphere) of CH_4 and CO_2, are estimated based on the methodology described in chapter 1 of the NOPR TSD.

The emissions intensity factors are expressed in terms of physical units per MWh or MMBtu of site energy savings. For power sector emissions, specific emissions intensity factors are calculated by sector and end use. Total emissions changes are estimated using the energy savings calculated in the national impact analysis with energy savings derived from a load shifting modeling analysis of ASHRAE Prototype models.

1. Air Quality Regulations Incorporated in DOE's Analysis

DOE's no-new-standards case for the electric power sector reflects the *AEO*, which incorporates the projected impacts of existing air quality regulations on emissions. *AEO2022* generally represents current legislation and environmental regulations, including recent government actions, that were in place at the time of preparation of *AEO2022*, including the emissions control programs discussed in the following paragraphs.[30]

SO_2 emissions from affected electric generating units ("EGUs") are subject to nationwide and regional emissions cap-and-trade programs. Title IV of the Clean Air Act sets an annual emissions cap on SO_2 for affected EGUs in the 48 contiguous States and the District of Columbia (D.C.). (42 U.S.C. 7651 *et seq*.) SO_2 emissions from numerous States in the eastern half of the United States are also limited under the Cross-State Air

[30] For further information, see the Assumptions to *AEO2022* report that sets forth the major assumptions used to generate the projections in the Annual Energy Outlook. Available at *www.eia.gov/outlooks/aeo/assumptions/* (last accessed April 15, 2022).

Pollution Rule ("CSAPR"). 76 FR 48208 (Aug. 8, 2011). CSAPR requires these States to reduce certain emissions, including annual SO_2 emissions, and went into effect as of January 1, 2015.[31] *AEO2022* incorporates implementation of CSAPR, including the update to the CSAPR ozone season program emission budgets and target dates issued in 2016. 81 FR 74504 (Oct. 26, 2016). [32] Compliance with CSAPR is flexible among EGUs and is enforced through the use of tradable emissions allowances. Under existing EPA regulations, for states subject to SO_2 emissions limits under CSAPR, excess SO_2 emissions allowances resulting from the lower electricity demand caused by the adoption of an efficiency standard could be used to permit offsetting increases in SO_2 emissions by another regulated EGU.

However, beginning in 2016, SO_2 emissions began to fall as a result of the Mercury and Air Toxics Standards ("MATS") for power plants. 77 FR 9304 (Feb. 16, 2012). In the MATS final rule, EPA established a standard for hydrogen chloride as a surrogate for acid gas hazardous air pollutants ("HAP"), and also established a standard for SO_2 (a non-HAP acid gas) as an alternative equivalent surrogate standard for acid gas HAP. The same controls are used to reduce HAP and non-HAP acid gas; thus, SO_2 emissions are being reduced as a result of the control technologies installed on coal-fired power plants to comply with the MATS requirements for acid gas. In order to continue operating, coal power plants must have either flue gas desulfurization or dry sorbent

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[31] CSAPR requires states to address annual emissions of SO_2 and NO_X, precursors to the formation of fine particulate matter ($PM_{2.5}$) pollution, in order to address the interstate transport of pollution with respect to the 1997 and 2006 $PM_{2.5}$ National Ambient Air Quality Standards ("NAAQS"). CSAPR also requires certain states to address the ozone season (May-September) emissions of NO_X, a precursor to the formation of ozone pollution, in order to address the interstate transport of ozone pollution with respect to the 1997 ozone NAAQS. 76 FR 48208 (Aug. 8, 2011). EPA subsequently issued a supplemental rule that included an additional five states in the CSAPR ozone season program; 76 FR 80760 (Dec. 27, 2011) (Supplemental Rule), and EPA issued the CSAPR Update for the 2008 ozone NAAQS. 81 FR 74504 (Oct. 26, 2016).

[32] In Sept. 2019, the D.C. Court of Appeals remanded the 2016 CSAPR Update to EPA. In April 2021, EPA finalized the 2021 CSAPR Update which resolved the interstate transport obligations of 21 states for the 2008 ozone NAAQS. 86 FR 23054 (April 30, 2021); *see also*, 86 FR 29948 (June 4, 2021) (correction to preamble). The 2021 CSAPR Update became effective on June 29, 2021. The release of AEO 2021 in February 2021 predated the 2021 CSAPR Update.

injection systems installed. Both technologies, which are used to reduce acid gas emissions, also reduce SO_2 emissions. Because of the emissions reductions under the MATS, it is unlikely that excess SO_2 emissions allowances resulting from the lower electricity demand would be needed or used to permit offsetting increases in SO_2 emissions by another regulated EGU.

CSAPR also established limits on NO_X emissions for numerous States in the eastern half of the United States. Impacts from this Clean Energy Rule would have little effect on NO_X emissions in those States covered by CSAPR emissions limits if excess NO_X emissions allowances resulting from the lower electricity demand could be used to permit offsetting increases in NO_X emissions from other EGUs. In such case, NOx emissions would remain near the limit even if electricity generation goes down. A different case could possibly result, depending on the configuration of the power sector in the different regions and the need for allowances, such that NO_X emissions might not remain at the limit in the case of lower electricity demand. In this case, Federal building standards might reduce NOx emissions in covered States. Despite this possibility, DOE has chosen to be conservative in its analysis and has maintained the assumption that standards will not reduce NO_X emissions in States covered by CSAPR. Federal building standards would be expected to reduce NO_X emissions in the States not covered by CSAPR.

DOE estimated mercury emissions reduction using emissions factors based on AEO2022, which incorporates the MATS.

C. Monetization of Emissions Changes

As part of the development of this rule, for the purpose of complying with the requirements of Executive Order 12866, DOE considered the estimated monetary climate and health benefits and disbenefits from the changes in emissions of CO_2, CH_4, N_2O, NO_X, and SO_2 that are expected to result from this rule. DOE considered the emissions changes expected to result over the lifetime of buildings constructed in the analysis period. This section summarizes the basis for the values used for monetizing the emissions changes and presents the values considered in this rule.

On March 16, 2022, the Fifth Circuit Court of Appeals (No. 22-30087) granted the federal government's emergency motion for stay pending appeal of the February 11, 2022, preliminary injunction issued in *Louisiana v. Biden*, No. 21-cv-1074-JDC-KK (W.D. La.). As a result of the Fifth Circuit's order, the preliminary injunction is no longer in effect, pending resolution of the federal government's appeal of that injunction or a further court order. Among other things, the preliminary injunction enjoined the defendants in that case from "adopting, employing, treating as binding, or relying upon" the interim estimates of the social cost of greenhouse gases—which were issued by the Interagency Working Group on the Social Cost of Greenhouse Gases on February 26, 2021—to monetize the benefits and disbenefits of changing greenhouse gas emissions. In the absence of further intervening court orders, DOE will revert to its approach prior to the injunction and present monetized benefits and disbenefits where appropriate and permissible under law.

1. Monetization of Greenhouse Gas Emissions

For the purpose of complying with the requirements of Executive Order 12866, DOE estimates the monetized benefits and disbenefits of the changes in emissions of

CO_2, CH_4, and N_2O by using a measure of the social cost ("SC") of each pollutant (*e.g.*, SC- CO_2). These estimates represent the monetary value of the net harm to society associated with a marginal increase in emissions of these pollutants in a given year, or the benefit of avoiding that increase. These estimates are intended to include (but are not limited to) climate-change-related changes in net agricultural productivity, human health, property damages from increased flood risk, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services. DOE exercises its own judgment in presenting monetized climate benefits and disbenefits as recommended by applicable Executive orders and guidance, and DOE would reach the same conclusion presented in this notice in the absence of the social cost of greenhouse gases, including the February 2021 Interim Estimates presented by the Interagency Working Group on the Social Cost of Greenhouse Gases.

DOE estimated the climate benefits and disbenefits of CO_2, CH_4, and N_2O changes (i.e., SC-GHGs) using the estimates presented in the Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990 published in February 2021 by the Interagency Working Group on the Social Cost of Greenhouse Gases (IWG) (IWG, 2021).[33] The SC-GHGs is the theoretically appropriate value to use in conducting benefit-cost analyses of policies that affect CO_2, N_2O and CH_4 emissions. As a member of the IWG involved in the development of the February 2021 SC-GHG TSD, the DOE agrees that the interim SC-

[33] *See* Interagency Working Group on Social Cost of Greenhouse Gases, *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide. Interim Estimates Under Executive Order 13990*, Washington, D.C., February 2021. Available at: *www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf* (last accessed March 17, 2021).

GHG estimates represent the most appropriate estimate of the SC-GHG until revised estimates have been developed reflecting the latest, peer-reviewed science.

The SC-GHGs estimates presented here were developed over many years, using transparent process, peer-reviewed methodologies, the best science available at the time of that process, and with input from the public. Specifically, in 2009, an interagency working group ("IWG") that included the DOE and other executive branch agencies and offices was established to ensure that agencies had access to the best available information when quantifying the benefits of reducing CO_2 emissions in benefit-cost analyses. The IWG published estimates of the social cost of carbon ("SC-CO_2") in 2010 that were developed from an ensemble of three widely cited integrated assessment models ("IAMs") that estimate climate damages using highly aggregated representations of climate processes and the global economy combined into a single modeling framework. The three IAMs were run using a common set of input assumptions in each model for future population, economic, and CO_2 emissions growth, as well as equilibrium climate sensitivity ("ECS") – a measure of the globally averaged temperature response to increased atmospheric CO_2 concentrations. These estimates were updated in 2013 based on new versions of each IAM. In August 2016 the IWG published estimates of the social cost of methane ("SC-CH_4") and nitrous oxide ("SC-N_2O") using methodologies that are consistent with the methodology underlying the SC-CO_2 estimates. The modeling approach that extends the IWG SC-CO_2 methodology to non-CO_2 GHGs has undergone multiple stages of peer review. The SC-CH_4 and SC-N_2O estimates were developed by Marten et al. (2015) and underwent a standard double-blind peer review process prior to journal publication.

In 2015, as part of the response to public comments received to a 2013 solicitation for comments on the SC-CO_2 estimates, the IWG announced a National Academies of Sciences, Engineering, and Medicine review of the SC-CO_2 estimates to offer advice on how to approach future updates to ensure that the estimates continue to reflect the best available science and methodologies. In January 2017, the National Academies released their final report, Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide, and recommended specific criteria for future updates to the SC-CO_2 estimates, a modeling framework to satisfy the specified criteria, and both near-term updates and longer-term research needs pertaining to various components of the estimation process (National Academies, 2017).[34] Shortly thereafter, in March 2017, President Trump issued Executive Order 13783, which disbanded the IWG, withdrew the previous TSDs, and directed agencies to ensure SC-CO_2 estimates used in regulatory analyses are consistent with the guidance contained in OMB's Circular A-4, "including with respect to the consideration of domestic versus international impacts and the consideration of appropriate discount rates" (EO 13783, Section 5(c)). Benefit-cost analyses following E.O. 13783 used SC-GHG estimates that attempted to focus on the U.S.-specific share of climate change damages as estimated by the models (and so did not reflect many pathways by which physical impacts outside the United States affect the welfare of U.S. citizens and residents) and were calculated using two default discount rates recommended by Circular A-4, 3 percent and 7 percent.[35]All other methodological

[34] *See* National Academies of Sciences, Engineering, and Medicine. 2017. Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide. Washington, DC: The National Academies Press. *doi.org/10.17226/24651*.

[35] DOE regulatory analyses under E.O. 13783 included sensitivity analyses based on global SC-GHG values and using a lower discount rate of 2.5%. OMB Circular A-4 (2003) recognizes that special considerations arise when applying discount rates if intergenerational effects are important. In the IWG's 2015 *Response to Comments*, OMB—as a co-chair of the IWG—made clear that "Circular A-4 is a living document," that "the use of 7 percent is not considered appropriate for intergenerational discounting," and that "[t]here is wide support for this view in the academic literature, and it is recognized in Circular A-4 itself." OMB, as part of the IWG, similarly repeatedly confirmed that "a focus on global SCC estimates in [regulatory impact analyses] is appropriate" (IWG 2015).

decisions and model versions used in SC-GHG calculations remained the same as those used by the IWG in 2010 and 2013, respectively.

On January 20, 2021, President Biden issued Executive Order 13990, which re-established the IWG and directed it to develop updated estimates of the social cost of carbon and other greenhouse gases that reflect the best available science and the recommendations of the National Academies (2017). The IWG was tasked with first reviewing the SC-GHG estimates currently used in Federal analyses and publishing interim estimates within 30 days of the EO that reflect the full impact of GHG emissions, including by taking global damages into account.

As noted previously, DOE participated in the IWG but has also independently evaluated the interim SC-GHG estimates published in the February 2021 TSD and determined they are appropriate to use here to estimate the climate benefits and disbenefits associated with this proposed rule. DOE and other agencies intend to undertake a fuller update of the SC-GHG estimates that takes into consideration the advice of the National Academies (2017) and other recent scientific literature. The DOE has also evaluated the supporting rationale of the February 2021 TSD, including the studies and methodological issues discussed therein, and concludes that it agrees with the rationale for these estimates presented in the TSD and summarized below.

The February 2021 SC-GHG TSD provides a complete discussion of the IWG's initial review conducted under EO 13990. In particular, the IWG found that the SC-GHG estimates used under E.O. 13783 fail to reflect the full impact of GHG emissions in multiple ways. First, the IWG found that the SC-GHG estimates used under E.O. 13783 fail to fully capture many climate impacts that affect the welfare of U.S. citizens and

residents, and those impacts are better reflected by global measures of the SC-GHG. Examples of effects omitted from the E.O. 13783 estimates include direct effects on U.S. citizens, assets, and investments located abroad, supply chains, U.S. military assets and interests abroad, and tourism, and spillover pathways such as economic and political destabilization and global migration that can lead to adverse impacts on U.S. national security, public health, and humanitarian concerns. In addition, assessing the benefits of U.S. GHG mitigation activities requires consideration of how those actions may affect mitigation activities by other countries, as those international mitigation actions will provide a benefit to U.S. citizens and residents by mitigating climate impacts that affect U.S. citizens and residents. A wide range of scientific and economic experts have emphasized the issue of reciprocity as support for considering global damages of GHG emissions. If the United States does not consider impacts on other countries, it is difficult to convince other countries to consider the impacts of their emissions on the United States. The only way to achieve an efficient allocation of resources for emissions reduction on a global basis—and so benefit the U.S. and its citizens—is for all countries to base their policies on global estimates of damages. As a member of the IWG involved in the development of the February 2021 SC-GHG TSD, DOE agrees with this assessment and, therefore, in this rule DOE centers attention on a global measure of SC-GHG. This approach is the same as that taken in DOE regulatory analyses from 2012 through 2016. A robust estimate of climate damages to U.S. citizens and residents that accounts for the myriad of ways that global climate change reduces the net welfare of U.S. populations does not currently exist in the literature. As explained in the February 2021 TSD, existing estimates are both incomplete and an underestimate of total damages that accrue to the citizens and residents of the U.S. because they do not fully capture the regional interactions and spillovers discussed previously, nor do they include all of the important physical, ecological, and economic impacts of climate change recognized in

the climate change literature. As noted in the February 2021 SC-GHG TSD, the IWG will continue to review developments in the literature, including more robust methodologies for estimating a U.S.-specific SC-GHG value, and explore ways to better inform the public of the full range of carbon impacts. As a member of the IWG, DOE will continue to follow developments in the literature pertaining to this issue.

Second, the IWG found that the use of the social rate of return on capital (7 percent under current OMB Circular A-4 guidance) to discount the future benefits and disbenefits of reducing GHG emissions inappropriately underestimates the impacts of climate change for the purposes of estimating the SC-GHG. Consistent with the findings of the National Academies (2017) and the economic literature, the IWG continued to conclude that the consumption rate of interest is the theoretically appropriate discount rate in an intergenerational context (IWG 2010, 2013, 2016a, 2016b),[36] and recommended that discount rate uncertainty and relevant aspects of intergenerational ethical considerations be accounted for in selecting future discount rates.

Furthermore, the damage estimates developed for use in the SC-GHG are estimated in consumption-equivalent terms, and so an application of OMB Circular A-4's guidance for regulatory analysis would then use the consumption discount rate to

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[36] Interagency Working Group on Social Cost of Carbon. *Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12866*. 2010. United States Government. (Last accessed April 15, 2022.) *www.epa.gov/sites/default/files/2016-12/documents/scc_tsd_2010.pdf*; Interagency Working Group on Social Cost of Carbon. *Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866*. 2013. (Last accessed April 15, 2022.) *www.federalregister.gov/documents/2013/11/26/2013-28242/technical-support-document-technical-update-of-the-social-cost-of-carbon-for-regulatory-impact;* Interagency Working Group on Social Cost of Greenhouse Gases, United States Government. Technical Support Document: Technical Update on the Social Cost of Carbon for Regulatory Impact Analysis-Under Executive Order 12866. August 2016. (Last accessed January 18, 2022.) *www.epa.gov/sites/default/files/2016-12/documents/sc_co2_tsd_august_2016.pdf* ; Interagency Working Group on Social Cost of Greenhouse Gases, United States Government. Addendum to Technical Support Document on Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12866: Application of the Methodology to Estimate the Social Cost of Methane and the Social Cost of Nitrous Oxide. August 2016. (Last accessed January 18, 2022.) *www.epa.gov/sites/default/files/2016-12/documents/addendum_to_sc-ghg_tsd_august_2016.pdf*.

calculate the SC-GHG. DOE agrees with this assessment and will continue to follow developments in the literature pertaining to this issue. DOE also notes that while OMB Circular A-4, as published in 2003, recommends using 3% and 7% discount rates as "default" values, Circular A-4 also reminds agencies that "different regulations may call for different emphases in the analysis, depending on the nature and complexity of the regulatory issues and the sensitivity of the benefit and cost estimates to the key assumptions." On discounting, Circular A-4 recognizes that "special ethical considerations arise when comparing benefits and costs across generations," and Circular A-4 acknowledges that analyses may appropriately "discount future costs and consumption benefits…at a lower rate than for intragenerational analysis." In the 2015 Response to Comments on the Social Cost of Carbon for Regulatory Impact Analysis, OMB, DOE, and the other IWG members recognized that "Circular A-4 is a living document" and "the use of 7 percent is not considered appropriate for intergenerational discounting. There is wide support for this view in the academic literature, and it is recognized in Circular A-4 itself." Thus, DOE concludes that a 7% discount rate is not appropriate to apply to value the social cost of greenhouse gases in the analysis presented in this analysis. In this analysis, to calculate the present and annualized values of climate benefits and disbenefits, DOE uses the same discount rate as the rate used to discount the value of damages from future GHG emissions, for internal consistency. That approach to discounting follows the same approach that the February 2021 TSD recommends "to ensure internal consistency—*i.e.*, future damages from climate change using the SC-GHG at 2.5 percent should be discounted to the base year of the analysis using the same 2.5 percent rate." DOE has also consulted the National Academies' 2017 recommendations on how SC-GHG estimates can "be combined in RIAs with other cost and benefits estimates that may use different discount rates." The National Academies

reviewed "several options," including "presenting all discount rate combinations of other costs and benefits with [SC-GHG] estimates."

As a member of the IWG involved in the development of the February 2021 SC-GHG TSD, DOE agrees with this assessment and will continue to follow developments in the literature pertaining to this issue. While the IWG works to assess how best to incorporate the latest, peer reviewed science to develop an updated set of SC-GHG estimates, it recommended the interim use of the mot SC-GHG estimates developed by the IWG prior to the group being disbanded in 2017. The estimates rely on the same models and harmonized inputs and are calculated using a range of discount rates. As explained in the February 2021 SC-GHG TSD, the IWG has recommended that agencies to revert to the same set of four values drawn from the SC-GHG distributions based on three discount rates as were used in regulatory analyses between 2010 and 2016 and subject to public comment. For each discount rate, the IWG combined the distributions across models and socioeconomic emissions scenarios (applying equal weight to each) and then selected a set of four values recommended for use in benefit-cost analyses: an average value resulting from the model runs for each of three discount rates (2.5 percent, 3 percent, and 5 percent), plus a fourth value, selected as the 95th percentile of estimates based on a 3 percent discount rate. The fourth value was included to provide information on potentially higher-than-expected economic impacts from climate change. As explained in the February 2021 SC-GHG TSD, and DOE agrees, this update reflects the immediate need to have an operational SC-GHG for use in regulatory benefit-cost analyses and other applications that was developed using a transparent process, peer-reviewed methodologies, and the science available at the time of that process. Those estimates were subject to public comment in the context of dozens of proposed rulemakings as well as in a dedicated public comment period in 2013.

There are a number of limitations and uncertainties associated with the SC-GHG estimates. First, the current scientific and economic understanding of discounting approaches suggests discount rates appropriate for intergenerational analysis in the context of climate change are likely to be less than 3 percent, near 2 percent or lower.[37] Second, the IAMs used to produce these interim estimates do not include all of the important physical, ecological, and economic impacts of climate change recognized in the climate change literature and the science underlying their "damage functions" – i.e., the core parts of the IAMs that map global mean temperature changes and other physical impacts of climate change into economic (both market and nonmarket) damages – lags behind the most recent research. For example, limitations include the incomplete treatment of catastrophic and non-catastrophic impacts in the integrated assessment models, their incomplete treatment of adaptation and technological change, the incomplete way in which inter-regional and intersectoral linkages are modeled, uncertainty in the extrapolation of damages to high temperatures, and inadequate representation of the relationship between the discount rate and uncertainty in economic growth over long time horizons. Likewise, the socioeconomic and emissions scenarios used as inputs to the models do not reflect new information from the last decade of scenario generation or the full range of projections. The modeling limitations do not all work in the same direction in terms of their influence on the SC-CO_2 estimates. However, as discussed in the February 2021 TSD, the IWG has recommended that, taken together, the limitations suggest that the interim SC-GHG estimates used in this rule likely underestimate the damages from GHG emissions. DOE concurs with this assessment.

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[37] Interagency Working Group on Social Cost of Greenhouse Gases (IWG). 2021. Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990. February. United States Government. Available at: <*https://www.whitehouse.gov/briefing-room/blog/2021/02/26/a-return-to-science-evidence-based-estimates-of-the-benefits-of-reducing-climate-pollution/*.

DOE's derivations of the SC-GHGs (*i.e.,* SC-CO_2, SC-N_2O, and SC-CH_4) values used for this rule are discussed in the following sections, and the results of DOE's analyses estimating the benefits and disbenefits of the changes in emissions of these pollutants are presented in section V.A. of this document.

a. Social Cost of Carbon

The SC-CO_2 values used for this rule were generated using the values presented in the 2021 update from the IWG's February 2021 TSD. Table IV.8 shows the updated sets of SC-CO_2 estimates from the latest interagency update in 5-year increments from 2020 to 2050. The full set of annual values used is presented in the SNOPR TSD. For purposes of capturing the uncertainties involved in regulatory impact analysis, DOE has determined it is appropriate include all four sets of SC-CO_2 values, as recommended by the IWG.[38]

Table IV.8 Annual SC-CO_2 Values from 2021 Interagency Update, 2020–2050 (2020$ per Metric Ton CO_2)

Year	Discount Rate			
	5%	3%	2.5%	3%
	Average	Average	Average	95th percentile
2020	14	51	76	152
2025	17	56	83	169
2030	19	62	89	187
2035	22	67	96	206
2040	25	73	103	225
2045	28	79	110	242
2050	32	85	116	260

In calculating the potential climate benefits and disbenefits resulting from changes in CO_2 emissions, DOE used the values from the 2021 interagency report, adjusted to 2021$ using the implicit price deflator for gross domestic product ("GDP") from the

[38] For example, the February 2021 TSD discusses how the understanding of discounting approaches suggests that discount rates appropriate for intergenerational analysis in the context of climate change may be lower than 3 percent.

Bureau of Economic Analysis. DOE derived values from 2051 to 2070 based on estimates published by EPA.[39] These estimates are based on methods, assumptions, and parameters identical to the 2020-2050 estimates published by the IWG. If further analysis of monetized climate benefits beyond 2070 becomes available prior to the publication of the final rule, DOE will include that analysis in the final rule.

DOE multiplied the CO_2 emissions change estimated for each year by the SC-CO_2 value for that year in each of the four cases. To calculate a present value of the stream of monetized climate impacts, DOE discounted the values in each of the four cases using the specific discount rate that had been used to obtain the SC-CO_2 values in each case.

b. Social Cost of Methane and Nitrous Oxide

The SC-CH_4 and SC-N_2O values used for this rule were generated using the values presented in the February 2021 TSD.[40] Table IV.9 shows the updated sets of SC-CH_4 and SC-N_2O estimates from the latest interagency update in 5-year increments from 2020 to 2050. To capture the uncertainties involved in regulatory impact analysis, DOE has determined it is appropriate to include all four sets of SC-CH_4 and SC-N_2O values, as recommended by the IWG.

Table IV.9 Annual SC-CH_4 and SC-N_2O Values from 2021 Interagency Update, 2020–2050 (2020$ per Metric Ton)

Year	SC-CH_4				SC-N_2O			
	Discount Rate and Statistic				Discount Rate and Statistic			
	5%	3%	2.5%	3%	5%	3%	2.5 %	3%
	Average	Average	Average	95th percentile	Average	Average	Average	95th percentile

[39] *See* EPA, *Revised 2023 and Later Model Year Light-Duty Vehicle GHG Emissions Standards: Regulatory Impact Analysis*, Washington, D.C., December 2021. Available at: *www.epa.gov/system/files/documents/2021-12/420r21028.pdf* (last accessed January 13, 2022).

[40] See Interagency Working Group on Social Cost of Greenhouse Gases, *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide. Interim Estimates Under Executive Order 13990*, Washington, D.C., February 2021. Available at: *www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf* (last accessed March 17, 2021).

2020	670	1500	2000	3900	5800	18000	27000	48000
2025	800	1700	2200	4500	6800	21000	30000	54000
2030	940	2000	2500	5200	7800	23000	33000	60000
2035	1100	2200	2800	6000	9000	25000	36000	67000
2040	1300	2500	3100	6700	10000	28000	39000	74000
2045	1500	2800	3500	7500	12000	30000	42000	81000
2050	1700	3100	3800	8200	13000	33000	45000	88000

DOE multiplied the CH_4 and N_2O emissions change estimated for each year by the SC-CH_4 and SC-N_2O estimates for that year in each of the cases. To calculate a present value of the stream of estimated monetized impacts, DOE discounted the values in each of the cases using the specific discount rate that had been used to obtain the SC-CH_4 and SC-N_2O estimates in each case.

2. Monetization of Other Emissions Impacts

For the SNOPR, DOE estimated the monetized value of NO_X and SO_2 emissions changes from electricity generation using benefit-per-ton estimates for that sector from the EPA's Benefits Mapping and Analysis Program.[41] DOE used EPA's values for $PM_{2.5}$-related benefits associated with NO_X and SO_2 and for ozone-related benefits associated with NO_X for 2025, 2030, and 2040, calculated with discount rates of 3 percent and 7 percent. DOE used linear interpolation to define values for the years not given in the 2025 to 2040 period; for years beyond 2050 the values are held constant.

DOE also estimated the monetized value of NO_X and SO_2 emissions changes from site use of natural gas in buildings impacted by this rule using benefit-per-ton estimates from the EPA's Benefits Mapping and Analysis Program. Although none of the sectors covered by EPA refers specifically to residential and commercial buildings, the sector

[41] *Estimating the Benefit per Ton of Reducing PM2.5 Precursors from 21 Sectors*. *www.epa.gov/benmap/estimating-benefit-ton-reducing-pm25-precursors-21-sectors*

called “area sources” would be a reasonable proxy for Federal buildings.[42] The EPA document provides high and low estimates for 2025 and 2030 at 3- and 7-percent discount rates.[43] DOE used the same linear interpolation and extrapolation as it did with the values for electricity generation.

DOE multiplied the emissions changes (in tons) in each year by the associated $/ton values, and then discounted each series using discount rates of 3 percent and 7 percent as appropriate

We request comment on how to address the monetization of climate and health benefits and disbenefits from this proposal.

D. Conclusion

Table IV.10 provides DOE’s estimate of cumulative emissions changes expected to result from this rulemaking. DOE acknowledges exchanging on-site fossil fuel generated energy for reliance on the electric grid, which may still be generating energy with fossil fuels, doesn’t necessarily lead to an immediate reduction in emissions of GHGs and SO_2. However, it does prepare federal buildings for a green energy future. By ensuring that federal buildings are designed—either from the ground up, or when being renovated—to rely on the electric grid, the rule ensures that long-term, as the grid integrates more renewable energies, emissions will be reduced.

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[42] “Area sources” represents all emission sources for which states do not have exact (point) locations in their emissions inventories. Because exact locations would tend to be associated with larger sources, “area sources” would be fairly representative of small, dispersed sources like homes, businesses and office buildings.

[43] “Area sources” are a category in the 2018 document from EPA, but are not used in the 2021 document cited previously. See: *www.epa.gov/sites/default/files/2018-02/documents/sourceapportionmentbpttsd_2018.pdf.*

Table IV.10 Cumulative Emissions Changes in 2025–2084

Pollutant	Total
Primary (plant) Emissions Changes	
CO_2 (million metric tons)	-0.3
Hg (tons)	-0.01
NO_X (thousand tons)	0.54
SO_2 (thousand tons)	-1.0
CH_4 (thousand tons)	-0.1
N_2O (thousand tons)	-0.02
Upstream Emissions Changes	
CO_2 (million metric tons)	0.1
Hg (tons)	-0.00002
NO_X (thousand tons)	1.3
SO_2 (thousand tons)	-0.01
CH_4 (thousand tons)	10.5
N_2O (thousand tons)	-0.0004
Total Emissions Changes	
CO_2 (million metric tons)	-0.2
Hg (tons)	-0.01
NO_X (thousand tons)	1.9
SO_2 (thousand tons)	-1.0
CH_4 (thousand tons)	10.4
N_2O (thousand tons)	-0.021

Negative values refer to an increase in emissions.

Table IV.11 presents the present value of monetized climate disbenefits associated with the CO_2 emissions changes using the full set of SC-CO_2 estimates described previously.

Table IV.11 Present Value of Monetized Climate Disbenefits from Changes in CO_2 Emissions for Clean Energy Rule Construction Impacts 2025–2054 with a 30-Year Lifetime

	SC-CO_2 Case			
	Discount Rate and Statistics			
	5%	**3%**	**2.5%**	**3%**
	Average	**Average**	**Average**	**95th percentile**
	Million 2021$			
Total	-2.3	-9.4	-14.3	-28.3

Note: Negative numbers represent an increase cost or disbenefit. Climate benefits and disbenefits associated with CO_2 emissions changes occur over 2025-2070. DOE expects additional climate impacts to accrue from CO_2 emissions changes post 2070, but a lack of available SC-CO_2 estimates for years beyond 2070 prevents DOE from monetizing these additional impacts in this analysis.

Table IV.12 presents the monetized climate benefits associated with the estimated CH_4 emissions reduction, and Table IV.13 presents the monetized climate disbenefits associated with the estimated changes in N_2O emissions.

Table IV.12 Present Value of Monetized Climate Benefits from Changes in Methane Emissions for Clean Energy Rule Construction Impacts 2025–2054 with a 30-Year Lifetime

	SC-CH_4 Case			
	Discount Rate and Statistics			
	5%	3%	2.5%	3%
	Average	Average	Average	95th percentile
	Million 2021$			
Total	4.0	12.4	17.4	32.7

Note: Climate benefits and disbenefits associated with CH_4 emissions changes occur over 2025-2070. DOE expects additional climate impacts to accrue from CH_4 emissions changes post 2070, but a lack of available SC-CH4 estimates for years beyond 2070 prevents DOE from monetizing these additional impacts in this analysis.

Table IV.13 Present Value of Monetized Climate Disbenefits from Changes in Nitrous Oxide Emissions for Clean Energy Rule Construction Impacts 2025–2054 with a 30-Year Lifetime

	SC-N_2O Case			
	Discount Rate and Statistics			
	5%	3%	2.5%	3%
	Average	Average	Average	95th percentile
	Million 2021$			
Total	-0.1	-0.3	-0.4	-0.7

Note: Negative numbers represent an increase cost or disbenefit. Climate benefits and disbenefits associated with N_2O emissions changes occur over 2025-2070. DOE expects additional climate impacts to accrue from N_2O emissions changes post 2070, but a lack of available SC- N_2O estimates for years beyond 2070 prevents DOE from monetizing these additional impacts in this analysis.

DOE is well aware that scientific and economic knowledge about the contribution of CO_2 and other GHG emissions to changes in the future global climate and the potential resulting damages to the global and U.S. economy continues to evolve rapidly. DOE, together with other Federal agencies, will continue to review methodologies for estimating the monetary value of changes in CO_2 and other GHG emissions. This ongoing review will consider the comments on this subject that are part of the public record for this and other rulemakings, as well as other methodological assumptions and issues.

DOE also estimated the monetary value of the health benefits and disbenefits associated with changes in NO_X and SO_2 emissions anticipated to result from this rule. The dollar-per-ton values that DOE used are discussed in section V.C of this document. Table IV.14 presents the present value for NO_X emissions reduction calculated using 7-

percent and 3-percent discount rates, and Table IV.15 presents similar results for SO_2 emissions increases. The results in these tables reflect application of EPA's low dollar-per-ton values, which DOE used to be conservative.

Table IV.14 Present Value of NO_X Emissions Reduction

	3% Discount Rate (Low)	7% Discount Rate (Low)	3% Discount Rate (High)	7% Discount Rate (High)
	million 2021$			
Total	20.2	6.6	31.0	10.9

Table IV.15 Present Value of SO_2 Emissions Increase

	3% Discount Rate (Low)	7% Discount Rate (Low)	3% Discount Rate (High)	7% Discount Rate (High)
	million 2021$			
Total	-54.1	-22.5	-57.8	-23.9

Note: Negative numbers represent an increase cost or disbenefit.

The Federal building energy standards in this proposed rule are projected to result in an estimated national increased energy use of 0.029 quad. The increase is for the full fuel cycle which is essentially accounting for source energy impacts. The actual breakdown is .001 upstream energy savings and an increase of 0.030 primary energy use (energy use impacts at the power plants) for a grand total of an increase in .029 quads of full fuel cycle energy. Additionally, the Federal building energy standards are projected to result in an estimated national CO_2 emissions increase of 0.2 Mt (million metric tons) according to AEO 2022 emission projection values accounting for electricity procured from the grid. It should be noted that this is a CO_2 emissions increase only and does not account for the additional emission impacts from other GHGs such as N_2O and CH_4. When combining CO_2 increases with savings in Methane (CH_4) and minor increases in N_20 into a CO_2 equivalent metric, there results in an overall net savings of CO_2e emissions of approximately 0.07 MMT (million metric tons) CO_2e.

Notably, the recent enactment of the Inflation Reduction Act of 2022 (Pub. L. 117-169) and the Infrastructure Investment and Jobs Act (Pub. L. 117-58) will drive power sector emissions reductions in both the near-term and the short-term. With these laws in place, U.S. economy-wide greenhouse gas emissions are already projected to be 40 percent below 2005 levels in 2030, with the power sector representing the largest source of these reductions. In contrast to the base case presented in this rulemaking, there are alternative scenarios for projecting the future emissions associated with grid electricity that better align with these new policy drivers. These scenarios, discussed in section V.A of this document, have a large effect on the net emissions impacts of the proposed rulemakings and present larger environmental and overall net benefits. With these policy drivers now in place, reduced power sector emissions below 40% would only further add to the benefits of this proposed rulemaking in the future in terms of emissions benefits. These scenarios do not present comprehensive profiles for all additional climate factors beyond CO_2 emissions (such as NOx, Hg, N_2O, CH_4, and SO_2), and have been presented only in the corresponding TSD for reference.

A more detailed discussion of the basis for these tentative conclusions is contained in the remainder of this document and the accompanying TSD. Further discussion on the costs and benefits can be found in section V.A of this document.

E. Reference Resources

DOE has prepared a list of resources to help Federal agencies address the reduction of fossil fuel-generated energy consumption. These resources come in many forms such as design guidance, case studies and in a variety of media such as printed documents or websites. The resources for energy efficiency improvement will also provide guidance for fossil fuel-generated energy consumption reductions.

- U.S. Department of Energy, Federal Energy Management Program. (https://www.energy.gov/eere/femp/federal-energy-management-program). FEMP provides access to numerous resources and tools that can help Federal agencies improve the energy efficiency of new and existing buildings.

- U.S. Department of Energy, Building Technologies Program. Database of high-performance buildings. (https://buildingdata.energy.gov/).

- U.S. Department of Energy, Better Buildings Program. Decarbonization Resource Hub. (https://betterbuildingssolutioncenter.energy.gov/carbon-hub).

- New York State Energy Research and Development Authority (NYSERDA). Building Decarbonization Insights. (https://www.nyserda.ny.gov/All-Programs/Empire-Building-Challenge/Building-Decarbonization-Insights)

- New Buildings Institute. Buildings Database. (https://newbuildings.org/resource/getting-to-zero-database/).

V. Procedural Issues and Regulatory Review

A. Review Under Executive Orders 12866 and 13563

Executive Order ("E.O.")12866, "Regulatory Planning and Review," as supplemented and reaffirmed by E.O. 13563, "Improving Regulation and Regulatory Review, 76 FR 3821 (Jan. 21, 2011), requires agencies, to the extent permitted by law, to

(1) propose or adopt a regulation only upon a reasoned determination that its benefits justify its costs (recognizing that some benefits and costs are difficult to quantify); (2) tailor regulations to impose the least burden on society, consistent with obtaining regulatory objectives, taking into account, among other things, and to the extent practicable, the costs of cumulative regulations; (3) select, in choosing among alternative regulatory approaches, those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity); (4) to the extent feasible, specify performance objectives, rather than specifying the behavior or manner of compliance that regulated entities must adopt; and (5) identify and assess available alternatives to direct regulation, including providing economic incentives to encourage the desired behavior, such as user fees or marketable permits, or providing information upon which choices can be made by the public. DOE emphasizes as well that E.O. 13563 requires agencies to use the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible. In its guidance, OIRA has emphasized that such techniques may include identifying changing future compliance costs that might result from technological innovation or anticipated behavioral changes. For the reasons stated in the preamble, this proposed regulatory action is consistent with these principles.

Section 6(a) of E.O. 12866 also requires agencies to submit "significant regulatory actions" to the Office of Information and Regulatory Affairs ("OIRA") for review. OIRA has determined that this proposed regulatory action constitutes a "significant regulatory action" under section 3(f) of E.O. 12866. Accordingly, pursuant to section 6(a)(3)(C) of E.O. 12866, DOE has provided to OIRA an assessment, including the underlying analysis, of benefits and costs anticipated from the proposed regulatory action, together with, to the extent feasible, a quantification of those costs; and an

assessment, including the underlying analysis, of costs and benefits of potentially effective and reasonably feasible alternatives to the planned regulation, and an explanation why the planned regulatory action is preferable to the identified potential alternatives. These assessments are summarized in the tables that follows, as well as elsewhere in this preamble. Further detail can be found in the technical support document for this proposed rulemaking.

DOE's analyses indicate that the proposed regulation would save a significant amount of site energy; however, switching from gas loads burned on-site to electric loads produced off-site, at national average level emission rates, would result in an increase of CO_2, N_2O, Hg, and SO_2 emissions with a decrease in NO_X and CH_4 emissions. Electrifying the end-use equipment results in emissions that become dependent upon the electricity generation mix delivered to the building. Relative to the case without the proposed amended standards, Clean Energy Rule compliant buildings constructed in the 30-year period that begins in the anticipated year of compliance with the proposed amended standards (2025–2034) will result in – an increased lifetime energy use of 0.029 quadrillion British thermal units ("Btu"), or quads.[44]

The cumulative net present value ("NPV") of the proposed standards for Clean Energy Rule compliant buildings ranges from -$15.6 million (at a 7-percent discount rate) to -$85.3 Million (at a 3-percent discount rate). This NPV expresses the estimated total value of future operating-cost savings minus the estimated increased product costs for a Clean Energy Rule compliant building constructed in 2025-2054.

[44] The quantity refers to full-fuel-cycle ("FFC") energy savings. FFC energy savings includes the energy consumed in extracting, processing, and transporting primary fuels (*i.e.*, coal, natural gas, petroleum fuels), and, thus, presents a more complete picture of the impacts of energy efficiency standards. For more information on the FFC metric, see section on emission within this document.

In addition, the proposed standards for Clean Energy Rule compliant buildings are projected to impact emissions of multiple greenhouse gases and other pollutants. DOE estimates that the proposed standards would result in cumulative emissions (over the same period as for energy savings) impacts of an increase of 0.2 million metric tons ("Mt")[45] of carbon dioxide ("CO_2"), an increase of 1.0 thousand tons of sulfur dioxide ("SO_2"), a decrease of 1.9 thousand tons of nitrogen oxides ("NO_X"), a decrease of 10.4 thousand tons of methane ("CH_4"), an increase of 0.021 thousand tons of nitrous oxide ("N_2O"), and an increase of 0.01 tons of mercury ("Hg").[46]

DOE estimates the monetized net climate benefits from a change in emissions of greenhouse gases using four different estimates of the social cost of CO_2 ("SC-CO_2"), the social cost of methane ("SC-CH_4"), and the social cost of nitrous oxide ("SC-N_2O"). Together these represent the social cost of greenhouse gases ("SC-GHG"). DOE used interim SC-GHG values developed by an Interagency Working Group on the Social Cost of Greenhouse Gases ("IWG").[47] The derivation of these values is discussed in section IV. of this document. For presentational purposes, the net climate benefits (Including both the climate benefits and disbenefits) associated with the average SC-GHG at a 3-percent discount rate is $2.8 million, primarily driven by savings in CH_4. DOE does not

[45] A metric ton is equivalent to 1.1 short tons. Results for emissions other than CO_2 are presented in short tons.

[46] DOE calculated emissions changes relative to the no-new-standards case, which reflects key assumptions in the *Annual Energy Outlook [2022]* ("*AEO[2022"*]). *AEO2022* represents current federal and state legislation and final implementation of regulations as of the time of its preparation. See section IV.K of this document for further discussion of *AEO2022* assumptions that effect air pollutant emissions.

[47] See Interagency Working Group on Social Cost of Greenhouse Gases, *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide. Interim Estimates Under Executive Order 13990*, Washington, D.C., February 2021, *available at www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf?source=email*

have a single central SC-GHG point estimate and it emphasizes the importance and value of considering the benefits calculated using all four SC-GHG estimates.[48]

DOE also estimates health disbenefits from changes in SO_2 and NO_X emissions.[49] DOE estimates the present value of the health disbenefits would be $15.9 million using a 7-percent discount rate, and $33.9 million using a 3-percent discount rate which is driven by SO_2 emission increases outweighing NO_X emissions decreases.[50] DOE is currently only monetizing (for SO_2 and NO_X) PM2.5 precursor health effects and (for NO_X) ozone precursor health benefits, but will continue to assess the ability to monetize other effects such as health effects from reductions in direct PM2.5 emissions.

Table V.1 summarizes the economic benefits and costs expected to result from the proposed standards. In the table, total benefits for both the 3-percent and 7-percent discount rate cases include monetized climate benefits based on the average SC-GHG estimate under 3-percent discount rate (thus the climate benefits number stays the same). DOE does not have a single central SC-GHG point estimate and it emphasizes the importance and value of considering the benefits calculated using all four SC-GHG

[48] On March 16, 2022, the Fifth Circuit Court of Appeals (No. 22-30087) granted the federal government's emergency motion for stay pending appeal of the February 11, 2022, preliminary injunction issued in *Louisiana v. Biden*, No. 21-cv-1074-JDC-KK (W.D. La.). As a result of the Fifth Circuit's order, the preliminary injunction is no longer in effect, pending resolution of the federal government's appeal of that injunction or a further court order. Among other things, the preliminary injunction enjoined the defendants in that case from "adopting, employing, treating as binding, or relying upon" the interim estimates of the social cost of greenhouse gases—which were issued by the Interagency Working Group on the Social Cost of Greenhouse Gases on February 26, 2021—to monetize the benefits of reducing greenhouse gas emissions. In the absence of further intervening court orders, DOE will revert to its approach prior to the injunction and present monetized benefits where appropriate and permissible under law.

[49] DOE estimated the monetized value of NO_X and SO_2 emissions changes associated with the Clean Energy Rule using benefit per ton estimates from the scientific literature. See section IV.L.2 of this document for further discussion.

[50] DOE estimates the economic value of these emissions changes resulting from the considered rule for the purpose of complying with the requirements of Executive Order 12866.

estimates. The estimated total net benefits using each of the four cases are presented in section IV of this document.

Table V.1. Summary of Monetized Economic Benefits and Costs (Million 2021$) (2025-2054 plus 30-Year Lifetime)

	Million 2021$	
	3% discount rate	**7% discount rate**
Operating Cost Savings	-195.5	-89.5
Climate Benefits*	2.8	2.8
Health Benefits**	-33.9	-15.9
Total Benefits†**	-226.7	-102.7
Incremental Product Costs††**	-139.4	-85.5
Net Benefits	-87.3	-17.3

Note: This table presents the costs and benefits associated with Federal new commercial and multi-family high-rise buildings built and operated in 2025–2084. These results include benefits which accrue after 2054 from the buildings constructed in 2025−2054. Climate benefits and disbenefits associated with GHG emissions changes occur over 2025-2070. DOE expects additional climate impacts to accrue from GHG emissions changes post 2070, but a lack of available SC-CO_2, SC-CH_4, and SC-N_2O estimates for emissions years beyond 2070 prevents DOE from monetizing these additional impacts in this analysis.

* Climate benefits are calculated using four different estimates of the social cost of carbon (SC-CO_2), methane (SC-CH_4), and nitrous oxide (SC-N_2O) (model average at 2.5 percent, 3 percent, and 5 percent discount rates; 95th percentile at 3 percent discount rate). Together these represent the social cost of greenhouse gases (SC-GHG). For presentational purposes of this table, the climate benefits associated with the average SC-GHG at a 3 percent discount rate are shown but the Department does not have a single central SC-GHG point estimate. See section IV.C of this document for more details. On March 16, 2022, the Fifth Circuit Court of Appeals (No. 22-30087) granted the federal government's emergency motion for stay pending appeal of the February 11, 2022, preliminary injunction issued in *Louisiana v. Biden*, No. 21-cv-1074-JDC-KK (W.D. La.). As a result of the Fifth Circuit's order, the preliminary injunction is no longer in effect, pending resolution of the federal government's appeal of that injunction or a further court order. Among other things, the preliminary injunction enjoined the defendants in that case from "adopting, employing, treating as binding, or relying upon" the interim estimates of the social cost of greenhouse gases—which were issued by the Interagency Working Group on the Social Cost of Greenhouse Gases on February 26, 2021—to monetize the benefits of reducing greenhouse gas emissions. In the absence of further intervening court orders, DOE will revert to its approach prior to the injunction and present monetized benefits where appropriate and permissible under law.

** Health disbenefits are calculated using benefit-per-ton values for NO_X and SO_2. DOE is currently only monetizing (for SO_2 and NO_X) $PM_{2.5}$ precursor health benefits and (for NO_X) ozone precursor health benefits but will continue to assess the ability to monetize other effects such as health benefits from reductions in direct $PM_{2.5}$ emissions. See section IV.C of this document for more details.

† Total and net benefits include those consumer, climate, and health benefits that can be quantified and monetized. For presentation purposes, total and net benefits for both the 3-percent and 7-percent cases are presented using the average SC-GHG with 3-percent discount rate, but the Department does not have a single central SC-GHG point estimate. DOE emphasizes the importance and value of considering the benefits calculated using all four SC-GHG estimates.

†† Costs include incremental equipment costs as well as installation costs.

The benefits and costs of the proposed standards can also be expressed in terms of annualized values. The monetary values for the total annualized net benefits are (1) the reduced product purchase prices and installation costs, minus (2) the increase in operating costs, plus (3) the monetized value of changes in GHG, and NO_X, and SO_2 emissions, all

annualized.[51] . The benefits and disbenefits associated with changes in emissions as a result of the proposed standards are also calculated based on the lifetime of a Clean Energy Rule compliant building constructed in 2025-2054.

Estimates of annualized benefits and costs of the proposed standards are shown in. The results show as the primary estimate utilize a 7-percent discount rate for operating benefits, costs, and health benefits and disbenefits (from changes to NOx and SO_2 emissions), and a 3-percent discount rate case for climate benefits (from GHG emissions) are as follows:

- Capital cost impacts of the standards proposed in this case are estimated to be $7.89 million per year in decreased equipment costs.
- Annual operating disbenefits are estimated to be $8.26 million per year in increased equipment operating costs, primarily driven by the higher relative cost of electricity compared to natural gas.
- Net climate benefits total $0.15 million per year, primarily driven by savings from CH4.
- Net health disbenefits total $1.47 million per year, primarily driven by increased SO2 emissions overshadowing NOX emissions savings.
- Overall net monetized disbenefits would amount to a cost of $1.70 million per year.

Using a 3-percent discount rate for all benefits, disbenefits and costs the annualized results are as follows:

[51] To convert the time-series of costs and benefits into annualized values, DOE calculated a present value in $2021, the year used for discounting the NPV of total costs and savings. For the benefits, DOE calculated a present value associated with each year's shipments in the year in which the shipments occur (*e.g.*, 2030), and then discounted the present value from each year to 2022. Using the present value, DOE then calculated the fixed annual payment over a 30-year period, starting in the compliance year, that yields the same present value.

- Capital cost impacts of the standards proposed in this case are estimated to be $7.55 million per year in decreased equipment costs.

- Annual operating disbenefits are estimated to be $10.58 million per year in increased equipment operating costs, driven by the higher relative cost of electricity compared to natural gas.

- Net Climate benefits total $0.15 million per year, primarily driven by savings from CH4.

- Net health disbenefits total $1.84 million per year, primarily driven by increased SO2 emissions overshadowing NOX emissions savings.

- Overall net monetized disbenefits would amount to a cost of $4.73 million per year.

Table V.2 Annualized Monetized Benefits and Costs of Proposed Regulation (million 2021$)

Category	million 2021$/year	
	3% Discount Rate	7% Discount Rate
Operating Cost Impacts	-10.58	-8.26
Climate Benefits*	0.15	0.15
Health Benefits**	-1.84	-1.47
Total Benefits†	-12.27	-9.58
Incremental Product Costs††	-7.55	-7.89
Net Benefits	-4.73	-1.70

Note: This table presents the costs and benefits associated with the Clean Energy Rule impacted buildings in 2025−2084. These results include benefits which accrue after 2054 from the buildings constructed in 2025−2054.
* Climate benefits are calculated using four different estimates of the SC-GHG (see section IV.D of this document). For presentational purposes of this table, the climate benefits associated with the average SC-GHG at a 3 percent discount rate are shown, but the Department does not have a single central SC-GHG point estimate. On March 16, 2022, the Fifth Circuit Court of Appeals (No. 22-30087) granted the federal government's emergency motion for stay pending appeal of the February 11, 2022, preliminary injunction issued in *Louisiana v. Biden*, No. 21-cv-1074-JDC-KK (W.D. La.). As a result of the Fifth Circuit's order, the preliminary injunction is no longer in effect, pending resolution of the federal government's appeal of that injunction or a further court order. Among other things, the preliminary injunction enjoined the defendants in that case from "adopting, employing, treating as binding, or relying upon" the interim estimates of the social cost of greenhouse gases—which were issued by the Interagency Working Group on the Social Cost of Greenhouse Gases on February 26, 2021—to monetize the benefits of reducing greenhouse gas emissions. In the absence of further intervening court orders, DOE will revert to its approach prior to the injunction and presents monetized benefits where appropriate and permissible under law.
** Health disbenefits are calculated using benefit-per-ton values for NO_X and SO_2. DOE is currently only monetizing (for SO_2 and NO_X) $PM_{2.5}$ precursor health benefits and (for NO_X) ozone precursor health benefits but will continue to assess the ability to monetize other effects such as health benefits from reductions in direct $PM_{2.5}$ emissions.
† Total benefits for both the 3-percent and 7-percent cases are presented using the average SC-GHG with 3-percent discount rate, but the Department does not have a single central SC-GHG point estimate. DOE emphasizes the importance and value of considering the benefits calculated using all four SC-GHG estimates.
†† Costs include incremental equipment costs as well as installation costs.

DOE's analysis of the national impacts of the proposed standards is described in sections IV.A, and IV.B of this document.

Table V.3 presents DOE's evaluation of the economic impacts of the proposed regulations, as measured by the average life-cycle cost ("LCC").[52] The average LCC savings are -$30.1 Million and there is no traditional PBP as the incremental capital cost of the proposed regulation is negative but the incremental operating cost is positive (see section IV of this document).

Table V.3. Impacts of Proposed Regulation

Clean Energy Rule Compliant Building Policy	Average LCC Savings *Million 2021$*
3% Discount Rate	-56.13
7% Discount Rate	-4.077

DOE's analysis is sensitive to how emission factors per unit of grid electricity purchased change over time. The base case presented in this rulemaking utilizes emission factors obtained through EIA's Annual Energy Outlook for 2022 (AEO 2022). This is consistent with the methodology used in other rulemakings (including the efficiency portions for the analysis behind 10 CFR parts 433 and 435) and representative of an expected or 'business as usual" case. However, AEO 2022 does not account for goals or plans to accelerate grid decarbonization, such as President Biden's goal to achieve 100% carbon pollution-free electricity by 2035. Such accelerated clean grid scenarios can significantly impact the overall emissions profile of the rule allowing for more climate benefits sooner in the lifecycle of the expected projects.

[52] The average LCC refer to buildings that are affected by a standard and are measured relative to the efficiency distribution in the no-new-standards case, which depicts the market in the compliance year in the absence of new or amended standards (see section E. Impacts of the Rule of this document). The simple PBP, which is designed to compare specific building performance levels, is measured relative to the baseline compliance case (see section V.A of this document).

To demonstrate this proposed rulemaking's sensitivity to purchased electricity emission factor "cleanliness" projections, DOE analyzed an additional case where the future grid emission factors were assumed to follow a "95% reduction by 2035" (95 by 2035) profile as defined in the National Renewable Energy Lab's "2021 Standard Scenarios Report: A U.S. Electricity Sector Outlook" report presented in the technical support document for this rulemaking. This case represents a change in national electricity generation which assumes national power sector CO_2 emissions reach 95% below 2005 levels by 2035 and are eliminated on a net basis by 2050. This aggressive case results in only three years of annual increases in CO2e gas emissions and results in cumulative savings of CO2e emissions just after 5 years. Results for the 95 by 2035 case are presented in Table V.4 and Table V.5 of this document. Additional details on the sensitivity to emission factor progression and an additional case run based on the EIA Corporate Goal data are presented in the technical support document and environmental assessment supporting this rule. As noted previously, these alternative cases are presented to show the emissions and climate impacts of this rule in accelerated clean grid scenarios that may flow from recent legislation and Administration priorities, but that are not represented in the base case using AEO 2022 (the "business as usual" case).

Table V.4 Summary of Monetized Economic Benefits and Costs (Million 2021$) (2025-2054 plus 30-Year Lifetime) for 95 by 35 emissions reductions case

	Million 2021$	
	3% discount rate	**7% discount rate**
Operating Cost Savings	-195.5	-89.5
Climate Benefits*	92.9	92.9
Health Benefits**	46.6	15.8
Total Benefits†	-56.0	19.2
Incremental Product Costs††	-139.4	-85.5
Net Benefits	83.4	104.6

Note: This table presents the costs and benefits associated with Federal new commercial and multi-family high-rise buildings built in 2025–2084. These results include benefits which accrue after 2054 from the buildings constructed in 2025−2054.

* Climate benefits are calculated using four different estimates of the social cost of carbon (SC-CO_2), methane (SC-CH_4), and nitrous oxide (SC-N_2O) (model average at 2.5 percent, 3 percent, and 5 percent discount rates; 95th percentile at 3 percent discount rate). Together these represent the social cost of greenhouse gases (SC-GHG). For presentational purposes of this table, the climate benefits associated with the average SC-GHG at a 3 percent discount rate are shown but the Department does not have a single central SC-GHG point estimate. See section IV.C of this document for more details. On March 16, 2022, the Fifth Circuit Court of Appeals (No. 22-30087) granted the federal government's emergency motion for stay pending appeal of the February 11, 2022, preliminary injunction issued in *Louisiana v. Biden*, No. 21-cv-1074-JDC-KK (W.D. La.). As a result of the Fifth Circuit's order, the preliminary injunction is no longer in effect, pending resolution of the federal government's appeal of that injunction or a further court order. Among other things, the preliminary injunction enjoined the defendants in that case from "adopting, employing, treating as binding, or relying upon" the interim estimates of the social cost of greenhouse gases—which were issued by the Interagency Working Group on the Social Cost of Greenhouse Gases on February 26, 2021—to monetize the benefits of reducing greenhouse gas emissions. In the absence of further intervening court orders, DOE will revert to its approach prior to the injunction and present monetized benefits where appropriate and permissible under law.

** Health disbenefits are calculated using benefit-per-ton values for NO_X and SO_2. DOE is currently only monetizing (for SO_2 and NO_X) $PM_{2.5}$ precursor health benefits and (for NO_X) ozone precursor health benefits but will continue to assess the ability to monetize other effects such as health benefits from reductions in direct $PM_{2.5}$ emissions. See section IV.C of this document for more details.

† Total and net benefits include those consumer, climate, and health benefits that can be quantified and monetized. For presentation purposes, total and net benefits for both the 3-percent and 7-percent cases are presented using the average SC-GHG with 3-percent discount rate, but the Department does not have a single central SC-GHG point estimate. DOE emphasizes the importance and value of considering the benefits calculated using all four SC-GHG estimates.

†† Costs include incremental equipment costs as well as installation costs.

Table V.5 Annualized Monetized Benefits and Costs of Proposed Regulation (million 2021$) for 95 by 35 emissions reductions case

Category	**million 2021$/year**	
	3% Discount Rate	**7% Discount Rate**
Operating Cost Impacts	-10.58	-8.26
Climate Benefits*	5.03	5.03
Health Benefits**	2.52	1.46
Total Benefits†	-3.03	-1.77
Incremental Product Costs††	-7.55	-7.89
Net Benefits	4.51	6.11

Note: This table presents the costs and benefits associated with Clean Energy Rule impacted buildings in 2025−2084. These results include benefits which accrue after 2054 from the buildings constructed in 2025−2054.

* Climate benefits are calculated using four different estimates of the SC-GHG (see section IV.D of this document). For presentational purposes of this table, the climate benefits associated with the average SC-GHG at a 3 percent discount rate are shown, but the Department does not have a single central SC-GHG point estimate. On March 16, 2022, the Fifth Circuit Court of Appeals (No. 22-30087) granted the federal government's emergency motion for stay pending appeal of the February 11, 2022, preliminary injunction issued in *Louisiana v. Biden*, No. 21-cv-1074-JDC-KK (W.D. La.). As a result of the Fifth Circuit's order, the preliminary injunction is no longer in effect, pending resolution of the federal government's appeal of that injunction or a further court order. Among other things, the preliminary

injunction enjoined the defendants in that case from "adopting, employing, treating as binding, or relying upon" the interim estimates of the social cost of greenhouse gases—which were issued by the Interagency Working Group on the Social Cost of Greenhouse Gases on February 26, 2021—to monetize the benefits of reducing greenhouse gas emissions. In the absence of further intervening court orders, DOE will revert to its approach prior to the injunction and presents monetized benefits where appropriate and permissible under law.

** Health disbenefits are calculated using benefit-per-ton values for NO_X and SO_2. DOE is currently only monetizing (for SO_2 and NO_X) $PM_{2.5}$ precursor health benefits and (for NO_X) ozone precursor health benefits but will continue to assess the ability to monetize other effects such as health benefits from reductions in direct $PM_{2.5}$ emissions.

† Total benefits for both the 3-percent and 7-percent cases are presented using the average SC-GHG with 3-percent discount rate, but the Department does not have a single central SC-GHG point estimate. DOE emphasizes the importance and value of considering the benefits calculated using all four SC-GHG estimates.

†† Costs include incremental equipment costs as well as installation costs.

DOE's analysis of the impacts of the proposed regulation on federal agencies is described in section V.A, Cost Effectiveness, of this document.

B. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires preparation of an initial regulatory flexibility analysis ("IRFA") for any rule that by law must be proposed for public comment, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. As required by E.O. 13272, "Proper Consideration of Small Entities in Agency Rulemaking," 67 FR 53461 (Aug. 16, 2002), DOE published procedures and policies on February 19, 2003, to ensure that the potential impacts of its rules on small entities are properly considered during the rulemaking process. 68 FR 7990. DOE has made its procedures and policies available on the Office of the General Counsel's website (*www.energy.gov/gc/office-general-counsel*).

This proposed rule applies only to the fossil fuel-generated energy consumption of new Federal buildings and Federal buildings undergoing major renovation. As such, the only entities directly regulated by this rulemaking would be Federal agencies. DOE

does not believe that there will be any impacts on small entities such as small businesses, small organizations, or small governmental jurisdictions.

On the basis of the foregoing, DOE certifies that this rule will not have a significant economic impact on a substantial number of small entities. Accordingly, DOE has not prepared a regulatory flexibility analysis for this rulemaking. DOE's certification and supporting statement of factual basis will be provided to the Chief Counsel for Advocacy of the Small Business Administration pursuant to 5 U.S.C. 605(b).

C. Review Under the Paperwork Reduction Act

This proposed rulemaking will impose no new information or record keeping requirements. Accordingly, OMB clearance is not required under the Paperwork Reduction Act. (44 U.S.C. 3501 *et seq.*)

D. Review Under the National Environmental Policy Act of 1969

DOE prepared a draft Environmental Assessment (EA) (DOE/EA-1778) entitled, "Environmental Assessment for Final Rulemaking, 10 CFR parts 433 and 435, Fossil Fuel-Generated Energy Consumption Reduction for New Federal Buildings and Major Renovations of Federal Buildings," pursuant to the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA) (40 CFR parts 1500-1508), NEPA, as amended (42 U.S.C. 4321 *et seq*.), and DOE's NEPA Implementing Procedures (10 CFR part 1021).

The draft EA addresses the possible environmental effects attributable to the implementation of this proposed rule. The rule, by its fundamental intent, will have a positive impact on the environment. The anticipated impacts of this proposed rulemaking are an overall decrease in CO2 equivalent gases (despite modest increases in base CO2

and N2O emissions, CH4 emission reductions result in net savings) with an additional decrease in Nox emission and an increase in SO2 emissions resulting from reduced fossil fuel-generated energy consumption in new Federal buildings and major renovations of Federal buildings but increased electric purchases from the grid.

To identify the potential environmental impacts that may result from implementing the proposed rule on Federal buildings, DOE compared the requirements of the proposed rule shifting all scope 1 stationary combustion on site fossil fuel usage to electric with the "no-action alternative".

Accordingly, DOE concludes in the draft EA that new Federal buildings designed and constructed to be compliant with the Clean Energy Rule will not have a significant environmental impact compared to Federal buildings designed and constructed to Standard 90.1-2019 because the site energy impacts are very sensitive to and offset by upstream emissions associated with electricity purchased from the grid. This change in energy usage translates to varied emissions impacts of carbon dioxide ("CO_2"), nitrogen oxides ("NO_X"), mercury ("Hg"), and methane ("CH_4") over the 30-year period examined in the EA. As reported in the EA, Cumulative emission changes for 30 years of construction and operation for Federal buildings built during the analysis period (2025 through 2054) were estimated to be an increase of 174,730 metric tons of CO_2, an increase of 907.4 tons of SO_2, a decrease of 1597.67 tons of Nox, a decrease of 8,917.46 tons of CH_4, and an increase of 17.76 tons of N_2O.

E. Review Under Executive Order 13132

E.O. 13132, "Federalism," 64 FR 43255 (Aug. 10, 1999), imposes certain requirements on Federal agencies formulating and implementing policies or regulations

that preempt State law or that have federalism implications. The Executive order requires agencies to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the States and to carefully assess the necessity for such actions. The Executive order also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations. 65 FR 13735. DOE has examined this proposed rule and has tentatively determined that it would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, no further action is required by Executive Order 13132.

F. Review Under Executive Order 12988

With respect to the review of existing regulations and the promulgation of new regulations, section 3(a) of E.O. 12988, "Civil Justice Reform," imposes on Federal agencies the general duty to adhere to the following requirements: (1) eliminate drafting errors and ambiguity, (2) write regulations to minimize litigation, (3) provide a clear legal standard for affected conduct rather than a general standard, and (4) promote simplification and burden reduction. 61 FR 4729 (Feb. 7, 1996). Regarding the review required by section 3(a), section 3(b) of E.O. 12988 specifically requires that executive agencies make every reasonable effort to ensure that the regulation: (1) clearly specifies the preemptive effect, if any, (2) clearly specifies any effect on existing Federal law or regulation, (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction, (4) specifies the retroactive effect, if any, (5)

adequately defines key terms, and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of Executive Order 12988 requires executive agencies to review regulations in light of applicable standards in section 3(a) and section 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, this proposed rule meets the relevant standards of E.O. 12988.

G. Review Under the Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 ("UMRA") requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector. Pub. L. 104-4, section 201 (codified at 2 U.S.C. 1531). For a proposed regulatory action likely to result in a rule that may cause the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector of $100 million or more in any one year (adjusted annually for inflation), section 202 of UMRA requires a Federal agency to publish a written statement that estimates the resulting costs, benefits, and other effects on the national economy. (2 U.S.C. 1532(a), (b)) The UMRA also requires a Federal agency to develop an effective process to permit timely input by elected officers of State, local, and Tribal governments on a proposed "significant intergovernmental mandate," and requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments before establishing any requirements that might significantly or uniquely affect them. On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under UMRA. 62 FR 12820. DOE's policy statement is also available at *www.energy.gov/sites/prod/files/gcprod/documents/umra_97.pdf*.

This proposed rulemaking contains neither an intergovernmental mandate nor a mandate that may result in the expenditure of $100 million or more in any year by State, local and Tribal governments, in the aggregate, or by the private sector so these requirements under the UMRA do not apply.

H. Review Under the Treasury and General Government Appropriations Act, 1999

Section 654 of the Treasury and General Government Appropriations Act, 1999 (Pub. L. 105-277) requires Federal agencies to issue a Family Policymaking Assessment for any rule that may affect family well-being. This proposed rule would not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

I. Review Under Executive Order 12630

Pursuant to E.O. 12630, "Governmental Actions and Interference with Constitutionally Protected Property Rights," 53 FR 8859 (Mar. 15, 1988), DOE has determined that this proposed rule would not result in any takings that might require compensation under the Fifth Amendment to the U.S. Constitution.

J. Review Under the Treasury and General Government Appropriations Act, 2001

Section 515 of the Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516 note) provides for Federal agencies to review most disseminations of information to the public under information quality guidelines established by each agency pursuant to general guidelines issued by OMB. OMB's guidelines were published at 67 FR 8452 (Feb. 22, 2002), and DOE's guidelines were published at 67 FR 62446 (Oct. 7, 2002). Pursuant to OMB Memorandum M-19-15, Improving Implementation of the Information Quality Act (April 24, 2019), DOE published updated guidelines which are

available at *www.energy.gov/sites/prod/files/2019/12/f70/DOE%20Final%20Updated%20IQA%20Guidelines%20Dec%202019.pdf*. DOE has reviewed this SNOPR under the OMB and DOE guidelines and has concluded that it is consistent with applicable policies in those guidelines.

K. Review Under Executive Order 13211

E.O. 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," 66 FR 28355 (May 22, 2001), requires Federal agencies to prepare and submit to OIRA at OMB, a Statement of Energy Effects for any proposed significant energy action. A "significant energy action" is defined as any action by an agency that promulgates or is expected to lead to promulgation of a final rule, and that (1) is a significant regulatory action under Executive Order 12866, or any successor order; and (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy, or (3) is designated by the Administrator of OIRA as a significant energy action. For any proposed significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use should the proposal be implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use.

This proposed rulemaking would not have a significant adverse effect on the supply, distribution, or use of energy. Moreover, as the rulemaking would result in increased building energy efficiency, it would not have a significant adverse effect on energy. For these reasons, the rulemaking is not a significant energy action. Accordingly, DOE has not prepared a Statement of Energy Effects.

L. Information Quality

On December 16, 2004, OMB, in consultation with the Office of Science and Technology Policy ("OSTP"), issued its Final Information Quality Bulletin for Peer Review ("the Bulletin"). 70 FR 2664 (Jan. 14, 2005). The Bulletin establishes that certain scientific information shall be peer reviewed by qualified specialists before it is disseminated by the Federal Government, including influential scientific information related to agency regulatory actions. The purpose of the bulletin is to enhance the quality and credibility of the Government's scientific information. Under the Bulletin, EIA's CBECS and RECS are "influential scientific information," which the Bulletin defines as "scientific information that the agency reasonably can determine will have or does have a clear and substantial impact on important public policies or private sector decisions." 70 FR 2664, 2667 (January 14, 2005). The Academy recommendations have been peer reviewed pursuant to section II.2 of the Bulletin. Both surveys are peer reviewed internally within EIA and other DOE offices before they are published. In addition, both surveys are subject to public comment that EIA addresses before finalizing CBECS and RECS.

M. Description of Materials Incorporated by Reference.

In this final rule, DOE incorporates by reference ANSI/ASHRAE/IES Standard 90.1-2019, Energy Standard for Buildings Except Low-Rise Residential Buildings, (I-P Edition), 2019. This standard provides minimum requirements for energy efficient designs for buildings except for low-rise residential buildings. Copies of this standard are available from ASHRAE, Inc., 180 Peachtree Corners, GA 30092, (404) 636-8400, *www.ashrae.org*. ASHRAE provides a free, online, read-only version of Standard 90.1-2019 available at *www.ashrae.org/technical-resources/standards-and-guidelines*. Users must scroll down to locate and click on Standard 90.1-2019 (IP).

The Director of the Federal Register previously approved ANSI/ASHRAE/IES 90.1-2004, 2007, 2010, and 2013, Energy Standard for Buildings Except Low-Rise Residential Buildings for incorporation by reference in 10 CFR part 433.

In this final rule, DOE incorporates by reference the ICC 2021 International Energy Conservation Code, (IECC), Redline Version, copyright 2021. This U.S. standard provides minimum requirements for energy-efficient designs for low-rise residential buildings. Copies of this standard are available from the International Code Council, 4051 West Flossmoor Road, Country Club Hills, IL 60478, 1-888-422-7233, *www.iccsafe.org.*

The Director of the Federal Register previously approved ICC International Energy Conservation Code (IECC) 2005, 2009, and 2015 Editions, for incorporation by reference in 10 CFR part 435.

VI. Public Participation

A. Attendance at the Public Meeting

The time, date, and location of the public meeting are listed in the **DATES** and **ADDRESSES** sections at the beginning of this document. This meeting will be held via webinar. Webinar registration information, participant instructions, and information about the capabilities available to webinar participants can be found at the following link: *https://doe.webex.com/weblink/register/ra441feed3edc105af1383fa6e41e1e39*. Participants are responsible for ensuring their systems are compatible with the webinar software.

Please note that foreign nationals attending the meeting are subject to advance security screening procedures which require advance notice prior to attendance at the public meeting. If a foreign national wishes to participate in the public meeting, please inform DOE of this fact as soon as possible by contacting Ms. Regina Washington at (202) 586-1214 or by email (*Regina.Washington@ee.doe.gov*) so that the necessary procedures can be completed.

B. Procedure for Submitting Prepared General Statements for Distribution

Any person who has plans to present a prepared general statement may request that copies of his or her statement be made available at the public meeting. Such persons may submit requests, along with an advance electronic copy of their statement in PDF (preferred), Microsoft Word or Excel, WordPerfect, or text (ASCII) file format, to the appropriate address shown in the **ADDRESSES** section at the beginning of this document. The request and advance copy of statements must be received at least one week before the public meeting and are to be emailed. Please include a telephone number to enable DOE staff to make follow-up contact, if needed.

C. Conduct of the Public Meeting

DOE will designate a DOE official to preside at the public meeting and may also use a professional facilitator to aid discussion. The meeting will not be a judicial or evidentiary-type public hearing, but DOE will conduct it in accordance with section 336 of EPCA. (42 U.S.C. 6306) A court reporter will be present to record the proceedings and prepare a transcript. DOE reserves the right to schedule the order of presentations and to establish the procedures governing the conduct of the public meeting. There shall not be discussion of proprietary information, costs or prices, market share, or other commercial matters regulated by U.S. anti-trust laws. After the public meeting, interested parties may

submit further comments on the proceedings, as well as on any aspect of the rulemaking, until the end of the comment period.

The public meeting will be conducted in an informal, conference style. DOE will present a general overview of the topics addressed in this rulemaking, allow time for prepared general statements by participants, and encourage all interested parties to share their views on issues affecting this rulemaking. Each participant will be allowed to make a general statement (within time limits determined by DOE), before the discussion of specific topics. DOE will allow, as time permits, other participants to comment briefly on any general statements.

At the end of all prepared statements on a topic, DOE will permit participants to clarify their statements briefly. Participants should be prepared to answer questions by DOE and by other participants concerning these issues. DOE representatives may also ask questions of participants concerning other matters relevant to this rulemaking. The official conducting the public meeting will accept additional comments or questions from those attending, as time permits. The presiding official will announce any further procedural rules or modification of the previous procedures that may be needed for the proper conduct of the public meeting.

A transcript of the public meeting will be included in the docket, which can be viewed as described in the *Docket* section at the beginning of this document and will be accessible on the DOE website. In addition, any person may buy a copy of the transcript from the transcribing reporter.

D. Submission of Comments

DOE will accept comments, data, and information regarding this proposed rule before or after the public meeting, but no later than the date provided in the **DATES** section at the beginning of this proposed rule. Interested parties may submit comments, data, and other information using any of the methods described in the **ADDRESSES** section at the beginning of this document.

Submitting comments via *www.regulations.gov*. The *www.regulations.gov* webpage will require you to provide your name and contact information. Your contact information will be viewable to DOE Building Technologies staff only. Your contact information will not be publicly viewable except for your first and last names, organization name (if any), and submitter representative name (if any). If your comment is not processed properly because of technical difficulties, DOE will use this information to contact you. If DOE cannot read your comment due to technical difficulties and cannot contact you for clarification, DOE may not be able to consider your comment.

However, your contact information will be publicly viewable if you include it in the comment itself or in any documents attached to your comment. Any information that you do not want to be publicly viewable should not be included in your comment, nor in any document attached to your comment. Otherwise, persons viewing comments will see only first and last names, organization names, correspondence containing comments, and any documents submitted with the comments.

Do not submit to *www.regulations.gov* information for which disclosure is restricted by statute, such as trade secrets and commercial or financial information (hereinafter referred to as Confidential Business Information ("CBI")). Comments

submitted through *www.regulations.gov* cannot be claimed as CBI. Comments received through the website will waive any CBI claims for the information submitted. For information on submitting CBI, see the Confidential Business Information section.

DOE processes submissions made through *www.regulations.gov* before posting. Normally, comments will be posted within a few days of being submitted. However, if large volumes of comments are being processed simultaneously, your comment may not be viewable for up to several weeks. Please keep the comment tracking number that *www.regulations.gov* provides after you have successfully uploaded your comment.

Submitting comments via email. Comments and documents submitted via email also will be posted to *www.regulations.gov*. If you do not want your personal contact information to be publicly viewable, do not include it in your comment or any accompanying documents. Instead, provide your contact information in a cover letter. Include your first and last names, email address, telephone number, and optional mailing address. The cover letter will not be publicly viewable as long as it does not include any comments

Include contact information each time you submit comments, data, documents, and other information to DOE. No telefacsimiles ("faxes") will be accepted.

Comments, data, and other information submitted to DOE electronically should be provided in PDF (preferred), Microsoft Word or Excel, WordPerfect, or text (ASCII) file format. Provide documents that are not secured, that are written in English, and that are free of any defects or viruses. Documents should not contain special characters or any form of encryption and, if possible, they should carry the electronic signature of the author.

Campaign form letters. Please submit campaign form letters by the originating organization in batches of between 50 to 500 form letters per PDF or as one form letter with a list of supporters' names compiled into one or more PDFs. This reduces comment processing and posting time.

Confidential Business Information. Pursuant to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email two well-marked copies: one copy of the document marked "confidential" including all the information believed to be confidential, and one copy of the document marked "non-confidential" with the information believed to be confidential deleted. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

It is DOE's policy that all comments may be included in the public docket, without change and as received, including any personal information provided in the comments (except information deemed to be exempt from public disclosure).

VII. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this supplemental notice of proposed rulemaking.

List of Subjects

10 CFR Part 433

Buildings and facilities, Energy conservation, Engineers, Federal buildings and facilities, Fossil fuel reductions, Housing, Incorporation by reference, Multi-family residential buildings.

10 CFR Part 435

Buildings and facilities, Energy conservation, Engineers, Federal buildings and facilities, Fossil fuel reductions, Housing, Incorporation by reference.

Signing Authority

This document of the Department of Energy was signed on December 6, 2022, by Mary Sotos, Director of the Federal Energy Management Program, pursuant to delegated authority from the Secretary of Energy. That document with the original signature and date is maintained by DOE. For administrative purposes only, and in compliance with requirements of the Office of the Federal Register, the undersigned DOE Federal Register Liaison Officer has been authorized to sign and submit the document in electronic format for publication, as an official document of the Department of Energy. This administrative process in no way alters the legal effect of this document upon publication in the *Federal Register*.

Signed in Washington, DC, on December 9, 2022.

Treena V. Garrett
Federal Register Liaison Officer,
U.S. Department of Energy

For the reasons set forth in the preamble, DOE proposes to amend parts 433 and 435 of chapter II of title 10 of the Code of Federal Regulations as set forth below:

PART 433 -- ENERGY EFFICIENCY STANDARDS FOR THE DESIGN AND CONSTRUCTION OF NEW FEDERAL COMMERCIAL AND MULTI-FAMILY HIGH-RISE RESIDENTIAL BUILDINGS

1. The authority citation for part 433 continues to read as follows:

Authority: 42 U.S.C. 6831-6832, 6834-6835; 42 U.S.C. 7101 *et seq*.

2. Amend § 433.1 by adding paragraph (b) to read as follows:

§433.1 Purpose and scope.

* * * * *

(b) This part also establishes a maximum allowable fossil fuel-generated energy consumption standard for new Federal buildings that are commercial or multi-family high-rise residential buildings and major renovations to Federal buildings that are commercial or multi-family high-rise residential buildings, for which design for construction began on or after [*Date one year after date of publication in the Federal Register*].

* * * * *

3. Amend §433.2 by:

a. Adding in alphabetical order the definitions of “Construction cost,” “Design for renovation”, “EISA-subject building or project”, “Federal building,” “Fiscal year (FY),” “Major renovation,” “Major renovation cost,” “Major renovation of all Scope 1 fossil fuel-using systems in a building,” “Major renovation of a Scope 1 fossil fuel-using building system or Scope 1 fossil fuel-using component,” and “Multi-family high-rise residential building,”.

b. Revising the definition of “Proposed building”; and

c. Adding in alphabetical order the definition of “Scope 1 fossil fuel-generated energy consumption”, “Shift adjustment multiplier” and “Technical impracticability”.

The additions and revision read as follows:

§ 433.2 Definitions.

* * * * *

Construction cost means all costs associated with design and construction of a Federal building. It includes the cost of design, permitting, construction (materials and labor), and building commissioning. It does not include legal or administrative fees, or the cost of acquiring the land.

* * * * *

Design for renovation means the stage when the energy efficiency and sustainability details (such as insulation levels, HVAC systems, water-using systems, etc.) are either explicitly determined or implicitly included in a renovation project cost specification.

EISA-subject building or project means, for purposes of this rule, any new Federal building or renovation project that is subject to the cost thresholds and reporting requirements in Section 433 of EISA 2007 ((42 U.S.C. 6834(a)(3)(D)(i))). The cost threshold referenced in Section 433 of EISA is $2.5 million in 2007 dollars. GSA provides a table of annual updates to this cost threshold at *https://www.gsa.gov/real-estate/design-and-construction/annual-prospectus-thresholds*. GSA also provides a second cost threshold for renovations of leased buildings that is ½ of the cost threshold for renovation of Federally owned buildings.

* * * * *

Federal building as defined in 42 U.S.C. 6832 means any building to be constructed by, or for the use of, any Federal agency. Such term shall include buildings built for the purpose of being leased by a Federal agency, and privatized military housing.

Fiscal year (FY) begins on October 1 of the year prior to the specified calendar year and ends on September 30 of the specified calendar year.

* * * * *

Major renovation means either major renovation of all Scope 1 fossil fuel-generated/consuming systems in a Federal building or major renovation of one or more Scope 1 fossil fuel-using building systems or components, as defined in this section.

Major renovation cost means:

(1) Preliminary planning, engineering, architectural, legal, fiscal, and economic investigations and studies, surveys, designs, plans, working drawings, specifications, procedures, and other similar actions necessary for the alteration of a public building; and

(2) Repairing, remodeling, improving, or extending, or other changes in, a public building as per 40 U.S.C. 3301(a)(1).

Major renovation of all Scope 1 fossil fuel-using systems in a building means construction on an existing Federal building that is so extensive that it replaces all Scope 1 fossil fuel-using systems in the building. This term includes, but is not limited to,

comprehensive replacement or restoration of most or all major systems, interior work (such as ceilings, partitions, doors, floor finishes, etc.), or building elements and features.

Major renovation of a Scope 1 fossil fuel-using building system or Scope 1 fossil fuel-using component means changes to a Federal building that provide significant opportunities for energy efficiency or reduction in fossil fuel-related energy consumption. This includes, but is not limited to, replacement of the HVAC system, hot water system, or cooking system, or other fossil fuel-using systems or components of the building that have a major impact on fossil fuel usage.

Multi-family high-rise residential building means a residential Federal building that contains 3 or more dwelling units and that is designed to be 4 or more stories above grade.

* * * * *

Proposed building means the design for construction of a new Federal commercial or multi-family high-rise residential building, proposed for construction, or a major renovation to a Federal commercial or multi-family high-rise residential building.

* * * * *

Scope 1 fossil fuel-generated energy consumption means, for purposes of this proposed rule, the on-site stationary combustion of fossil fuels that contribute to Scope 1 emissions for generation of electricity, heat, cooling, or steam as defined by “Federal Greenhouse Gas Accounting and Reporting Guidance” (Council on Environmental Quality, January

17, 2016), including but not limited to, combustion of fuels in stationary sources (e.g., boilers, furnaces, turbines, and emergency generators). This term does not include mobile sources, fugitive emissions, or process emissions as defined by "Federal Greenhouse Gas Accounting and Reporting Guidance" (Council on Environmental Quality, January 17, 2016).

Shift adjustment multiplier means that agencies can apply a multiplication factor to their Maximum Allowable Fossil Fuel-Generated Energy Consumption by Building Category target based upon the weekly hours of active operation of the building. The weekly hours of operation to use as a basis for the shift adjustment multiplier lookup should be based upon the time in which in the building is actively occupied and operating per its intended use type and should include unoccupied hours or other times of limited use (such as night-time setback hours).

Technical impracticability means achieving the Scope 1 fossil fuel-generated energy consumption targets would (1) not be feasible from an engineering design or execution standpoint due to existing physical or site constraints that prohibit modification or addition of elements or spaces (2) significantly obstruct building operations and the functional needs of a building, specifically for industrial process loads, critical national security functions, mission critical information systems as defined in NIST SP 800-60 Vol. 2 Rev. 1, and research operations, or (3) significantly degrade energy resiliency and energy security of building operations as defined in 10 U.S.C. 101(e)(6) and 10 U.S.C. 101(e)(7) respectively. Upon determination that complying with the Clean Energy Rule is technically impracticable, the building is still required to reduce fossil fuel consumption to the maximum extent practicable. Technical impracticability may include technology availability and cost considerations but may not be based solely on cost considerations.

4. Amend §433.3 by revising paragraph (b)(5) to read as follows:

§433.3 Materials incorporated by reference.

* * * * *

(b) * * *

(5) ANSI/ASHRAE/IES 90.1-2019, ("ASHRAE 90.1-2019"), Energy Standard for Buildings Except Low-Rise Residential Buildings, I-P Edition, copyright 2019, IBR approved for §§ 433.2, 433.100, 433.101, 433.201 and appendix A to this subpart.

5. Subpart B is added to part 433 to read as follows:

Subpart B -- Reduction in Scope 1 Fossil Fuel-Generated Energy Consumption
Sec.
433.200 Scope 1 Fossil fuel-generated energy consumption requirement.
433.201 Scope 1 Fossil fuel-generated energy consumption determination.
433.202 Petition for downward adjustment.

Appendix A to Subpart B of Part 433—Maximum Allowable Scope 1 Fossil Fuel-Generated Energy Consumption

§433.200 Scope 1 Fossil fuel-generated energy consumption requirement.

(a) *New EISA-Subject buildings.* (1) New Federal buildings that are commercial or multi-family high-rise residential buildings, for which design for construction began on or after [*Date one year after date of publication in the Federal Register*], must be designed to meet the requirements of paragraph (c) of this section if the cost of the building is at least $2,500,000 (in 2007 dollars, adjusted for inflation). *See* GSA Annual Prospectus Thresholds at *www.gsa.gov/real-estate/design-construction/gsa-annual-prospectus-thresholds*.

(2) Reserved.

(b) *Major renovations of EISA-Subject buildings.* (1) Major renovations to Federal buildings that are commercial or multi-family high-rise residential buildings, for which design for construction began on or after [*Date one year after date of publication in the Federal Register*], must be designed to meet the requirements of paragraph (c) or (d) of this section, as applicable, if:

(i) The renovation is a major renovation to a public building as defined in 40 U.S.C. 3301 and for which transmittal of a prospectus to Congress is required under 40 U.S.C. 3307; or

(ii) The cost of the major renovation of a Federally owned building is at least $2,500,000 (in 2007 dollars, adjusted for inflation). The cost of a major renovation for a Federally leased building is at least $1,250,000 (in 2007 dollars). *See* GSA Annual Prospectus Thresholds at *www.gsa.gov/real-estate/design-construction/gsa-annual-prospectus-thresholds*.

(2) This subpart only applies to major renovations that meet the major renovation of all scope 1 fossil fuel-using systems in a Federal building or the major renovation of a scope 1 fossil fuel-using building system or scope 1 fossil fuel-using component definition in § 433.2.

(3) For leased buildings, this subpart applies to major renovations only if the building was originally built for the use of any Federal agency, including being leased by a Federal agency.

(4) This subpart applies only to the portions of the proposed building or proposed building systems that are being renovated and to the extent that the scope of the renovations permits compliance with the applicable requirements of this subpart. Unaltered portions of the proposed building or proposed building systems are not required to comply with this subpart.

(c) *Federal buildings that are of the type included in Appendix A of this subpart.*

(1) *New Construction and Major Renovations of all Scope 1 Fossil Fuel-Using Systems in EISA-Subject Buildings*.

(i) Design for construction began during fiscal year 2024 through fiscal year 2029. For new construction or major renovations of all Scope 1 fossil-fuel using systems in a Federal building for which design for construction or renovation, as applicable, began during fiscal year 2024 through 2029, the Scope 1 fossil fuel-generated energy consumption of the proposed building, based on the building design and calculated according to §433.201(a), must not exceed the value identified in Tables A-1a to A-2a (if targets based on emissions are used) or Tables A-1b to A-2b (if targets based on kBtu of fossil fuel usage are used) of appendix A of this subpart for the associated building type, climate zone, and fiscal year in which design for construction began.

(A) Federal agencies may apply a shift adjustment multiplier to the values in Tables A-1a to A-2a or Tables A-1b to A-2b based on the following baseline hours of operation assumed in Tables A-1a to A-2a or Tables A-1b to A-2b.

(B) To calculate the shift adjustment multiplier, agencies shall estimate the number of shifts for their new building and multiply by the appropriate factor shown below in Table VII.1 of this section for their building type. The Scope 1 fossil fuel-generated energy consumption target for the building would be the value in either Tables A-1a to A-2a or Tables A-1b to A-2b multiplied by the multiplier calculated in the previous sentence.

Table VII.1. Shift Adjustment Multiplier by Hours of Operation and Building Type

Building Activity/Type	Weekly Hours of Operation		
	50 or less	51 to 167	168
Admin/professional office	1	1	1.4
Bank/other financial	1	1	1.4
Government office	1	1	1.4
Medical office(non-diagnostic)	1	1	1.4
Mixed-use office	1	1	1.4
Other office	1	1	1.4
Laboratory	1	1	1.4
Distribution/shipping center	0.7	1.4	2.1
Nonrefrigerated warehouse	0.7	1.4	2.1
Convenience store	1	1	1.4
Convenience store with gas	1	1	1.4
Grocery store/food market	1	1	1.4
Other food sales	1	1	1.4
Fire station/police station	0.8	0.8	1.1
Other public order and safety	0.8	0.8	1.1
Medical office (diagnostic)	1	1	1.5
Clinic/other outpatient health	1	1	1.5
Refrigerated warehouse	1	1	1
Religious worship	0.9	1.7	1.7
Entertainment/culture	0.8	1.5	1.5
Library	0.8	1.5	1.5
Recreation	0.8	1.5	1.5
Social/meeting	0.8	1.5	1.5
Other public assembly	0.8	1.5	1.5
College/university	0.8	1.3	1.3
Elementary/middle school	0.8	1.3	1.3
High school	0.8	1.3	1.3
Preschool/daycare	0.8	1.3	1.3
Other classroom education	0.8	1.3	1.3
Fast food	0.4	1.1	2.1
Restaurant/cafeteria	0.4	1.1	2.1

Building Activity/Type	Weekly Hours of Operation		
	50 or less	51 to 167	168
Other food service	0.4	1.1	2.1
Hospital/inpatient health	1	1	1
Nursing home/assisted living	1	1	1
Dormitory/fraternity/sorority	1	1	1
Hotel	1	1	1
Motel or inn	1	1	1
Other lodging	1	1	1
Vehicle dealership/showroom	0.8	1.2	1.8
Retail store	0.8	1.2	1.8
Other retail	0.8	1.2	1.8
Post office/postal center	0.7	1.5	1.5
Repair shop	0.7	1.5	1.5
Vehicle service/repair shop	0.7	1.5	1.5
Vehicle storage/maintenance	0.7	1.5	1.5
Other service	0.7	1.5	1.5
Strip shopping mall	1	1	1
Enclosed mall	1	1	1
Bar/Pub/Lounge	1	1	1.4
Courthouse/Probation Office	1	1	1.4

(ii) Design for construction began during or after fiscal year 2030. For new construction or major renovations of all fossil fuel-using systems in an EISA-Subject building for which design for construction or renovation, as applicable, began during or after fiscal year 2030, the Scope 1 fossil fuel-generated energy consumption of the proposed building, based on building design and calculated according to §433.201(a), must be zero.

(2) *Major Renovations of a Federal Building System or Component within an EISA-Subject Building.* System level renovations shall follow the renovation requirements in section 4.2.1.3 of the applicable building baseline energy efficiency standards listed in § 433.100 substituting the “design for construction” with “design for renovation” for the relevant date and shall replace all equipment that is included in the renovation with all electric or non-fossil fuel using ENERGY STAR or Federal Energy Management

Program (FEMP) designated products as defined in §436.42. For component level renovations, Agencies shall replace all equipment that is part of the renovation with all electric or non-fossil fuel using ENERGY STAR or FEMP designated products as defined in §436.42.

(3) *Mixed-use buildings.* (i) For Federal buildings subject to the requirements of paragraph (c)(1) of this section that combine two or more building types identified in Tables 1a to 2a or Tables 1b to 2b of appendix A of this subpart, the maximum allowable fossil fuel-generated energy consumption of the proposed building is equal to the averaged applicable building type values in Tables A-1a to A-2a or Tables A-1b to A-2b weighted by floor area of the two or more building types. The equation which follows shall be used for mixed use buildings.

Equation 1: Scope 1 Fossil fuel-generated energy consumption for a mixed-use building = the sum across all building uses of (the fraction of total floor building floor area for building use i times the allowable fossil fuel-generated energy consumption for building use i)

Equation 1 may be rewritten as:

$$Scope\ 1\ Fossil\ Fuel-Generated\ Energy\ Consumption\ for\ a\ Mixed\ Use\ Building = \sum_{i=1}^{n} (Fraction\ of\ Total\ Building\ Floor\ Area\ for\ Building\ Use\ i\ times\ Allowable\ Scope\ 1\ Fossil\ Fuel-Generated\ Energy\ Consumption\ for\ Building\ Use\ i)$$

(ii) For example, if a proposed building for which design for construction began in FY2026 that is to be built in climate zone 4a has a total of 200 square feet—100 square feet of which qualifies as College/University and 100 square feet of which qualifies as

Laboratory—the maximum allowable Scope 1 fossil fuel-generated energy consumption is equal to:

[(100 sqft. × 3 kBtu/yr.-sqft.) + (100 sqft × 10 kBtu/yr.-sqft.)]/200 sqft. = 6.5 kBtu/yr.-sqft.

(d) *Federal buildings that are of the type not included in Appendix A of this subpart—*

(1) *Process load buildings.* For building types that are not included in any of the building types listed in Tables A-1a to A-2a or A-1b to A-2b of appendix A of this subpart, or for building types in these tables that contain significant process loads that are not likely to be found in the Commercial Buildings Energy Consumption Survey (CBECS) and qualify for exemption per §433.202, Federal agencies must select the applicable building type, climate zone, and fiscal year in which design for construction began from Tables 1a to 2a or 1b to 2b of appendix A of this subpart that most closely corresponds to the proposed building without the process load. The estimated Scope 1 fossil fuel-generated energy consumption of the process load must be added to the maximum allowable Scope 1 fossil fuel-generated energy consumption of the applicable building type for the appropriate fiscal year and climate zone to calculate the maximum allowable Scope 1 fossil fuel-generated energy consumption for the building. The same estimated Scope 1 fossil fuel-generated energy consumption of the process load that is added to the maximum allowable Scope 1 fossil fuel-generated energy consumption of the applicable building must also be used in determining the Scope 1 fossil fuel-generated energy consumption of the proposed building.

(2) *Mixed-use buildings.* For buildings that combine two or more building types with process loads or, alternatively, that combine one or more building types with process loads with one or more building types in Tables A-1a to A-2a or A-1b to A-2b of

appendix A of this subpart, the maximum allowable Scope 1 fossil fuel-generated energy consumption of the proposed building is equal to the averaged process load building values determined under paragraph (d)(1) of this section and the applicable building type values in Tables A-1a to A-2a or A-1b to A-2b of appendix A of this subpart, weighted by floor area.

§433.201 Scope 1 Fossil fuel-generated energy consumption determination.

(a) The fossil fuel-generated energy consumption of a proposed building is calculated as follows:

Equation 2: Fossil fuel-generated energy consumption = Direct Scope 1 Fossil Fuel-Generated Consumption of Proposed Building / Floor Area

Where:

Direct Scope 1 Fossil Fuel-Generated Energy Consumption of Proposed Building equals the total Scope 1 fossil fuel-generated energy consumption of the proposed building calculated in accordance with the Performance Rating Method in Appendix G of ASHRAE 90.1-2019 (incorporated by reference; see §433.3) and measured in thousands of British thermal units per year (kBtu/yr), except that this term does not include fossil fuel consumption for emergency electricity generation. Agencies must include all on-site fossil fuel use or Scope 1 emissions associated with non-emergency generation from backup generators (such as those for peak shaving or peak shifting). Any energy generation or Scope 1 emissions associated with biomass fuels are excluded. Any emissions associated with natural gas for alternatively fueled vehicles (“AFVs”) (or any other alternative fuel defined at 42 U.S.C. 13211 that is provided at a Federal building) is

excluded. Buildings with manufacturing or industrial process loads should be accounted for in the analysis for the building's fossil fuel consumption and GHG emissions but are not subject to the phase down targets.

Floor Area is the area enclosed by the exterior walls of a building, both finished and unfinished, including indoor parking facilities, basements, hallways, lobbies, stairways, and elevator shafts.

§433.202 Petition for downward adjustment.

(a) *New Federal buildings and major renovations of all Scope 1 fossil fuel-using systems in an EISA-subject building.* (1) Upon petition by a Federal agency the Director of FEMP may adjust the applicable maximum allowable Scope 1 fossil fuel-generated energy consumption standard with respect to a specific building, upon written certification from the head of the agency designing the building, that the requested adjustment is the largest feasible reduction in Scope 1 fossil fuel energy consumption that can practicably be achieved in light of the specified functional needs for that building, as demonstrated by:

(i) A statement sealed by the design engineer that the proposed building was designed in accordance with the applicable energy efficiency requirement to the maximum extent practicable and that each fossil fuel consuming product included in the proposed building that is of a product category covered by the ENERGY STAR program or FEMP for designated products is an ENERGY STAR product or a product meeting the FEMP designation criteria, as applicable;

(ii) A description of the systems, technologies, and practices that were evaluated and unable to meet the required fossil fuel reduction including a justification of why achieving the Scope 1 fossil fuel-generated energy consumption targets would be technically impracticable: and

(iii) Any other information the agency determines would help explain its request;

(2) The head of the agency designing the building, must also include the following information in the petition:

(i) A general description of the building, including but not limited to location, use type, floor area, stories, expected number of occupants and occupant schedule, project type, project cost, and functional needs, mission critical activity, research, and national security operations as applicable;

(ii) The maximum allowable Scope 1 fossil fuel energy consumption for the building from §433.200(c) or (d);

(iii) The estimated Scope 1 fossil fuel energy consumption of the proposed building;

(iv) A description of the proposed building's energy-related features, including but not limited to:

(A) HVAC system type and configuration;

(B) HVAC equipment sizes and efficiencies;

(C) Ventilation systems (including outdoor air volume, controls technique, heat recovery systems, and economizers, if applicable);

(D) Service water heating system configuration and equipment (including solar hot water, wastewater heat recovery, and controls for circulating hot water systems, if applicable);

(E) Estimated industrial process loads; and

(F) Any other on-site fossil fuel consuming equipment.

(3) Petitions for downward adjustment should be submitted to *ff-petition@ee.doe.gov,* or to:

U.S. Department of Energy, FEMP, Director, Fossil Fuel Reduction Petitions, EE-5F, 1000 Independence Ave. SW., Washington, DC 20585-0121.

(4) The Director of FEMP will make a best effort to notify the requesting agency in writing whether the petition for downward adjustment to the numeric reduction requirement is approved or rejected, in 45 calendar days of submittal, provided that the petition is complete. If the Director rejects the petition or establishes a value other than that presented in the petition, the Director will forward its reasons for rejection to the petitioning agency.

(b) *Major renovations of a Scope 1 fossil fuel-using building system or Scope 1 fossil fuel-using component*. (1) Upon petition by a Federal agency, the Director of FEMP may adjust the applicable requirements for the Federal agency to reduce Scope 1 on-site fossil fuel-generated energy consumption standard with respect to a specific renovation, upon written certification from the head of the agency designing the renovation, that the requested adjustment is the largest feasible reduction in Scope 1 fossil fuel energy consumption that can practicably be achieved in light of the specified functional needs for that building, as demonstrated by:

(i) A statement Sealed by the design engineer that the proposed renovation incorporates commercially available systems and/or components that provide a level of energy efficiency that is life-cycle cost effective as defined in this part and reduces consumption of Scope 1 fossil fuel energy to the maximum extent practicable and that each fossil fuel

consuming product included in the proposed building that is of a product category covered by the ENERGY STAR program or FEMP for designated products is an ENERGY STAR product or a product meeting the FEMP designation criteria, as applicable.

(ii) A description of the systems, technologies, and practices that were evaluated and unable to meet the required fossil fuel reduction including a justification of why achieving the Scope 1 fossil fuel-generated energy consumption targets would be technically impracticable: and

(iii) Any other information the agency determines would help explain its request.

(2) The head of the agency making the design decisions for the building, must also include the following information in the petition:

(i) A general description of the building, including but not limited to location, use type, floor area, stories, estimated number of occupants and occupant schedule, project type, project cost, and functional needs, mission critical activity, research, and national security operations, as applicable;

(ii) The maximum allowable Scope 1 fossil fuel energy consumption for the building from §433.200(c) or (d);

(iii) The estimated Scope 1 fossil fuel energy consumption of the building;

(iv) A description of system(s) or component(s) that are being renovated, including but not limited to:

(A) HVAC system or component type and configuration;

(B) HVAC equipment sizes and efficiencies;

(C) Ventilation systems or components (including outdoor air volume, controls technique, heat recovery systems, and economizers, if applicable);

(D) Service water heating system or component configuration and equipment (including solar hot water, wastewater heat recovery, and controls for circulating hot water systems, if applicable);

(E) Estimated process loads; and

(F) Any other on-site fossil fuel consuming equipment.

(3) Petitions for downward adjustment should be submitted to *ff-petition@ee.doe.gov,* or to:

U.S. Department of Energy, FEMP, Director, Fossil Fuel Reduction Petitions, EE-5F,1000 Independence Ave. SW., Washington, DC 20585-0121.

(4) The Director will make a best effort to notify the requesting agency in writing whether the petition for downward adjustment to the numeric reduction requirement is approved or rejected, in 45 calendar days of submittal for major renovations of a buildings system, and 20 calendar days for major renovations of a component, granted the petition is complete. If the Director rejects the petition, the Director will forward its reasons for rejection to the petitioning agency.

(c) *Exclusions*. The General Services Administration (GSA) may not submit petitions under paragraphs (a) and (b) of this section. Agencies that are tenants of GSA buildings for which the agency, not GSA, has significant design control may submit petitions in accordance with this section.

Appendix A to Subpart B of Part 433—Maximum Allowable Fossil Fuel-Generated Energy Consumption

(a) For purposes of the tables in this appendix, the climate zones for each county in the United States are those listed in Normative Appendix B Building Envelope Climate Criteria, Table B-1 U.S. Climate Zones, ASHRAE 90.1-2019 (incorporated by reference; see §433.3).

(b) For purpose of appendix A, the following definitions apply:

Education means a category of buildings used for academic or technical classroom instruction, such as elementary, middle, or high schools, and classroom buildings on college or university campuses. Buildings on education campuses for which the main use is not as a classroom are included in the category relating to their use. For example, administration buildings are part of "Office," dormitories are "Lodging," and libraries are "Public Assembly."

Food sales means a category of buildings used for retail or wholesale of food. For example, grocery stores are "Food Sales."

Food service means a category of buildings used for preparation and sale of food and beverages for consumption. For example, restaurants are "Food Service."

Health care (Inpatient) means a category of buildings used as diagnostic and treatment facilities for inpatient care.

Health care (Outpatient) means a category of buildings used as diagnostic and treatment facilities for outpatient care. Medical offices are included here if they use any type of diagnostic medical equipment (if they do not, they are categorized as an office building).

Laboratory means a category of buildings equipped for scientific experimentation or research as well as other technical, analytical, and administrative activities.

Lodging means a category of buildings used to offer multiple accommodations for short-term or long-term residents, including skilled nursing and other residential care buildings.

Mercantile (Enclosed and Strip Malls) means a category of shopping malls comprised of multiple connected establishments.

Multi-Family High-Rise Residential Buildings means a category of residential buildings that contain 3 or more dwelling units and that is designed to be 4 or more stories above grade.

Office means a category of buildings used for general office space, professional office, or administrative offices. Medical offices are included here if they do not use any type of diagnostic medical equipment (if they do, they are categorized as an outpatient health care building).

Public assembly means a category of public or private buildings, or spaces therein, in which people gather for social or recreational activities.

Public order and safety means a category of buildings used for the preservation of law and order or public safety.

Religious worship means a category of buildings in which people gather for religious activities, (such as chapels, churches, mosques, synagogues, and temples).

Retail (Other Than Mall) means a category of buildings used for the sale and display of goods other than food.

Service means a category of buildings in which some type of service is provided, other than food service or retail sales of goods.

Warehouse and storage means a category of buildings used to store goods, manufactured products, merchandise, raw materials, or personal belongings (such as self-storage).

Table A-1a - FY2020-FY2024 Maximum Allowable Fossil Fuel-Generated Energy Consumption by Building Category, Building Type and Climate Zone, Commercial Buildings and Multi-Family High-Rise Residential Buildings (CO_2e/yr-sqft)

Building Category	Climate Zone:	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
	Building Type	**Fossil Fuel-Generated Energy Use Intensity (CO2e/yr-sqft)**																		
Education	College/ university	0.21	0.22	0.23	0.28	0.35	0.33	0.47	0.42	0.47	0.61	0.59	0.60	0.76	0.72	0.64	0.89	0.89	1.04	1.39
Education	Elementary/ middle school	0.33	0.34	0.36	0.44	0.54	0.51	0.73	0.65	0.73	0.95	0.92	0.94	1.19	1.13	1.01	1.38	1.39	1.63	2.17
Education	High school	0.02	0.02	0.06	0.17	0.34	0.29	0.62	0.50	0.62	0.96	0.90	0.94	1.33	1.22	1.04	1.62	1.63	1.99	2.82
Education	Other classroom education	0.13	0.13	0.14	0.16	0.20	0.19	0.27	0.25	0.27	0.36	0.35	0.35	0.45	0.42	0.38	0.52	0.52	0.61	0.82
Education	Preschool/ daycare	0.30	0.31	0.33	0.40	0.49	0.46	0.66	0.59	0.66	0.87	0.83	0.85	1.08	1.02	0.92	1.26	1.26	1.48	1.97
Enclosed Mall	Enclosed mall	0.35	0.35	0.38	0.46	0.57	0.54	0.76	0.68	0.76	1.00	0.96	0.99	1.25	1.18	1.06	1.45	1.46	1.71	2.27
Food Sales	Convenience store	0.33	0.34	0.36	0.43	0.54	0.51	0.73	0.65	0.73	0.95	0.91	0.94	1.19	1.12	1.00	1.38	1.39	1.62	2.16
Food Sales	Convenience store with gas station	0.24	0.24	0.26	0.31	0.39	0.36	0.52	0.46	0.52	0.68	0.65	0.67	0.85	0.80	0.72	0.98	0.99	1.16	1.54
Food Sales	Grocery store/food market	0.35	0.36	0.38	0.46	0.58	0.54	0.77	0.69	0.78	1.01	0.97	1.00	1.27	1.20	1.07	1.47	1.48	1.73	2.30
Food Sales	Other food sales	1.09	1.11	1.18	1.43	1.78	1.68	2.38	2.13	2.39	3.12	3.00	3.08	3.91	3.69	3.30	4.54	4.56	5.33	7.11
Food Service	Fast food	2.06	2.09	2.23	2.70	3.37	3.16	4.50	4.02	4.51	5.90	5.67	5.82	7.39	6.97	6.24	8.56	8.60	10.06	13.41
Food Service	Other food service	0.27	0.27	0.29	0.35	0.44	0.41	0.59	0.52	0.59	0.77	0.74	0.76	0.96	0.91	0.81	1.11	1.12	1.31	1.74
Food Service	Restaurant/ cafeteria	1.47	1.49	1.59	1.92	2.40	2.25	3.21	2.87	3.21	4.20	4.04	4.15	5.26	4.96	4.44	6.10	6.13	7.17	9.56
Inpatient Health Care	Hospital/ inpatient health	1.06	1.08	1.13	1.31	1.56	1.48	1.99	1.81	2.00	2.53	2.44	2.50	3.10	2.93	2.66	3.54	3.56	4.12	5.40
Laboratory	Laboratory	0.79	0.80	0.85	1.03	1.28	1.21	1.72	1.53	1.72	2.25	2.16	2.22	2.82	2.66	2.38	3.26	3.28	3.83	5.11
Lodging	Dormitory/fraternity/sorority	0.51	0.51	0.55	0.66	0.83	0.78	1.10	0.99	1.11	1.45	1.39	1.43	1.81	1.71	1.53	2.10	2.11	2.47	3.29
Lodging	Hotel	0.46	0.47	0.50	0.60	0.75	0.71	1.00	0.90	1.01	1.32	1.26	1.30	1.65	1.55	1.39	1.91	1.92	2.24	2.99
Lodging	Motel or inn	0.60	0.61	0.65	0.78	0.98	0.92	1.31	1.17	1.31	1.71	1.65	1.69	2.14	2.02	1.81	2.49	2.50	2.92	3.90
Lodging	Other lodging	0.23	0.24	0.25	0.30	0.38	0.36	0.51	0.45	0.51	0.66	0.64	0.65	0.83	0.78	0.70	0.96	0.97	1.13	1.51
Nursing	Nursing home/ assisted living	0.82	0.83	0.88	1.07	1.33	1.25	1.78	1.60	1.79	2.34	2.25	2.31	2.93	2.76	2.47	3.39	3.41	3.99	5.32
Office	Administrative/ professional office	0.30	0.31	0.33	0.39	0.49	0.46	0.66	0.59	0.66	0.86	0.83	0.85	1.08	1.02	0.91	1.25	1.26	1.47	1.96

Building Category	Climate Zone:	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
	Building Type	**Fossil Fuel-Generated Energy Use Intensity (CO2e/yr-sqft)**																		
Office	Bank/other financial	0.18	0.19	0.20	0.24	0.30	0.28	0.40	0.36	0.40	0.53	0.50	0.52	0.66	0.62	0.56	0.76	0.77	0.90	1.19
Office	Government office	0.31	0.31	0.33	0.40	0.50	0.47	0.67	0.60	0.67	0.88	0.84	0.87	1.10	1.04	0.93	1.27	1.28	1.50	2.00
Office	Medical office (non-diagnostic)	0.34	0.35	0.37	0.45	0.56	0.52	0.74	0.66	0.74	0.97	0.94	0.96	1.22	1.15	1.03	1.41	1.42	1.66	2.21
Office	Mixed-use office	0.26	0.27	0.28	0.34	0.43	0.40	0.58	0.51	0.58	0.75	0.72	0.74	0.94	0.89	0.80	1.10	1.10	1.29	1.72
Office	Other office	0.40	0.40	0.43	0.52	0.65	0.61	0.86	0.77	0.87	1.13	1.09	1.12	1.42	1.34	1.20	1.64	1.65	1.93	2.58
Outpatient Health Care	Clinic/other outpatient health	0.25	0.25	0.27	0.33	0.41	0.38	0.55	0.49	0.55	0.71	0.69	0.71	0.90	0.84	0.76	1.04	1.04	1.22	1.63
Outpatient Health Care	Medical office (diagnostic)	0.27	0.27	0.29	0.35	0.44	0.41	0.58	0.52	0.59	0.77	0.74	0.76	0.96	0.90	0.81	1.11	1.12	1.31	1.74
Public Assembly	Entertainment/ culture	0.20	0.20	0.21	0.25	0.32	0.30	0.43	0.38	0.43	0.56	0.54	0.55	0.70	0.66	0.59	0.81	0.81	0.95	1.27
Public Assembly	Library	0.23	0.24	0.25	0.30	0.38	0.36	0.51	0.45	0.51	0.67	0.64	0.66	0.83	0.79	0.70	0.97	0.97	1.14	1.51
Public Assembly	Other public assembly	0.23	0.24	0.25	0.31	0.38	0.36	0.51	0.46	0.51	0.67	0.64	0.66	0.84	0.79	0.71	0.97	0.97	1.14	1.52
Public Assembly	Recreation	0.24	0.24	0.26	0.31	0.39	0.37	0.53	0.47	0.53	0.69	0.66	0.68	0.86	0.81	0.73	1.00	1.00	1.17	1.57
Public Assembly	Social/meeting	0.30	0.30	0.32	0.39	0.49	0.46	0.65	0.58	0.65	0.85	0.82	0.84	1.06	1.00	0.90	1.23	1.24	1.45	1.93
Public Order & Safety	Fire station/ police station	0.54	0.55	0.58	0.70	0.88	0.83	1.17	1.05	1.18	1.54	1.48	1.52	1.93	1.82	1.63	2.23	2.25	2.62	3.50
Public Order & Safety	Other public order and safety	0.26	0.27	0.29	0.35	0.43	0.40	0.58	0.52	0.58	0.75	0.73	0.74	0.95	0.89	0.80	1.10	1.10	1.29	1.72
Religious Worship	Religious worship	0.24	0.24	0.26	0.31	0.39	0.37	0.52	0.47	0.52	0.68	0.66	0.67	0.85	0.81	0.72	0.99	1.00	1.16	1.55
Retail (except malls)	Other retail	0.40	0.40	0.43	0.52	0.65	0.61	0.86	0.77	0.86	1.13	1.09	1.12	1.42	1.34	1.20	1.64	1.65	1.93	2.57
Retail (except malls)	Retail store	0.01	0.01	0.04	0.11	0.22	0.18	0.40	0.32	0.40	0.62	0.58	0.61	0.85	0.79	0.67	1.04	1.05	1.28	1.81
Retail (except malls)	Vehicle dealership/ showroom	0.56	0.57	0.60	0.73	0.91	0.86	1.22	1.09	1.22	1.60	1.54	1.58	2.00	1.89	1.69	2.32	2.33	2.72	3.63
Service	Other service	0.58	0.59	0.63	0.76	0.95	0.89	1.27	1.13	1.27	1.66	1.60	1.64	2.08	1.96	1.76	2.41	2.42	2.83	3.78
Service	Post office/postal center	0.24	0.25	0.26	0.32	0.40	0.37	0.53	0.47	0.53	0.69	0.67	0.69	0.87	0.82	0.73	1.01	1.01	1.19	1.58

Building Category	Climate Zone:	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
	Building Type	Fossil Fuel-Generated Energy Use Intensity (CO2e/yr-sqft)																		
Service	Repair shop	0.18	0.18	0.20	0.24	0.30	0.28	0.40	0.35	0.40	0.52	0.50	0.51	0.65	0.61	0.55	0.75	0.76	0.89	1.18
Service	Vehicle service/repair shop	0.37	0.37	0.39	0.48	0.60	0.56	0.80	0.71	0.80	1.04	1.00	1.03	1.31	1.23	1.10	1.51	1.52	1.78	2.37
Service	Vehicle storage/maintenance	0.29	0.30	0.31	0.38	0.47	0.45	0.63	0.57	0.64	0.83	0.80	0.82	1.04	0.98	0.88	1.21	1.21	1.42	1.89
Strip Shopping Mall	Strip shopping mall	0.35	0.35	0.38	0.45	0.57	0.53	0.76	0.68	0.76	0.99	0.96	0.98	1.25	1.17	1.05	1.44	1.45	1.70	2.26
Warehouse	Distribution/ shipping center	0.20	0.20	0.21	0.26	0.32	0.31	0.43	0.39	0.44	0.57	0.55	0.56	0.71	0.67	0.60	0.83	0.83	0.97	1.29
Warehouse	Non-refrigerated warehouse	0.19	0.19	0.20	0.25	0.31	0.29	0.41	0.37	0.41	0.54	0.52	0.53	0.68	0.64	0.57	0.78	0.79	0.92	1.23
Warehouse	Refrigerated warehouse	0.03	0.04	0.04	0.05	0.06	0.05	0.08	0.07	0.08	0.10	0.10	0.10	0.12	0.12	0.11	0.14	0.15	0.17	0.23

Table A-1b - FY2020-FY2024 Maximum Allowable Fossil Fuel-Generated Energy Consumption by Building Category, Building Type and Climate Zone, Commercial Buildings and Multi-Family High-Rise Residential Buildings (source kBtu/yr-sqft)

Building Category	Climate Zone:	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
	Building Type	Fossil Fuel-Generated Energy Use Intensity (site kBtu/yr-sqft)																		
Education	College/ university	2	2	2	3	3	3	4	4	4	6	5	5	7	7	6	8	8	9	13
Education	Elementary/ middle school	3	3	3	4	5	5	7	6	7	9	8	9	11	10	9	13	13	15	20
Education	High school	0	0	1	2	3	3	6	5	6	9	8	9	12	11	9	15	15	18	26
Education	Other classroom education	1	1	1	1	2	2	2	2	2	3	3	3	4	4	3	5	5	6	7
Education	Preschool/ daycare	3	3	3	4	4	4	6	5	6	8	8	8	10	9	8	11	11	13	18
Enclosed Mall	Enclosed mall	3	3	3	4	5	5	7	6	7	9	9	9	11	11	10	13	13	15	21
Food Sales	Convenience store	3	3	3	4	5	5	7	6	7	9	8	9	11	10	9	13	13	15	20
Food Sales	Convenience store with gas station	2	2	2	3	4	3	5	4	5	6	6	6	8	7	7	9	9	10	14
Food Sales	Grocery store/ food market	3	3	3	4	5	5	7	6	7	9	9	9	12	11	10	13	13	16	21

Building Category	Climate Zone:	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
	Building Type	Fossil Fuel-Generated Energy Use Intensity (site kBtu/yr-sqft)																		
Food Sales	Other food sales	10	10	11	13	16	15	22	19	22	28	27	28	36	33	30	41	41	48	64
Food Service	Fast food	19	19	20	24	31	29	41	37	41	54	51	53	67	63	57	78	78	91	122
Food Service	Other food service	2	2	3	3	4	4	5	5	5	7	7	7	9	8	7	10	10	12	16
Food Service	Restaurant/ cafeteria	13	14	14	17	22	20	29	26	29	38	37	38	48	45	40	55	56	65	87
Inpatient Health Care	Hospital/ inpatient health	10	10	10	12	14	13	18	16	18	23	22	23	28	27	24	32	32	37	49
Laboratory	Laboratory	7	7	8	9	12	11	16	14	16	20	20	20	26	24	22	30	30	35	46
Lodging	Dormitory/ fraternity/ sorority	5	5	5	6	7	7	10	9	10	13	13	13	16	16	14	19	19	22	30
Lodging	Hotel	4	4	5	5	7	6	9	8	9	12	11	12	15	14	13	17	17	20	27
Lodging	Motel or inn	5	6	6	7	9	8	12	11	12	16	15	15	19	18	16	23	23	27	35
Lodging	Other lodging	2	2	2	3	3	3	5	4	5	6	6	6	8	7	6	9	9	10	14
Nursing	Nursing home/ assisted living	7	8	8	10	12	11	16	14	16	21	20	21	27	25	22	31	31	36	48
Office	Administrative/ professional office	3	3	3	4	4	4	6	5	6	8	8	8	10	9	8	11	11	13	18
Office	Bank/ other financial	2	2	2	2	3	3	4	3	4	5	5	5	6	6	5	7	7	8	11
Office	Government office	3	3	3	4	5	4	6	5	6	8	8	8	10	9	8	12	12	14	18
Office	Medical office (non-diagnostic)	3	3	3	4	5	5	7	6	7	9	8	9	11	10	9	13	13	15	20
Office	Mixed-use office	2	2	3	3	4	4	5	5	5	7	7	7	9	8	7	10	10	12	16
Office	Other office	4	4	4	5	6	6	8	7	8	10	10	10	13	12	11	15	15	18	23
Outpatient Health Care	Clinic/other outpatient health	2	2	2	3	4	3	5	4	5	6	6	6	8	8	7	9	9	11	15
Outpatient Health Care	Medical office (diagnostic)	2	2	3	3	4	4	5	5	5	7	7	7	9	8	7	10	10	12	16
Public Assembly	Entertainment/ culture	2	2	2	2	3	3	4	3	4	5	5	5	6	6	5	7	7	9	11
Public Assembly	Library	2	2	2	3	3	3	5	4	5	6	6	6	8	7	6	9	9	10	14
Public Assembly	Other public assembly	2	2	2	3	3	3	5	4	5	6	6	6	8	7	6	9	9	10	14

Building Category	Climate Zone:	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
	Building Type	**Fossil Fuel-Generated Energy Use Intensity (site kBtu/yr-sqft)**																		
Public Assembly	Recreation	2	2	2	3	4	3	5	4	5	6	6	6	8	7	7	9	9	11	14
Public Assembly	Social/meeting	3	3	3	4	4	4	6	5	6	8	7	8	10	9	8	11	11	13	18
Public Order & Safety	Fire station/ police station	5	5	5	6	8	7	11	10	11	14	13	14	17	16	15	20	20	24	32
Public Order & Safety	Other public order and safety	2	2	3	3	4	4	5	5	5	7	7	7	9	8	7	10	10	12	16
Religious Worship	Religious worship	2	2	2	3	4	3	5	4	5	6	6	6	8	7	7	9	9	11	14
Retail (except malls)	Other retail	4	4	4	5	6	6	8	7	8	10	10	10	13	12	11	15	15	17	23
Retail (except malls)	Retail store	0	0	0	1	2	2	4	3	4	6	5	5	8	7	6	9	9	12	16
Retail (except malls)	Vehicle dealership/ showroom	5	5	5	7	8	8	11	10	11	14	14	14	18	17	15	21	21	25	33
Service	Other service	5	5	6	7	9	8	12	10	12	15	14	15	19	18	16	22	22	26	34
Service	Post office/ postal center	2	2	2	3	4	3	5	4	5	6	6	6	8	7	7	9	9	11	14
Service	Repair shop	2	2	2	2	3	3	4	3	4	5	5	5	6	6	5	7	7	8	11
Service	Vehicle service/ repair shop	3	3	4	4	5	5	7	6	7	9	9	9	12	11	10	14	14	16	22
Service	Vehicle storage/ maintenance	3	3	3	3	4	4	6	5	6	8	7	7	9	9	8	11	11	13	17
Strip Shopping Mall	Strip shopping mall	3	3	3	4	5	5	7	6	7	9	9	9	11	11	10	13	13	15	21
Warehouse	Distribution/ shipping center	2	2	2	2	3	3	4	4	4	5	5	5	6	6	5	7	8	9	12
Warehouse	Non-refrigerated warehouse	2	2	2	2	3	3	4	3	4	5	5	5	6	6	5	7	7	8	11
Warehouse	Refrigerated warehouse	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	2	2

Table A-2a - FY2025-FY2029 Maximum Allowable Fossil Fuel-Generated Energy Consumption by Building Category, Building Type and Climate Zone, Commercial Buildings and Multi-Family High-Rise Residential Buildings (CO_2e/yr-sqft)

Building Category	Climate Zone:	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
	Building Type	Fossil Fuel-Generated Energy Use Intensity (CO_2e/yr-sqft)																		
Education	College/ university	0.11	0.11	0.12	0.14	0.17	0.16	0.23	0.21	0.23	0.30	0.29	0.30	0.38	0.36	0.32	0.44	0.44	0.52	0.69
Education	Elementary/ middle school	0.17	0.17	0.18	0.22	0.27	0.26	0.36	0.33	0.36	0.48	0.46	0.47	0.60	0.56	0.50	0.69	0.70	0.81	1.08
Education	High school	0.01	0.01	0.03	0.09	0.17	0.14	0.31	0.25	0.31	0.48	0.45	0.47	0.66	0.61	0.52	0.81	0.81	0.99	1.41
Education	Other classroom education	0.06	0.06	0.07	0.08	0.10	0.10	0.14	0.12	0.14	0.18	0.17	0.18	0.22	0.21	0.19	0.26	0.26	0.31	0.41
Education	Preschool/dayc are	0.15	0.15	0.16	0.20	0.25	0.23	0.33	0.30	0.33	0.43	0.42	0.43	0.54	0.51	0.46	0.63	0.63	0.74	0.98
Enclosed Mall	Enclosed mall	0.17	0.18	0.19	0.23	0.29	0.27	0.38	0.34	0.38	0.50	0.48	0.49	0.63	0.59	0.53	0.73	0.73	0.85	1.14
Food Sales	Convenience store	0.17	0.17	0.18	0.22	0.27	0.25	0.36	0.32	0.36	0.48	0.46	0.47	0.60	0.56	0.50	0.69	0.69	0.81	1.08
Food Sales	Convenience store with gas station	0.12	0.12	0.13	0.15	0.19	0.18	0.26	0.23	0.26	0.34	0.33	0.33	0.42	0.40	0.36	0.49	0.49	0.58	0.77
Food Sales	Grocery store/ food market	0.18	0.18	0.19	0.23	0.29	0.27	0.39	0.35	0.39	0.51	0.49	0.50	0.63	0.60	0.54	0.74	0.74	0.86	1.15
Food Sales	Other food sales	0.55	0.55	0.59	0.71	0.89	0.84	1.19	1.07	1.19	1.56	1.50	1.54	1.96	1.85	1.65	2.27	2.28	2.66	3.55
Food Service	Fast food	1.03	1.05	1.11	1.35	1.68	1.58	2.25	2.01	2.26	2.95	2.83	2.91	3.69	3.48	3.12	4.28	4.30	5.03	6.71
Food Service	Other food service	0.13	0.14	0.14	0.18	0.22	0.21	0.29	0.26	0.29	0.38	0.37	0.38	0.48	0.45	0.41	0.56	0.56	0.65	0.87
Food Service	Restaurant/cafe teria	0.74	0.75	0.79	0.96	1.20	1.13	1.60	1.43	1.61	2.10	2.02	2.07	2.63	2.48	2.22	3.05	3.06	3.58	4.78
Inpatient Health Care	Hospital/ inpatient health	0.53	0.54	0.56	0.65	0.78	0.74	1.00	0.91	1.00	1.26	1.22	1.25	1.55	1.47	1.33	1.77	1.78	2.06	2.70
Laboratory	Laboratory	0.39	0.40	0.42	0.51	0.64	0.60	0.86	0.77	0.86	1.12	1.08	1.11	1.41	1.33	1.19	1.63	1.64	1.92	2.56
Lodging	Dormitory/ fraternity/ sorority	0.25	0.26	0.27	0.33	0.41	0.39	0.55	0.49	0.55	0.72	0.70	0.71	0.91	0.85	0.76	1.05	1.06	1.23	1.65
Lodging	Hotel	0.23	0.23	0.25	0.30	0.38	0.35	0.50	0.45	0.50	0.66	0.63	0.65	0.82	0.78	0.70	0.96	0.96	1.12	1.50
Lodging	Motel or inn	0.30	0.30	0.32	0.39	0.49	0.46	0.65	0.58	0.66	0.86	0.82	0.84	1.07	1.01	0.91	1.24	1.25	1.46	1.95
Lodging	Other lodging	0.12	0.12	0.13	0.15	0.19	0.18	0.25	0.23	0.25	0.33	0.32	0.33	0.42	0.39	0.35	0.48	0.48	0.57	0.75
Nursing	Nursing home/ assisted living	0.41	0.42	0.44	0.53	0.67	0.63	0.89	0.80	0.89	1.17	1.12	1.15	1.46	1.38	1.24	1.70	1.71	1.99	2.66
Office	Administrative/ professional office	0.15	0.15	0.16	0.20	0.25	0.23	0.33	0.29	0.33	0.43	0.41	0.43	0.54	0.51	0.46	0.63	0.63	0.74	0.98
Office	Bank/other financial	0.09	0.09	0.10	0.12	0.15	0.14	0.20	0.18	0.20	0.26	0.25	0.26	0.33	0.31	0.28	0.38	0.38	0.45	0.60

Building Category	Climate Zone:	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
	Building Type	**Fossil Fuel-Generated Energy Use Intensity (CO_2e/yr-sqft)**																		
Office	Government office	0.15	0.16	0.17	0.20	0.25	0.24	0.33	0.30	0.34	0.44	0.42	0.43	0.55	0.52	0.46	0.64	0.64	0.75	1.00
Office	Medical office (non-diagnostic)	0.17	0.17	0.18	0.22	0.28	0.26	0.37	0.33	0.37	0.49	0.47	0.48	0.61	0.58	0.51	0.71	0.71	0.83	1.11
Office	Mixed-use office	0.13	0.13	0.14	0.17	0.22	0.20	0.29	0.26	0.29	0.38	0.36	0.37	0.47	0.45	0.40	0.55	0.55	0.64	0.86
Office	Other office	0.20	0.20	0.21	0.26	0.32	0.30	0.43	0.39	0.43	0.57	0.54	0.56	0.71	0.67	0.60	0.82	0.83	0.97	1.29
Outpatient Health Care	Clinic/ other outpatient health	0.13	0.13	0.13	0.16	0.20	0.19	0.27	0.24	0.27	0.36	0.34	0.35	0.45	0.42	0.38	0.52	0.52	0.61	0.81
Outpatient Health Care	Medical office (diagnostic)	0.13	0.14	0.14	0.18	0.22	0.21	0.29	0.26	0.29	0.38	0.37	0.38	0.48	0.45	0.41	0.56	0.56	0.65	0.87
Public Assembly	Entertainment/ culture	0.10	0.10	0.11	0.13	0.16	0.15	0.21	0.19	0.21	0.28	0.27	0.27	0.35	0.33	0.29	0.40	0.41	0.48	0.63
Public Assembly	Library	0.12	0.12	0.13	0.15	0.19	0.18	0.25	0.23	0.25	0.33	0.32	0.33	0.42	0.39	0.35	0.48	0.49	0.57	0.76
Public Assembly	Other public assembly	0.12	0.12	0.13	0.15	0.19	0.18	0.25	0.23	0.26	0.33	0.32	0.33	0.42	0.39	0.35	0.49	0.49	0.57	0.76
Public Assembly	Recreation	0.12	0.12	0.13	0.16	0.20	0.18	0.26	0.23	0.26	0.34	0.33	0.34	0.43	0.41	0.36	0.50	0.50	0.59	0.78
Public Assembly	Social/ meeting	0.15	0.15	0.16	0.19	0.24	0.23	0.32	0.29	0.33	0.42	0.41	0.42	0.53	0.50	0.45	0.62	0.62	0.72	0.97
Public Order & Safety	Fire station /police station	0.27	0.27	0.29	0.35	0.44	0.41	0.59	0.53	0.59	0.77	0.74	0.76	0.96	0.91	0.81	1.12	1.12	1.31	1.75
Public Order & Safety	Other public order and safety	0.13	0.13	0.14	0.17	0.22	0.20	0.29	0.26	0.29	0.38	0.36	0.37	0.47	0.45	0.40	0.55	0.55	0.64	0.86
Religious Worship	Religious worship	0.12	0.12	0.13	0.16	0.19	0.18	0.26	0.23	0.26	0.34	0.33	0.34	0.43	0.40	0.36	0.50	0.50	0.58	0.78
Retail (except malls)	Other retail	0.20	0.20	0.21	0.26	0.32	0.30	0.43	0.39	0.43	0.57	0.54	0.56	0.71	0.67	0.60	0.82	0.82	0.96	1.29
Retail (except malls)	Retail store	0.01	0.01	0.02	0.06	0.11	0.09	0.20	0.16	0.20	0.31	0.29	0.30	0.43	0.39	0.34	0.52	0.52	0.64	0.90
Retail (except malls)	Vehicle dealership/ showroom	0.28	0.28	0.30	0.37	0.46	0.43	0.61	0.55	0.61	0.80	0.77	0.79	1.00	0.94	0.84	1.16	1.17	1.36	1.82
Service	Other service	0.29	0.29	0.31	0.38	0.47	0.45	0.63	0.57	0.64	0.83	0.80	0.82	1.04	0.98	0.88	1.21	1.21	1.42	1.89
Service	Post office/ postal center	0.12	0.12	0.13	0.16	0.20	0.19	0.27	0.24	0.27	0.35	0.33	0.34	0.44	0.41	0.37	0.50	0.51	0.59	0.79
Service	Repair shop	0.09	0.09	0.10	0.12	0.15	0.14	0.20	0.18	0.20	0.26	0.25	0.26	0.33	0.31	0.27	0.38	0.38	0.44	0.59
Service	Vehicle service/	0.18	0.19	0.20	0.24	0.30	0.28	0.40	0.36	0.40	0.52	0.50	0.51	0.65	0.62	0.55	0.76	0.76	0.89	1.19

Building Category	Climate Zone:	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
	Building Type	Fossil Fuel-Generated Energy Use Intensity (CO_2e/yr-sqft)																		
	repair shop																			
Service	Vehicle storage/ maintenance	0.15	0.15	0.16	0.19	0.24	0.22	0.32	0.28	0.32	0.42	0.40	0.41	0.52	0.49	0.44	0.60	0.61	0.71	0.95
Strip Shopping Mall	Strip shopping mall	0.17	0.18	0.19	0.23	0.28	0.27	0.38	0.34	0.38	0.50	0.48	0.49	0.62	0.59	0.53	0.72	0.73	0.85	1.13
Warehouse	Distribution/ shipping center	0.10	0.10	0.11	0.13	0.16	0.15	0.22	0.19	0.22	0.28	0.27	0.28	0.36	0.34	0.30	0.41	0.41	0.49	0.65
Warehouse	Non-refrigerated warehouse	0.09	0.10	0.10	0.12	0.15	0.14	0.21	0.18	0.21	0.27	0.26	0.27	0.34	0.32	0.29	0.39	0.39	0.46	0.61
Warehouse	Refrigerated warehouse	0.02	0.02	0.02	0.02	0.03	0.03	0.04	0.03	0.04	0.05	0.05	0.05	0.06	0.06	0.05	0.07	0.07	0.08	0.11

Table A-2b - FY2025-FY2029 Maximum Allowable Fossil Fuel-Generated Energy Consumption by Building Category, Building Type and Climate Zone, Commercial Buildings and Multi-Family High-Rise Residential Buildings (site kBtu/yr-sqft)

Building Category	Climate Zone:	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
	Building Type	Fossil Fuel-Generated Energy Use Intensity (site kBtu/yr-sqft)																		
Education	College/ university	1	1	1	1	2	1	2	2	2	3	3	3	3	3	3	4	4	5	6
Education	Elementary/ middle school	2	2	2	2	2	2	3	3	3	4	4	4	5	5	5	6	6	7	10
Education	High school	0	0	0	1	2	1	3	2	3	4	4	4	6	6	5	7	7	9	13
Education	Other classroom education	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	4
Education	Preschool/ daycare	1	1	1	2	2	2	3	3	3	4	4	4	5	5	4	6	6	7	9
Enclosed Mall	Enclosed mall	2	2	2	2	3	2	3	3	3	5	4	4	6	5	5	7	7	8	10
Food Sales	Convenience store	2	2	2	2	2	2	3	3	3	4	4	4	5	5	5	6	6	7	10
Food Sales	Convenience store with gas station	1	1	1	1	2	2	2	2	2	3	3	3	4	4	3	4	4	5	7
Food Sales	Grocery store/ food market	2	2	2	2	3	2	4	3	4	5	4	5	6	5	5	7	7	8	10
Food Sales	Other food sales	5	5	5	6	8	8	11	10	11	14	14	14	18	17	15	21	21	24	32
Food Service	Fast food	9	9	10	12	15	14	20	18	20	27	26	26	34	32	28	39	39	46	61
Food Service	Other food service	1	1	1	2	2	2	3	2	3	3	3	3	4	4	4	5	5	6	8

Building Category	Climate Zone:	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
	Building Type	**Fossil Fuel-Generated Energy Use Intensity (site kBtu/yr-sqft)**																		
Food Service	Restaurant/ cafeteria	7	7	7	9	11	10	15	13	15	19	18	19	24	23	20	28	28	33	43
Inpatient Health Care	Hospital/ inpatient health	5	5	5	6	7	7	9	8	9	11	11	11	14	13	12	16	16	19	24
Laboratory	Laboratory	4	4	4	5	6	5	8	7	8	10	10	10	13	12	11	15	15	17	23
Lodging	Dormitory/ fraternity/ sorority	2	2	2	3	4	4	5	4	5	7	6	6	8	8	7	10	10	11	15
Lodging	Hotel	2	2	2	3	3	3	5	4	5	6	6	6	7	7	6	9	9	10	14
Lodging	Motel or inn	3	3	3	4	4	4	6	5	6	8	7	8	10	9	8	11	11	13	18
Lodging	Other lodging	1	1	1	1	2	2	2	2	2	3	3	3	4	4	3	4	4	5	7
Nursing	Nursing home/ assisted living	4	4	4	5	6	6	8	7	8	11	10	10	13	13	11	15	15	18	24
Office	Administrative/ professional office	1	1	1	2	2	2	3	3	3	4	4	4	5	5	4	6	6	7	9
Office	Bank/ other financial	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	4	5
Office	Government office	1	1	2	2	2	2	3	3	3	4	4	4	5	5	4	6	6	7	9
Office	Medical office (non-diagnostic)	2	2	2	2	3	2	3	3	3	4	4	4	6	5	5	6	6	8	10
Office	Mixed-use office	1	1	1	2	2	2	3	2	3	3	3	3	4	4	4	5	5	6	8
Office	Other office	2	2	2	2	3	3	4	4	4	5	5	5	6	6	5	7	7	9	12
Outpatient Health Care	Clinic/ other outpatient health	1	1	1	1	2	2	2	2	2	3	3	3	4	4	3	5	5	6	7
Outpatient Health Care	Medical office (diagnostic)	1	1	1	2	2	2	3	2	3	3	3	3	4	4	4	5	5	6	8
Public Assembly	Entertainment/ culture	1	1	1	1	1	1	2	2	2	3	2	2	3	3	3	4	4	4	6
Public Assembly	Library	1	1	1	1	2	2	2	2	2	3	3	3	4	4	3	4	4	5	7
Public Assembly	Other public assembly	1	1	1	1	2	2	2	2	2	3	3	3	4	4	3	4	4	5	7
Public Assembly	Recreation	1	1	1	1	2	2	2	2	2	3	3	3	4	4	3	5	5	5	7
Public Assembly	Social/meeting	1	1	1	2	2	2	3	3	3	4	4	4	5	5	4	6	6	7	9
Public Order & Safety	Fire station/ police station	2	2	3	3	4	4	5	5	5	7	7	7	9	8	7	10	10	12	16

Building Category	Climate Zone:	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
	Building Type	**Fossil Fuel-Generated Energy Use Intensity (site kBtu/yr-sqft)**																		
Public Order & Safety	Other public order and safety	1	1	1	2	2	2	3	2	3	3	3	3	4	4	4	5	5	6	8
Religious Worship	Religious worship	1	1	1	1	2	2	2	2	2	3	3	3	4	4	3	4	5	5	7
Retail (except malls)	Other retail	2	2	2	2	3	3	4	3	4	5	5	5	6	6	5	7	7	9	12
Retail (except malls)	Retail store	0	0	0	1	1	1	2	1	2	3	3	3	4	4	3	5	5	6	8
Retail (except malls)	Vehicle dealership/ showroom	3	3	3	3	4	4	6	5	6	7	7	7	9	9	8	11	11	12	16
Service	Other service	3	3	3	3	4	4	6	5	6	8	7	7	9	9	8	11	11	13	17
Service	Post office/ postal center	1	1	1	1	2	2	2	2	2	3	3	3	4	4	3	5	5	5	7
Service	Repair shop	1	1	1	1	1	1	2	2	2	2	2	2	3	3	2	3	3	4	5
Service	Vehicle service/repair shop	2	2	2	2	3	3	4	3	4	5	5	5	6	6	5	7	7	8	11
Service	Vehicle storage/ maintenance	1	1	1	2	2	2	3	3	3	4	4	4	5	4	4	5	6	6	9
Strip Shopping Mall	Strip shopping mall	2	2	2	2	3	2	3	3	3	5	4	4	6	5	5	7	7	8	10
Warehouse	Distribution/ shipping center	1	1	1	1	1	1	2	2	2	3	2	3	3	3	3	4	4	4	6
Warehouse	Non-refrigerated warehouse	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	4	4	4	6
Warehouse	Refrigerated warehouse	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1

PART 435 -- ENERGY EFFICIENCY STANDARDS FOR THE DESIGN AND CONSTRUCTION OF NEW FEDERAL LOW-RISE RESIDENTIAL BUILDINGS

6. The authority citation for part 435 continues to read as follows:

Authority: 42 U.S.C. 6831-6832; 6834-6836; 42 U.S.C. 8253-54; 42 U.S.C. 7101 *et seq.*

7. Amend §435.1, by adding paragraph (b) to read as follows:

§ 435.1 Purpose and scope.

* * * * *

(b) This part also establishes a maximum allowable fossil fuel-generated energy consumption standard for new Federal buildings that are low-rise residential buildings and major renovations to Federal buildings that are low-rise residential buildings, for which design for construction began on or after [*Date one year after date of publication in the Federal Register*]

* * * * *

8. Amend §435.2 by:

a. Adding in alphabetical order, the definitions of "Construction cost," "Design for renovation", "EISA-subject building or project", "Federal building," "Fiscal year (FY)," "Major renovation," "Major renovation cost," "Major renovation of all Scope fossil fuel-using systems in a building," and "Major renovation of a Scope 1 fossil fuel-using building system or Scope 1 fossil fuel-using component";

b. Revising the definitions of "Proposed building"; and

c. Adding in alphabetical order, the definitions of "Scope 1 fossil fuel-generated energy consumption" and "Shift adjustment multiplier" and "Technical impracticability".

The additions and revision read as follows:

§435.2 Definitions.

* * * * *

Construction cost means all costs associated with design and construction of a Federal building. It includes the cost of design, permitting, construction (materials and labor), and building commissioning. It does not include legal or administrative fees, or the cost of acquiring the land.

* * * * *

Design for renovation means the stage when the energy efficiency and sustainability details (such as insulation levels, HVAC systems, water-using systems, etc.) are either explicitly determined or implicitly included in a renovation project cost specification.

* * * * *

EISA-subject building or project means, for purposes of this rule, any new building or renovation project that is subject to the cost thresholds and reporting requirements in Section 433 of EISA 2007 ((42 U.S.C. 6834(a)(3)(D)(i))). The cost threshold referenced in Section 433 of EISA is $2.5 million in 2007 dollars. GSA provides a table of annual updates to this cost threshold at *https://www.gsa.gov/real-estate/design-and-construction/annual-prospectus-thresholds*. GSA also provides a second cost threshold for renovations of leased buildings that is ½ of the cost threshold for renovation of Federally owned buildings.

* * * * *

Federal building as defined in 42 U.S.C. 6832 means any building to be constructed by, or for the use of, any Federal agency. Such term shall include buildings built for the purpose of being leased by a Federal agency, and privatized military housing.

Fiscal Year (FY) begins on October 1 of the year prior to the specified calendar year and ends on September 30 of the specified calendar year.

* * * * *

Major renovation means either major renovation of all Scope 1 fossil fuel-generated/consuming systems in a building or major renovation of one or more Scope 1 fossil fuel-using building systems or components, as defined in this section.

Major renovation cost means:

(1) Preliminary planning, engineering, architectural, legal, fiscal, and economic investigations and studies, surveys, designs, plans, working drawings, specifications, procedures, and other similar actions necessary for the alteration of a public building; and

(2) Repairing, remodeling, improving, or extending, or other changes in, a public building as per 40 U.S.C. 3301(a)(1).

Major renovation of all Scope 1 fossil fuel-using systems in a building means construction on an existing building that is so extensive that it replaces all Scope 1 fossil fuel-using systems in the building. This term includes, but is not limited to, comprehensive replacement or restoration of most or all major systems, interior work (such as ceilings, partitions, doors, floor finishes, etc.), or building elements and features.

Major renovation of a Scope 1 fossil fuel-using building system or Scope 1 fossil fuel-using component means changes to a building that provide significant opportunities for energy efficiency or reduction in fossil fuel-related energy consumption. This includes, but is not limited to, replacement of the HVAC system, hot water system, or cooking system, or other fossil fuel-using systems or components of the building that have a major impact on fossil fuel usage.

* * * * *

Proposed building means the design for construction of a new Federal low-rise residential building, or major renovation to a Federal low-rise residential building, proposed for construction.

Scope 1 fossil fuel-generated energy consumption means, for purposes of this rule, the on-site stationary combustion of fossil fuels that contribute to Scope 1 emissions for generation of electricity, heat, cooling, or steam as defined by "Federal Greenhouse Gas Accounting and Reporting Guidance" (Council on Environmental Quality, January 17, 2016). Emissions that result from combustion of fuels in stationary sources (e.g., boilers, furnaces, turbines, and emergency generators). This term does not include mobile sources, fugitive emissions, or process emissions as defined by "Federal Greenhouse Gas Accounting and Reporting Guidance" (Council on Environmental Quality, January 17, 2016).

Shift adjustment multiplier means that agencies can apply a multiplication factor to their Maximum Allowable Fossil Fuel-Generated Energy Consumption by Building Category

target based upon the weekly hours of active operation of the building. The weekly hours of operation to use as a basis for the shift adjustment multiplier lookup should be based upon the time in which in the building is actively occupied and operating per its intended use type and should include unoccupied hours or other times of limited use (such as night-time setback hours).

Technical impracticability means achieving the Scope 1 fossil fuel-generated energy consumption targets would-

(1) Not be feasible from an engineering design or execution standpoint due to existing physical or site constraints that prohibit modification or addition of elements or spaces

(2) Significantly obstruct building operations and the functional needs of a building, specifically for industrial process loads, critical national security functions, mission critical information systems as defined in NIST SP 800-60 Vol. 2 Rev. 1, and research operations, or

(3) Significantly degrade energy resiliency and energy security of building operations as defined in 10 U.S.C. 101(e)(6) and 10 U.S.C. 101(e)(7) respectively. Upon determination that complying with the Clean Energy Rule is technically impracticable, the building is still required to reduce fossil fuel consumption to the maximum extent practicable. Technical impracticability may include technology availability and cost considerations but may not be based solely on cost considerations.

9. Amend §435.3 by revising paragraph (b)(4) to read as follows:

§435.3 Materials incorporated by reference.

* * * * *

(b)***

(4) ICC 2021 International Energy Conservation Code (IECC), Redline Version, Copyright 2021, ("IECC 2021"), IBR approved for §§435.2, 435.5, 435.201, and appendix A to this subpart.

10. Section 435.4 is revised to read as follows:

§435.4 Life-cycle cost-effective.

Except as specified in subparts A, B or C of this part, Federal agencies shall determine life-cycle cost-effectiveness by using the procedures set out in subpart A of 10 CFR part 436. A Federal agency may choose to use any of four methods, including life-cycle cost, net savings, savings-to-investment ratio, and adjusted internal rate of return using the discount rate published in the annual supplement to the Life Cycle Costing Manual for the FEMP (NIST 85-3273).

11. Subpart B is added to part 435 to read as follows:

Subpart B -- Reduction in Scope 1 Fossil Fuel-Generated Energy Consumption
Sec.
435.200 Scope 1 Fossil fuel-generated energy consumption requirement.
435.201 Scope 1 Fossil fuel-generated energy consumption determination.
435.202 Petition for downward adjustment.

Appendix A to Subpart B of Part 435—Maximum Allowable Scope 1 Fossil Fuel-Generated Energy Consumption

§435.200 Scope 1 Fossil fuel-generated energy consumption requirement.

(a) *New EISA-Subject buildings.* (1) New Federal buildings that are low-rise residential buildings, for which design for construction began on or after [Date one year after date of publication in the *Federal Register*], must be designed to meet the requirements of paragraph (c) of this section if the cost of the building is at least $2,500,000 (in 2007 dollars, adjusted for inflation). *See* GSA Annual Prospectus Thresholds at *www.gsa.gov/real-estate/design-construction/gsa-annual-prospectus-thresholds*.

(b) *Major renovations of EISA-Subject buildings.* (1) Major renovations to Federal buildings that are low-rise residential buildings, for which design for construction began on or after [*Date one year after date of publication in the Federal Register*], must be designed to meet the requirements of paragraph (c) of this section if the cost of the major renovation is at least $2,500,000 (in 2007 dollars, adjusted for inflation).

(2) This subpart applies only to the portions of the proposed building or proposed building systems that are being renovated and to the extent that the scope of the renovation permits compliance with the applicable requirements in this subpart. Unaltered portions of the proposed building or proposed building systems are not required to comply with this subpart.

(3) For leased buildings, this subpart applies to major renovations only if the proposed building was originally built for the use of any Federal agency, including being leased by a Federal agency.

(c) *Federal buildings that are of the type included in Appendix A of this subpart*--(1) New Construction and Major Renovations of all Scope 1 Fossil Fuel-Using Systems in an EISA-Subject Building.

(i) Design for construction began during fiscal year 2024 through fiscal year 2029. For new construction or major renovations of all fossil fuel-using systems in an EISA-subject building, for which design for construction or renovation, as applicable, began during fiscal year 2024 through 2029, the Scope 1 fossil fuel-generated energy consumption of the proposed building, based on the building design and calculated according to § 435.201(a), must not exceed the value identified in Tables A-1a to A-2a (if targets based

on Scope 1 emissions are used) or Tables A-1b to A-2b (if targets based on kBtu of fossil fuel usage are used) of Appendix A of this subpart for the associated building type, climate zone, and fiscal year in which design for construction began.

(A) Federal agencies may apply a shift adjustment multiplier to the values in Tables A-1a to A-2a or Tables A-1b to A-2b based on the following baseline hours of operation assumed in Tables A-1a to A-2a or Tables A-1b to A-2b.

(B) To calculate the shift adjustment multiplier, agencies shall estimate the number of shifts for their new building and multiply by the appropriate factor shown below in Table 1 for their building type. The Scope 1 fossil fuel-generated energy consumption target for the building would be the value in either Tables A-1a to A-2a or Tables A-1b to A-2b multiplied by the multiplier calculated in the previous sentence.

Table VII.2. Shift Adjustment Multiplier by Hours of Operation and Building Type

	Weekly Hours of Operation		
Building Activity/Type	**50 or less**	**51 to 167**	**168**
Admin/professional office	1	1	1.4
Bank/other financial	1	1	1.4
Government office	1	1	1.4
Medical office(non-diagnostic)	1	1	1.4
Mixed-use office	1	1	1.4
Other office	1	1	1.4
Laboratory	1	1	1.4
Distribution/shipping center	0.7	1.4	2.1
Nonrefrigerated warehouse	0.7	1.4	2.1
Convenience store	1	1	1.4
Convenience store with gas	1	1	1.4
Grocery store/food market	1	1	1.4
Other food sales	1	1	1.4
Fire station/police station	0.8	0.8	1.1
Other public order and safety	0.8	0.8	1.1
Medical office (diagnostic)	1	1	1.5
Clinic/other outpatient health	1	1	1.5
Refrigerated warehouse	1	1	1

Religious worship	0.9	1.7	1.7
Entertainment/culture	0.8	1.5	1.5
Library	0.8	1.5	1.5
Recreation	0.8	1.5	1.5
Social/meeting	0.8	1.5	1.5
Other public assembly	0.8	1.5	1.5
College/university	0.8	1.3	1.3
Elementary/middle school	0.8	1.3	1.3
High school	0.8	1.3	1.3
Preschool/daycare	0.8	1.3	1.3
Other classroom education	0.8	1.3	1.3
Fast food	0.4	1.1	2.1
Restaurant/cafeteria	0.4	1.1	2.1
Other food service	0.4	1.1	2.1
Hospital/inpatient health	1	1	1
Nursing home/assisted living	1	1	1
Dormitory/fraternity/sorority	1	1	1
Hotel	1	1	1
Motel or inn	1	1	1
Other lodging	1	1	1
Vehicle dealership/showroom	0.8	1.2	1.8
Retail store	0.8	1.2	1.8
Other retail	0.8	1.2	1.8
Post office/postal center	0.7	1.5	1.5
Repair shop	0.7	1.5	1.5
Vehicle service/repair shop	0.7	1.5	1.5
Vehicle storage/maintenance	0.7	1.5	1.5
Other service	0.7	1.5	1.5
Strip shopping mall	1	1	1
Enclosed mall	1	1	1
Bar/Pub/Lounge	1	1	1.4
Courthouse/Probation Office	1	1	1.4

(ii) Design for construction began during or after fiscal year 2030. For new construction and major renovations of all Scope 1 fossil fuel-using systems in an EISA-subject building, the Scope 1 fossil fuel-generated energy consumption of the proposed building, based on building design and calculated according to §435.201(a), must be zero.

(2) Major Renovations of a Scope 1 Fossil Fuel-Using Building System or Scope 1 fossil fuel-using Component within an EISA-Subject Building shall follow the renovation requirements in section 4.2.1.3 of the applicable building baseline energy efficiency standards listed in §435.4 substituting the term "design for construction" with "design for renovation" for the relevant date, and shall replace all equipment that is included in the renovation with all electric or non-fossil fuel using ENERGY STAR or FEMP designated products as defined in §436.42. For component level renovations, Agencies shall replace all equipment that is part of the renovation with all electric or non-fossil fuel using ENERGY STAR or FEMP designated products as defined in §436.42.

(d) *EISA-Subject buildings that are of the type not included in Appendix A of this subpart—* (1) *Process load buildings.* For building types that are not included in any of the building types listed in Tables A-1a to A-2a or A-1b to A-2b of appendix A of this subpart, or for building types in these tables that contain significant process loads, Federal agencies must select the applicable building type, climate zone, and fiscal year in which design for construction began from Tables A-1a to A-2a or A-1b to A-2b of appendix A of this subpart that most closely corresponds to the proposed building without the process load. The estimated Scope 1 fossil fuel-generated energy consumption of the process load must be added to the maximum allowable Scope 1 fossil fuel-generated energy consumption of the applicable building type for the appropriate fiscal year and climate zone to calculate the maximum allowable Scope 1 fossil fuel-generated energy consumption for the building. The same estimated Scope 1 fossil fuel-generated energy consumption of the process load that is added to the maximum allowable Scope 1 fossil fuel-generated energy consumption of the applicable building must also be used in determining the Scope 1 fossil fuel-generated energy consumption of the proposed building.

(2) *Mixed-use buildings.* For buildings that combine two or more building types with process loads or, alternatively, that combine one or more building types with process loads with one or more building types in Tables A-1a toA-2a or A-1b to A-2b of appendix A of this subpart, the maximum allowable Scope 1 fossil fuel-generated energy consumption of the proposed building is equal to the averaged process load building values determined under paragraph (d)(1) of this section and the applicable building type values in Tables A-1a toA-2a or A-1b to A-2b of appendix A of this subpart, weighted by floor area. Equation 1 shall be used for mixed use buildings.

Equation 1: Scope 1 Fossil fuel generated energy consumption for a mixed-use building = the sum across all building uses of (the fraction of total floor building floor area for building use i times the allowable fossil fuel-generated energy consumption for building use i)

Equation 2 may be rewritten as:

$$Scope\ 1\ Fossil\ Fuel-Generated\ Energy\ Consumption\ for\ a\ Mixed\ Use\ Building = \sum_{i=1}^{n} (Fraction\ of\ Total\ Building\ Floor\ Area\ for\ Building\ Use\ i\ times\ Allowable\ Scope\ 1\ Fossil\ Fuel-Generated\ Energy\ Consumption\ for\ Building\ Use\ i)$$

§435.201 Scope 1 Fossil fuel-generated energy consumption determination.

(a) The Scope 1 fossil fuel-generated energy consumption of a proposed design is calculated as follows:

Equation: Scope 1 Fossil Fuel-Generated Energy Consumption = Direct Fossil Fuel Consumption of Proposed Building / Floor Area

Where:

Direct Scope 1 Fossil Fuel-Generated Energy Consumption of Proposed Building equals the total site Scope 1 fossil fuel-generated energy consumption of the proposed building calculated in accordance with the Simulated Performance Alternative in Section 405 of the IECC 2021 (incorporated by reference; see §435.3), and measured in thousands of British thermal units per year (kBtu/yr), except that this term does not include fossil fuel consumption for emergency electricity generation. Agencies must include all on-site fossil fuel use or Scope 1 emissions associated with non-emergency generation from backup generators (such as those for peak shaving or peak shifting). Any energy generation or Scope 1 emissions associated with biomass fuels are excluded. Any emissions associated with natural gas for alternatively fueled vehicles ("AFVs") (or any other alternative fuel defined at 42 U.S.C. 13211 that is provided at a Federal building) is excluded. Buildings with manufacturing or industrial process loads should be accounted for in the analysis for the building's fossil fuel consumption and GHG emissions but are not subject to the phase down targets.

Floor Area is the floor area of the structure that is enclosed by exterior walls, including finished or unfinished basements, finished or heated space in attics, and garages if they have an uninsulated wall in common with the house. Not included are crawl spaces, and sheds and other buildings that are not attached to the house.

§435.202 Petition for downward adjustment.

(a) *New Federal buildings and major renovations of all Scope 1 fossil fuel-using systems in an EISA-subject building.* (1) Upon petition by a Federal agency the Director of FEMP may adjust the applicable maximum allowable Scope 1 fossil fuel energy consumption standard with respect to a specific building, upon written certification from the head of

the agency designing the building, that the requested adjustment is the largest feasible reduction in Scope 1 fossil fuel energy consumption that can practicably be achieved in light of the specified functional needs for that building, as demonstrated by:

(i) A statement sealed by the design engineer that the proposed building was designed in accordance with the applicable energy efficiency requirements to the maximum extent practicable and that each fossil fuel consuming product included in the proposed building that is of a product category covered by the ENERGY STAR program or FEMP for designated products is an ENERGY STAR product or a product meeting the FEMP designation criteria, as applicable;

(ii) A description of the systems, technologies, and practices that were evaluated and unable to meet the required fossil fuel reduction including a justification of why achieving the Scope 1 fossil fuel-generated energy consumption targets would be technically impracticable: and

(iii) Any other information the agency determines would help explain its request;

(2) The head of the agency designing the building, must also include the following information in the petition:

(i) A general description of the building, including but not limited to location, use type, floor area, stories, expected number of occupants and occupant schedule, project type, project cost, and functional needs, mission critical activity, research, and national security operations as applicable;

(ii) The maximum allowable Scope 1 fossil fuel energy consumption for the building from paragraphs (c) or (d) of this section;

(iii) The estimated Scope 1 fossil fuel energy consumption of the proposed building;

(iv) A description of the proposed building's energy-related features, including but not limited to:

(A) HVAC system type and configuration;

(B) HVAC equipment sizes and efficiencies;

(C) Ventilation systems (including outdoor air volume, controls technique, heat recovery systems, and economizers, if applicable);

(D) Service water heating system configuration and equipment (including solar hot water, wastewater heat recovery, and controls for circulating hot water systems, if applicable);

(E) Estimated industrial process loads; and

(F) Any other on-site fossil fuel consuming equipment.

(3) Petitions for downward adjustment should be submitted to *ff-petition@ee.doe.gov,* or to:

U.S. Department of Energy, FEMP, Director, Fossil Fuel Reduction Petitions, EE-5F, 1000 Independence Ave. SW., Washington, DC 20585-0121.

(4) The Director will make a best effort to notify the requesting agency in writing whether the petition for downward adjustment to the numeric reduction requirement is approved or rejected, in 45 calendar days of submittal, granted the petition is complete. If the Director rejects the petition or establishes a value other than that presented in the petition, the Director will forward its reasons for rejection to the petitioning agency.

(b) *Major renovations of a Scope 1 fossil fuel-using building system or Scope 1 fossil fuel-using component*. (1) Upon petition by a Federal agency, the Director of FEMP may adjust the applicable requirements for the Federal agency to reduce Scope 1 on-site fossil fuel-generated energy consumption standard with respect to a specific renovation, upon written certification from the head of the agency designing the renovation, that the requested adjustment is the largest feasible reduction in Scope 1 fossil fuel energy

consumption that can practicably be achieved in light of the specified functional needs for that building, as demonstrated by:

(i) A statement Sealed by the design engineer that the proposed renovation incorporates commercially available systems and/or components that provide a level of energy efficiency that is life-cycle cost effective as defined in this part and reduces consumption of Scope 1 fossil fuel energy consumption to the maximum extent practicable and that each fossil fuel consuming product included in the proposed building that is of a product category covered by the ENERGY STAR program or FEMP for designated products is an ENERGY STAR product or a product meeting the FEMP designation criteria, as applicable.

(ii) A description of the systems, technologies, and practices that were evaluated and unable to meet the required fossil fuel reduction including a justification of why achieving the Scope 1 fossil fuel-generated energy consumption targets would be technically impracticable: and

(iii) Any other information the agency determines would help explain its request.

(2) The head of the agency making the design decisions for the building, must also include the following information in the petition:

(i) A general description of the building, including but not limited to location, use type, floor area, stories, estimated number of occupants and occupant schedule, project type, project cost, and functional needs, mission critical activity, research, and national security operations as applicable;

(ii) The maximum allowable Scope 1 fossil fuel energy consumption for the building from §435.200(c) or (d);

(iii) The estimated Scope 1 fossil fuel energy consumption of the building;

(iv) A description of system(s) or component(s) that are being renovated, including but not limited to:

(A) HVAC system or component type and configuration;

(B) HVAC equipment sizes and efficiencies;

(C) Ventilation systems or components (including outdoor air volume, controls technique, heat recovery systems, and economizers, if applicable);

(D) Service water heating system or component configuration and equipment (including solar hot water, wastewater heat recovery, and controls for circulating hot water systems, if applicable);

(E) Estimated process loads; and

(F) Any other on-site fossil fuel consuming equipment.

(3) Petitions for downward adjustment should be submitted to *ff-petition@ee.doe.gov,* or to:

U.S. Department of Energy, FEMP, Director, Fossil Fuel Reduction Petitions, EE-5F,1000 Independence Ave. SW., Washington, DC 20585-0121.

(4) The Director will make a best effort to notify the requesting agency in writing whether the petition for downward adjustment to the numeric reduction requirement is approved or rejected, in 45 calendar days of submittal for major renovations of a buildings system, and 20 calendar days for major renovations of a component, granted the petition is complete. If the Director rejects the petition, the Director will forward its reasons for rejection to the petitioning agency.

(c) *Exclusions*. The General Services Administration (GSA) may not submit petitions under paragraphs (a) and (b) of this section. Agencies that are tenants of GSA buildings for which the agency, not GSA, has significant design control may submit petitions in accordance with this section.

Appendix A to Subpart B of Part 435 Maximum Allowable Scope 1 Fossil Fuel Generated Energy Consumption

(a) For purposes of the tables in this appendix, the climate zones for each county in the United States are those listed in Figure 301.1 of IECC 2021 (incorporated by reference; see §435.3).

(b) For purpose of appendix A, the following definitions apply:

Mobile Home means a dwelling unit built to the Federal Manufactured Home Construction and Safety Standards in 24 CFR part 3280, that is built on a permanent chassis and moved to a site. It may be placed on a permanent or temporary foundation and may contain one or more rooms.

Multi-Family in 2-4 Unit Buildings means a category of structures that is divided into living quarters for two, three, or four families or households in which one household lives above or beside another. This category also includes houses originally intended for occupancy by one family (or for some other use) that have since been converted to separate dwellings for two to four families.

Multi-Family in 5 or More Unit Buildings means a category of structures that contain living quarters for five or more households or families and in which one household lives above or beside another.

Single-Family Attached means a building with two or more connected dwelling units, generally with a shared wall, each providing living space for one household or family. Attached houses are considered single-family houses as long as they are not divided into more than one dwelling unit and they have independent outside entrances. A single-family house is contained within walls extending from the basement (or the ground floor if there is no basement) to the roof. Townhouses, row houses, and duplexes are

considered single-family attached dwelling units, as long as there is no dwelling unit above or below another.

Single-Family Detached means a separate, unconnected dwelling unit, not sharing a wall with any other building or dwelling unit, which provides living space for one household or family. A single-family house is contained within walls extending from the basement (or the ground floor if there is no basement) to the roof. This includes modular homes but does not include mobile homes.

Table A-1a – FY2020-FY2024 Maximum Allowable Fossil Fuel-Generated Energy Consumption by Building Category, Building Type and Climate Zone, Residential Buildings (CO_2e/yr-sqft)

Building Category	Climate Zone:	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
	Building Activity/ Type	Fossil Fuel-Generated Energy Use Intensity (CO_2e/yr-sqft)																		
Residential	Mobile	0.666	0.667	0.668	0.733	0.800	0.778	0.922	0.776	0.887	0.922	1.007	1.005	1.006	1.223	1.199	1.111	1.336	1.336	1.511
Residential	Single-family detached	0.440	0.441	0.441	0.445	0.450	0.448	0.458	0.447	0.455	0.458	0.469	0.467	0.468	0.479	0.476	0.471	0.488	0.488	0.499
Residential	Single-family attached	0.776	0.776	0.777	0.778	0.780	0.779	0.783	0.779	0.782	0.783	0.787	0.787	0.787	0.792	0.790	0.788	0.795	0.795	0.799
Residential	Multi-family (in 2–4-unit building)	0.556	0.557	0.561	0.574	0.593	0.587	1.225	0.583	1.111	1.225	1.164	1.158	1.162	2.006	1.995	1.774	2.440	2.441	2.882
Residential	Multi-family (in 5+ unit building)	0.224	0.225	0.229	0.242	0.261	0.255	0.893	0.251	0.880	0.893	1.332	1.326	1.330	1.774	1.763	1.442	2.008	2.009	2.550

Table A-1b – FY2020-FY2024 Maximum Allowable Fossil Fuel-Generated Energy Consumption by Building Category, Building Type and Climate Zone, Residential Buildings (source kBtu/yr-sqft)

Building Category	Climate Zone:	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
	Building Activity/ Type	Fossil Fuel-Generated Energy Use Intensity (site kBtu/yr-sqft)																		

Residential	Mobile	6	6	6	7	7	7	8	7	8	8	10	10	10	11	11	10	12	12	14
Residential	Single-family detached	4	4	4	4	5	4	5	4	5	5	6	6	6	7	7	6	8	8	9
Residential	Single-family attached	7	7	7	7	7	7	8	7	7	8	8	8	8	8	8	8	9	9	9
Residential	Multi-family (in 2–4-unit building)	5	5	6	7	8	8	11	8	10	11	15	14	15	19	18	16	22	22	26
Residential	Multi-family (in 5+ unit building)	2	2	3	4	6	5	8	5	7	8	12	11	12	16	15	13	19	19	23

Table A-2a – FY2025-FY2029 Maximum Allowable Fossil Fuel-Generated Energy Consumption by Building Category, Building Type and Climate Zone, Residential Buildings (CO_2e/yr-sqft)

Building Category	Climate Zone:	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
	Building Activity/ Type	Fossil Fuel-Generated Energy Use Intensity (CO_2e/yr-sqft)																		
Residential	Mobile	0.333	0.334	0.337	0.340	0.339	0.346	0.338	0.344	0.346	0.354	0.352	0.353	0.362	0.359	0.355	0.368	0.368	0.376	0.33
Residential	Single-family detached	0.220	0.221	0.222	0.225	0.224	0.229	0.224	0.227	0.229	0.234	0.233	0.234	0.240	0.238	0.235	0.244	0.244	0.250	0.20
Residential	Single-family attached	0.388	0.388	0.389	0.390	0.390	0.392	0.389	0.391	0.392	0.394	0.393	0.394	0.396	0.395	0.394	0.397	0.398	0.400	0.38
Residential	Multi-family (in 2–4-unit building)	0.288	0.330	0.337	0.346	0.344	0.362	0.341	0.356	0.363	0.382	0.379	0.381	1.003	0.997	0.887	1.220	1.220	1.441	0.28
Residential	Multi-family (in 5+ unit building)	0.133	0.134	0.221	0.330	0.228	0.346	0.225	0.340	0.347	0.366	0.363	0.365	0.887	0.881	0.771	1.104	1.104	1.225	0.13

Table A-2b – FY2025-FY2029 Maximum Allowable Fossil Fuel-Generated Energy Consumption by Building Category, Building Type and Climate Zone, Residential Buildings (source kBtu/yr-sqft)

Building Category	Climate Zone:	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
	Building Activity/ Type	Fossil Fuel-Generated Energy Use Intensity (site kBtu/yr-sqft)																		
Residential	Mobile	3	3	3	3	4	4	4	3	4	4	5	5	5	6	5	5	6	6	7
Residential	Single-family detached	2	2	2	2	2	2	3	2	2	3	3	3	3	4	3	3	4	4	4

Residential	Single-family attached	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5
Residential	Multi-family (in 2–4-unit building)	3	3	3	3	4	4	6	4	5	6	7	7	7	9	9	8	11	11	13
Residential	Multi-family (in 5+ unit building)	1	1	1	2	3	3	4	2	4	4	6	6	6	8	7	6	9	9	11

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