

## 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:** Federal Energy Management Program, Department of Energy.

**ACTION:** Final rule.

**SUMMARY:** The Department of Energy ("DOE") is publishing a rule that establishes energy performance standards for the new construction and major renovation of 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 of 2007 ("EISA"). Consistent with the requirements of ECPA and EISA, DOE is establishing Federal building energy performance standards that require Federal agencies to reduce their use of 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. This final rule also provides processes by which Federal agencies may petition DOE for a modification to the final standards.

**DATES:** The effective date of this rule is July 15, 2024. Compliance with revised performance standards established in this rule is required for the construction of new and major renovation of Federal buildings, including commercial buildings, multi-family high-rise residential buildings, and low-rise residential buildings, for which design for construction begins on or after May 1, 2025.

**ADDRESSES:** The docket for this rulemaking, which includes **Federal Register** notices, public meeting attendee lists and transcripts, comments, and other supporting documents/materials, is available for review at [www.regulations.gov](http://www.regulations.gov). All documents in the docket are listed in the [www.regulations.gov](http://www.regulations.gov) index.

The docket web page can be found at [www.regulations.gov/docket/EERE-2010-BT-STD-0031](http://www.regulations.gov/docket/EERE-2010-BT-STD-0031). The docket web page contains instructions on how to access all documents, including public comments, in the docket.

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#### SUPPLEMENTARY INFORMATION:

##### Table of Contents

|                                                                       |  |
|-----------------------------------------------------------------------|--|
| I. Introduction                                                       |  |
| A. Authority                                                          |  |
| B. Background                                                         |  |
| C. Final Rule Overview                                                |  |
| II. Public Comments on the 2022 SNOPIR                                |  |
| III. Discussion of the Final Rule                                     |  |
| A. Scope                                                              |  |
| 1. Federal Buildings                                                  |  |
| 2. Calculating Costs                                                  |  |
| a. Construction and Major Renovations Costs                           |  |
| b. Individual Buildings                                               |  |
| c. Major Renovations                                                  |  |
| d. Energy Conservation Measures                                       |  |
| 3. Fossil Fuel-Generated Energy Consumption                           |  |
| a. Limitation to On-Site Use of Fossil Fuels                          |  |
| b. Exemptions and Exceptions                                          |  |
| B. Performance Standards for Fossil Fuel-Generated Energy Consumption |  |
| 1. New Construction and Major Renovations of a Whole Building         |  |
| 2. Major Renovations Within a Building                                |  |
| 3. Shift Adjustment Multiplier                                        |  |
| 4. Compliance Date                                                    |  |
| C. Petitions for Downward Adjustment                                  |  |
| 1. DOE Review of Petitions                                            |  |
| 2. Making Petitions for Downward Adjustment Public                    |  |
| 3. Bundling Petitions                                                 |  |
| 4. GSA Tenant Agencies                                                |  |
| 5. Petitions Submitted by the Department of Defense                   |  |
| D. Definitions                                                        |  |
| IV. Additional Issues Raised by Commenters                            |  |
| A. Authority                                                          |  |
| B. APA Concerns                                                       |  |
| V. Methodology, Analytical Results, and Conclusion                    |  |
| A. Cost-Effectiveness                                                 |  |
| B. Emissions Analysis                                                 |  |
| 1. Air Quality Regulations Incorporated in DOE's Analysis             |  |
| C. Monetizing Emissions Impacts                                       |  |
| 1. Monetization of Greenhouse Gas Emissions                           |  |
| a. Social Cost of Carbon                                              |  |
| b. Social Cost of Methane and Nitrous Oxide                           |  |
| c. Sensitivity Analysis Using Updated 2023 SC-GHG Estimates           |  |
| 2. Monetization of Other Emissions Impacts                            |  |
| D. Public Comment                                                     |  |
| E. Conclusion                                                         |  |
| F. Reference Resources                                                |  |
| VI. Procedural Issues and Regulatory Review                           |  |
| A. Review Under Executive Orders 12866, 13563, and 14094              |  |
| B. Review Under the Regulatory Flexibility Act                        |  |

|                                                                              |
|------------------------------------------------------------------------------|
| C. Review Under the Paperwork Reduction Act                                  |
| D. Review Under the National Environmental Policy Act of 1969                |
| E. Review Under Executive Order 13132                                        |
| F. Review Under Executive Order 12988                                        |
| G. Review Under the Unfunded Mandates Reform Act of 1995                     |
| H. Review Under the Treasury and General Government Appropriations Act, 1999 |
| I. Review Under Executive Order 12630                                        |
| J. Review Under the Treasury and General Government Appropriations Act, 2001 |
| K. Review Under Executive Order 13211                                        |
| L. Information Quality                                                       |
| VII. Approval of the Office of the Secretary                                 |

## I. Introduction

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

### A. Authority

Section 305 of ECPA established energy conservation requirements for Federal buildings. 42 U.S.C. 6834. Section 433(a) of EISA amended section 305 of ECPA and directed DOE to establish regulations that require certain new Federal buildings and Federal buildings undergoing major renovations to reduce their fossil fuel-generated energy consumption. 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)<sup>1</sup> with respect to which the

<sup>1</sup> 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



Administrator of General Services is required to transmit a prospectus to Congress under 40 U.S.C. 3307;<sup>2</sup> 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, 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 FY 2010, 65 percent beginning in FY 2015, 80 percent beginning in FY 2020, 90 percent beginning in FY 2025, and 100 percent beginning in FY 2030, also shown in 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, ECPA, as amended by EISA, permits DOE to adjust the applicable numeric reduction requirement downward with respect to a specific building, if the head of the Federal agency requesting the downward adjustment certifies in writing that meeting such requirement would be technically impracticable in light of the agency's specified functional needs for that 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.*

#### B. Background

In this final rule, DOE establishes regulations that require certain new Federal buildings and Federal buildings undergoing major renovations to be

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.

<sup>2</sup> 40 U.S.C. 3307 describes the minimum construction, alteration, and lease costs that would trigger a prospectus to Congress.

designed to reduce their fossil fuel-generated energy consumption and provides a process for Federal agencies to petition for a downward adjustment from these requirements if applicable. This rule amends the regulations governing energy efficiency in Federal buildings found in 10 CFR parts 433 and 435.

DOE previously published a notice of proposed rulemaking ("NOPR") in the **Federal Register** on October 15, 2010, which proposed a rule 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 several comments expressing concern and encouraging DOE to re-examine the proposed regulations.<sup>3</sup> In response to these comments, DOE identified additional areas for clarification and consideration that would benefit from further public comment. DOE issued a supplemental notice of proposed rulemaking ("2014 SNOPR") on October 14, 2014. 79 FR 61694. Comments were accepted through December 15, 2014. *Id.* DOE received comments requesting reconsideration of key issues.

DOE revisited its proposed rule and issued a second SNOPR on December 21, 2022 ("2022 SNOPR"). 87 FR 78382. The rule proposed in the 2022 SNOPR differed from the rule proposed in the 2014 SNOPR. Specifically, the rule proposed in the 2022 SNOPR:

Limited its application to on-site fossil fuel usage or Scope 1 GHG emissions in CO<sub>2</sub>e ("Carbon Dioxide Equivalent Gases").

Introduced a shift multiplier for Federal commercial buildings that operate on extended schedules compared to the private sector buildings sampled in CBECS.

Revised the calculation of fossil fuel usage to be consistent with how DOE measures fossil fuel usage and greenhouse gas emissions in reporting related to Section 432 of EISA.

Clarified that the rule applies to EISA-subject major renovations for (1) all on-site fossil fuel-using systems, (2) on-site fossil fuel-using system level renovations, and (3) on-site fossil fuel-using component level renovations.

Clarified when the rule applies to leased Federal facilities.

Refined 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.

<sup>3</sup> Complete contents of the docket folder may be found at [www.regulations.gov/#/docketDetail;D=EERE-2010-BT-STD-0031](http://www.regulations.gov/#/docketDetail;D=EERE-2010-BT-STD-0031).

Provided an alternative compliance method for buildings with process loads that are not included in CBECS and RECS.

Clarified that process loads of building types not included in CBECS are not subject to the fossil fuel reduction requirements.

Stated that certain renewable fuels are exempt from the calculation of fossil fuel usage.

Identified information Federal agencies must provide when petitioning for a downward adjustment.

A public meeting on the 2022 SNOPR was held on January 5, 2023, and public comments were accepted through March 23, 2023. 87 FR 78382; 88 FR 12267. The comment period was extended to accommodate requests from stakeholders to provide additional time to analyze the information presented in the 2022 SNOPR and accompanying technical support document.

#### C. Final Rule Overview

The final rule adopts energy performance standards for new construction and major renovation of Federal buildings. The final rule adds standards for the maximum emissions resulting from on-site fossil fuel usage, language related to the purpose of these new standards, definitions associated with these standards, and a detailed process for Federal agencies petitioning for a downward adjustment from these standards to 10 CFR parts 433 (Federal commercial and multi-family high-rise residential buildings) and 435 (Federal low-rise residential buildings). The final rule adds the following provisions to 10 CFR parts 433 and 435:

Adds a paragraph to the purpose and scope provisions which states that the regulation also establishes the maximum allowable fossil fuel-generated energy consumption standard for EISA-subject Federal buildings.

Adds and revises definitions applicable to 10 CFR parts 433 and 435.

Adds subpart B that outlines the fossil fuel-generated energy consumption requirement, the process for determining a Federal building's fossil fuel-generated energy consumption, and the process for petitioning for a downward adjustment.

Adds Appendix A to Subpart B that identifies the targets for specific building types and climate zones for FY 2020–2024 and FY 2025–2029.

After considering the comments submitted in response to the 2022 SNOPR, DOE makes the following substantive revisions to the rule proposed in the 2022 SNOPR:

Revises the definitions of "construction cost" and "major



renovation cost” so that the definitions list similar costs associated with the construction or major renovation of EISA-subject buildings.

Shortens the review period for the FEMP Director to review petitions for downward adjustment related to construction of new Federal buildings or major renovations from 45 days to 30 days.

Adds regulatory language that clarifies when Federal agencies may bundle petitions for downward adjustments.

Additionally, DOE updated the datasets used for the underlying modeling impact analysis. The final rule

is discussed in greater detail in section VII of this document.

## II. Public Comments on the 2022 SNOPR

DOE received comments in response to the 2022 SNOPR from the individuals and interested parties listed in Table II–1.<sup>4</sup> These comments are available in the public docket for this rulemaking. The specific issues relating to the final rule raised by the commenters are addressed in section III of this document.

Additional concerns raised by the commenters relating to DOE's authority to promulgate these standards or

potential procedural issues are addressed in Section IV of this document. A parenthetical reference at the end of a comment quotation or paraphrase provides the location of the item in the public record.<sup>5</sup> DOE also held a public meeting webinar on January 5, 2023, where it sought input from stakeholders regarding its proposed rule. DOE focuses on written comments in this final rule, as only one stakeholder (Sierra Club) opted to speak during the public meeting webinar, and its verbal comments were consistent with its written comments later submitted.

TABLE II–1—DECEMBER 2022 SNOPR WRITTEN COMMENTS

| Commenter(s)                                                                                                                    | Abbreviation      | Document No. |
|---------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------|
| A J .....                                                                                                                       | .....             | 118          |
| Abbi J .....                                                                                                                    | .....             | 119          |
| Aeroseal .....                                                                                                                  | .....             | 97           |
| Alliance to Save Energy .....                                                                                                   | ASE .....         | 76           |
| American Chemistry Council .....                                                                                                | ACC .....         | 88           |
| American Council for an Energy-Efficient Economy, Earthjustice, Rewiring America, Rocky Mountain Institute, & Sierra Club ..... | ACEEE et al. .... | 126          |
| American Gas Association .....                                                                                                  | AGA .....         | 100          |
| American Institute of Architects .....                                                                                          | AIA .....         | 114          |
| American Public Gas Association .....                                                                                           | APGA .....        | 102          |
| The American Society of Heating, Refrigerating and Air-Conditioning Engineers .....                                             | ASHRAE .....      | 96           |
| Anonymous .....                                                                                                                 | .....             | 82           |
| Bloom Energy .....                                                                                                              | .....             | 85           |
| Build SMART .....                                                                                                               | .....             | 111          |
| Business Council for Sustainable Energy .....                                                                                   | BCSE .....        | 115          |
| Celsius Energy .....                                                                                                            | .....             | 117          |
| Coalition of 66 .....                                                                                                           | .....             | 95           |
| Combined Heat and Power Alliance .....                                                                                          | CHPA .....        | 104          |
| Federal Bureau of Investigation .....                                                                                           | FBI .....         | 84           |
| Fuel Cell & Hydrogen Energy Association .....                                                                                   | FCHEA .....       | 106          |
| Geothermal Exchange .....                                                                                                       | .....             | 103          |
| Green Buildings Institute .....                                                                                                 | GBI .....         | 120          |
| Institute for Policy Integrity at New York University School of Law .....                                                       | .....             | 93           |
| International Association of Sheet Metal, Air, Rail and Transportation Workers .....                                            | SMART .....       | 91           |
| International Code Council .....                                                                                                | ICC .....         | 98           |
| Jenna B .....                                                                                                                   | .....             | 80           |
| Lauren Schwarze .....                                                                                                           | .....             | 79           |
| Local Officials .....                                                                                                           | .....             | 125          |
| Michael Ladach .....                                                                                                            | .....             | 122          |
| Microgrid Resources Coalition .....                                                                                             | MRC .....         | 105          |
| Middle Tennessee Natural Gas Utility District .....                                                                             | .....             | 112          |
| National Electrical Contractors Association .....                                                                               | NECA .....        | 123          |
| National Propane Gas Association .....                                                                                          | NPGA .....        | 90           |
| Philadelphia Gas Works .....                                                                                                    | PGW .....         | 116          |
| Polyisocyanurate Insulation Manufacturers Association .....                                                                     | PIMA .....        | 83           |
| Rinnai America Corporation .....                                                                                                | .....             | 121          |
| S. McKnight .....                                                                                                               | .....             | 127          |
| Samuel Smith .....                                                                                                              | .....             | 110          |
| Sarah Lance .....                                                                                                               | .....             | 81           |
| Sierra Club members .....                                                                                                       | .....             | 124          |
| Think Microgrid .....                                                                                                           | .....             | 92           |
| U.S. Green Building Council .....                                                                                               | .....             | 107          |
| View Inc .....                                                                                                                  | .....             | 86           |
| Washington Gas Light Company .....                                                                                              | WGL .....         | 101          |
| Gas Associations .....                                                                                                          | .....             | 99           |

<sup>4</sup> DOE received comments from an individual on April 11, 2023, after the re-opened comment period closed. Doc. No. 127. Despite the fact that these comments were filed late, DOE considered the

issues raised in these comments when reviewing the rule.

<sup>5</sup> The parenthetical reference provides a reference for information located in the docket for this rulemaking. (Docket No. EERE–2010–BT–STD–

0031, which is maintained at [www.regulations.gov](http://www.regulations.gov)). The references are arranged as follows: (commenter name, comment docket ID number, page of that document).



### III. Discussion of the Final Rule

The following section discusses the final rule. The final rule introduces energy performance standards for new construction and major renovation of Federal buildings. The final rule adds standards for the maximum emissions resulting from on-site fossil fuel usage, language related to the purpose of these new standards, definitions associated with these standards, and a detailed process for Federal agencies petitioning for a downward adjustment from these standards to 10 CFR parts 433 (Federal commercial and multi-family high-rise residential buildings) and 435 (Federal low-rise residential buildings). The revisions to 10 CFR parts 433 and 435, as summarized in this section, are presented at the end of this document.

#### A. Scope

##### 1. Federal Buildings

This final rule applies to a defined subset of new Federal buildings and major renovations to Federal buildings, as specified in section 433 of EISA. *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). However, the rule would not apply in cases of Federal agencies leasing space in buildings where the Federal Government does not lease the entire building. Accordingly, if the building at issue is not entirely leased

to the Federal Government at the time of renovation, the final energy performance standards do not apply.

The subset of Federal buildings to which this rule applies 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, 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.<sup>6</sup> 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 2024 is \$3,613,000.<sup>7</sup> GSA also provides a separate dollar threshold for alterations in leased public buildings for which a prospectus is required; in FY 2024, this threshold is \$1,806,500.

The second qualifying category of EISA-subject buildings includes 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).<sup>8</sup> For the purposes of calculating this threshold, agencies should use the inflated value of the \$2,500,000 as of October of the FY

during which the design for construction of the project begins. DOE is adopting a methodology that allows for a constant inflator to be applied during the entirety of the year. By this methodology, an agency should set the Bureau of Labor and Statistics CPI Inflation calculator to \$2,500,000 in October 2006 for the value of the original cost threshold. As of the most recent update, October 2023, \$2.5 million in 2007 dollars, when adjusted for inflation, is \$3,811,583. DOE revises regulatory text in §§ 433.200(a) and 435.200(a) to clarify how the cost thresholds for new public and non-public buildings should be adjusted for inflation.

As noted previously, GSA also provides a separate dollar threshold for alterations in leased public buildings (\$1,806,500 in FY 2024). DOE will use both thresholds (*i.e.*, the \$2,500,000 in 2007 dollars threshold (adjusted for inflation) for Federal buildings that are not public buildings, and the \$1,806,500 in FY 2024 dollars threshold for leased public buildings) for this second category of EISA-subject buildings (*i.e.*, buildings for which a prospectus is not required). Using the lower GSA prospectus threshold for leased public buildings 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 also applied to buildings and renovations for which a prospectus is not required.

TABLE III–1—COST THRESHOLDS FOR FY2024 (MILLION DOLLARS)

|                                                                     | Public buildings | Non-Public buildings |
|---------------------------------------------------------------------|------------------|----------------------|
| Construction or Major Renovation to Federally Owned Buildings ..... | * \$3.613        | ** \$3.812           |
| Major Renovation of Federally Leased Buildings .....                | † 1.806          | †† 1.806             |

\* Cost threshold for buildings that are owned public buildings, as defined in 40 U.S.C. 3301, is determined by the GSA annual prospectus thresholds published for each FY at [www.gsa.gov/real-estate/design-and-construction/annual-prospectus-thresholds](http://www.gsa.gov/real-estate/design-and-construction/annual-prospectus-thresholds).

\*\* Cost threshold for any new construction or major renovation that is in an owned, non-public building is determined by adjusting the \$2,500,000 in 2007\$ for inflation to the current FY. DOE sets the inflated value for the entire FY based on the value reported in October of that FY in the Bureau of Labor and Statistics CPI Inflation calculator [www.bls.gov/data/inflation\\_calculator.htm](http://www.bls.gov/data/inflation_calculator.htm).

† Cost threshold for major renovations within leased buildings is determined by the GSA annual prospectus thresholds published for each FY at [www.gsa.gov/real-estate/design-and-construction/annual-prospectus-thresholds](http://www.gsa.gov/real-estate/design-and-construction/annual-prospectus-thresholds).

†† Cost threshold for major renovations within leased buildings is determined by the GSA annual prospectus thresholds published for each FY at [www.gsa.gov/real-estate/design-and-construction/annual-prospectus-thresholds](http://www.gsa.gov/real-estate/design-and-construction/annual-prospectus-thresholds).

For example, a building in the first category would include a federal office building for which design for construction began in FY 2024 and with construction or renovation costs that are

more than \$3,613,000. 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 \$3,811,583 in FY 2024 (\$2,500,000 in 2007 dollars, adjusted for inflation). DOE expects that most low-rise residential buildings that meet the cost threshold will be low-rise

<sup>6</sup> 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 that are leased 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.

<sup>7</sup> See GSA Annual Prospectus Thresholds, available at [www.gsa.gov/real-estate/design-and-construction/annual-prospectus-thresholds](http://www.gsa.gov/real-estate/design-and-construction/annual-prospectus-thresholds).

<sup>8</sup> To find the adjusted cost threshold, go to [data.bls.gov/cgi-bin/cpicalc.pl](http://data.bls.gov/cgi-bin/cpicalc.pl).

multi-family buildings or low-rise dormitories as Federal low-rise single-family homes are not likely to meet the cost threshold.

The International Code Council (ICC) stated that this final rule should apply to all new Federal buildings and major renovation projects. ICC, Doc. No. 98, pg. 2. ICC asserted that doing so would maximize the long term ecological and economic benefits of the rule. *Id.* However, DOE notes that section 433 of EISA clearly identifies the buildings to which the energy performance standards are to apply. Thus, although DOE encourages Federal agencies consider these energy performance standards holistically in developing their construction and renovation plans, the final rule only applies to EISA-subject buildings.

## 2. Calculating Costs

The final rule also outlines which costs Federal agencies must include when calculating construction or major renovation costs to an EISA-subject building.

### a. Construction and Major Renovations Costs

In the final rule, DOE revises the definitions of “construction cost” and “major renovation cost” proposed in the 2022 SNOPIR. The 2022 SNOPIR proposed to define “construction cost” as “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.” 87 FR 78382, 78420. However, the 2022 SNOPIR explicitly stated that “construction cost” does not include legal or administrative fees, or the cost of acquiring the land. *Id.*

The 2022 SNOPIR proposed to define “major renovation cost” as costs associated with the “[r]epairing, remodeling, improving, or extending, or other changes in, a public building as per 40 U.S.C. 3301(a)(1).” These costs included costs associated with the “[p]reliminary 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[.]” *Id.*

One individual commented on the definition of “construction cost” proposed on the 2022 SNOPIR. Doc. No. 127, pg. 2. They stated that “construction cost” should include administrative and legal fees because it would increase the number of buildings to which these energy performance standards apply as more construction

projects would meet the threshold. *Id.* In addition, they claimed that including administrative and legal fees when calculating construction costs would promote fiscal responsibility with public funds. *Id.* This commenter also argued that land acquisition costs should be included in the definition of “construction cost” because doing so would “incentivize project managers to prioritize the use of existing Federal lands and renovations of existing buildings, rather than buying new spaces” *Id.*

After reviewing the definitions proposed in the 2022 SNOPIR and stakeholder comments, DOE amends the definitions of “construction cost” to include a similar list of costs that DOE included in the definition of “major renovation cost.” This includes, but is not limited to, the costs of preliminary planning, engineering, architectural, permitting, fiscal and economic investigations and studies, surveys, designs, plans, working drawings, specifications, procedures, and other similar actions necessary for the construction of a new Federal building. Additionally, DOE amends the definition of “construction cost” to remove the language specifically excluding legal or administrative fees from the calculation of “construction cost.” If legal or administrative fees are associated with the construction of a new Federal building, such as permitting fees, then these costs must be included in the calculation of construction costs. However, DOE notes that most administrative or legal costs are generally part of overhead costs and are not associated with the construction of a new Federal building.

DOE declines to adopt the commenter’s suggestion that the cost of acquiring the land should be included in the definition of “construction cost.” DOE previously stated that many new Federal buildings are built on land already owned by the Federal Government. 79 FR 61694, 61698. Thus, including the land costs in the definition of “construction cost” is unnecessary and would have little practical effect. Moreover, not including land costs for new Federal buildings in the threshold calculation would be consistent with the threshold calculation for major renovations, for which land costs are not included.

In addition, DOE also amends the definition of “major renovation cost” so that it aligns with the revised definition of “construction cost.” First, the revised definition of “major renovation cost” provides a general description of major renovation costs—*i.e.*, cost associated with the repairing, remodeling,

improving, extending, or other changes in a federal building. Second, the revised definition then lists specific associated costs included in the definition of “major renovation costs.” Third, the revised definition replaces references to “public buildings,” as defined in 40 U.S.C. 3301(a)(1), to “Federal buildings,” as defined in the final rule so that the definition applies to both categories of EISA-subject buildings.

### b. Individual Buildings

The final rule applies the cost thresholds to individual buildings rather than multiple buildings in a single project. A commenter urged DOE to reconsider the proposed definition of “buildings” to apply to multiple buildings that are located within the grounds of another public building, meaning that the standard would apply to multiple buildings and “projects” would be the unit of analysis. Doc. No. 127, pg. 1. However, the statute authorizes DOE to establish Federal building energy efficiency performance standards that reduce fossil fuel-generated energy consumption for “new Federal buildings and Federal buildings undergoing major renovations” not “projects” that could include multiple buildings or major renovations. 42 U.S.C. 6834(a)(3)(D)(i). The cost threshold and public building determination stipulated in the statutory language is also specific to individual buildings. Furthermore, the date that design for construction begins (to determine the appropriate reduction target) is also building specific. Thus, when calculating the costs to determine whether the final rule applies, Federal agencies should calculate the costs for individual buildings.

### c. Major Renovations

In establishing these standards, DOE is sensitive to the notion that Federal agencies might break up their major renovations into smaller pieces to prevent associated costs from exceeding the applicable threshold. DOE discourages the practice of “breaking up renovation projects to get around the cost threshold” and intends to further address this topic as part of the Department’s implementation guidance. Even in cases of replacing individual systems or equipment, for which this rule applies, DOE believes agencies should prioritize pairing energy efficiency measures with reducing fossil fuel use. DOE notes that Section 433 of EISA 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). Multiple sequential renovations to the same building are likely to provide significant opportunities for substantial improvements and their cumulative effect over time should be evaluated and utilized to determine the cost of the project for the application of this rule. In this final rule, DOE broadly applies the term “major renovations” to include projects for which Federal agencies can practicably implement the energy efficiency and fossil fuel reduction goals of ECPA and EISA.

DOE is clarifying that the energy performance standards being adopted in this final rule apply both to whole building retrofits as well as multiple minor renovations that occur in phases on the same Federal building as long as the building meets the cost thresholds as explained above. More specifically, this final rule applies to renovations that are so extensive that they replace all on-site fossil fuel-using systems in the building, such as comprehensive replacement or restoration of most or all major systems, interior work (e.g., ceilings, partitions, doors, floor finishes, etc.), or building elements and features. DOE refers to such major renovations as “whole building” renovations throughout this preamble. However, the final rule also requires Federal agencies to consider major renovations that are less than whole building renovations (i.e., component and system level renovations, including multiple sequential renovations) that provide significant opportunities for substantial improvements in energy efficiency and reduce on-site fossil fuel usage across the Federal building portfolio.

#### d. Energy Conservation Measures

When designing new or renovated buildings, DOE encourages agencies to consider any energy conservation measures (“ECMs”) that 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 that impact on-site fossil fuel usage, DOE urges the agency to evaluate and consider the total of those project costs bundled together when implementing those ECMs to determine whether the total cost meets the thresholds in section 433 of EISA. ECMs that impact on-site fossil fuel usage include, but are not limited to, 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 the use of fossil fuel. Considering ECM projects in a more comprehensive approach, rather than a piecemeal approach, better aligns with the goals of section 433 of EISA.

#### 3. Fossil Fuel-Generated Energy Consumption

##### a. Limitation to On-Site Use of Fossil Fuels

Section 433 of EISA directs DOE to establish regulations that require certain new Federal buildings and Federal buildings undergoing major renovations be designed to reduce their fossil fuel-generated energy consumption. 42 U.S.C. 6834(a)(3)(D)(i). The scope of the building energy covered by the final rule is limited by the term “fossil fuel-generated energy consumption.” In the 2022 SNOPIR, DOE noted that this term is not defined in section 433 of EISA and proposed to define “fossil fuel-generated energy consumption” as 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). This includes, 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).

87 FR 78382, 78421. Pursuant to this proposed definition, the standard would apply to energy consumption from fossil fuels used by equipment and systems designed to support building operations; that is, fossil fuels consumed on site. The proposed definition would not apply to the consumption of fossil fuels used to produce electricity off-site.

DOE received several public comments in response to 2022 SNOPIR’s proposed definition of “fossil fuel-generated energy consumption.” Several commenters supported the proposed definition. For example, the Green Building Initiative (GBI) expressed support for focusing on on-site generated energy because “it presents the best opportunity to clearly track improvements and more clearly

measure improvements of Federal buildings.” GBI, Doc. No. 120, pg. 3. GBI also acknowledged that many factors within off-site generated energy are outside the control of the Federal government and that focusing on on-site generated energy will assist the Federal government in improving the factors that it can control. *Id.* Furthermore, one commenter urged DOE to retain its focus on on-site fossil fuel reduction as it focused the standard on outcomes. Doc. No. 79, pg. 4–5.

DOE also received comments that opposed the definition for “fossil fuel-generated energy consumption” proposed in the 2022 SNOPIR. For example, several commenters questioned DOE’s authority to define “fossil fuel-generated energy consumption.” See e.g., APGA, Doc. No. 102, pg. 3; NPGA, Doc. No. 90, pg. 3; AGA, Doc. No. 100, pg. 11. NPGA and AGA both alleged that DOE does not have authority to define “fossil fuel-generated energy consumption” because the meaning of the term is clear. NPGA, Doc. No. 90, pg. 3; AGA, Doc. No. 100, pg. 11. They argued that the plain text of the statute unambiguously refers to the total energy consumption of the buildings, rather than only the on-site energy consumption. AGA, Doc. No. 100, pg. 11.

Section 433 of EISA does not define the term “fossil fuel-generated energy consumption of the buildings.” But when the text of section 433 is considered as a whole, it is best read to apply standards only to the on-site consumption of fossil fuels on the site of the Federal building.

In section 433 of EISA, Congress sought to address how certain Federal buildings are designed when they are constructed or undergo major renovations. The operative sentence directing the imposition of standards states that certain new Federal buildings or Federal buildings undergoing major renovations “shall be designed so that the fossil fuel-generated energy consumption of the buildings is reduced[.]” 42 U.S.C. 6834(a)(3)(D)(i)(I) (emphasis added). Section 433 then prescribes standards that progressively reduce and then entirely eliminate “fossil fuel-generated energy consumption of the buildings” by FY 2030. 42 U.S.C. 6834(a)(3)(D)(i)(II).

With this text, Congress clearly indicated that section 433 covers fossil fuel-generated energy consumption that can be reduced, and ultimately eliminated, through building design measures. On-site consumption of fossil fuel-generated energy can be reduced, and entirely eliminated, through the use of building design measures. Such

measures may include the installation of electric equipment for space and water heating, along with any insulation, ductwork, and electrical work necessary to ensure the building's needs are met.

By contrast, off-site consumption of fossil fuels, such as the combustion of natural gas and coal by distant power plants, cannot practically be eliminated through building design measures. Building design measures can reduce the amount of fossil-fuel derived electricity that a federal building draws from the grid through various efficiency measures and on-site generation. But such building design measures could not eliminate entirely the consumption of fossil-fuel derived electricity, as section 433 requires beginning in FY 2030, unless section 433 were read to require every Federal building to use on-site non-fossil generation to generate *all* of the electricity that would be used by the building. While self-generation could be achievable for some Federal facilities, for others it is not. Particularly for buildings with high energy demands and limited generation and storage space, such as high energy demand buildings with small site footprints and/or located in areas with poor solar resources, full on-site generation at all times of day could impose extreme additional expense or even be technically impracticable. DOE therefore finds it highly implausible that Congress intended that outcome in adopting the requirement to reduce and eliminate fossil fuel-generated energy consumption through the design of Federal buildings. No commenter has offered any basis to conclude that it would be reasonable to read section 433 as requiring that every new Federal building or major renovation subject to EISA be designed to generate all of its own electricity by FY 2030.

Consumers of electricity, including the Federal government, sometimes seek to reduce the use of fossil fuels in electricity generation through procurement practices, which can include directly contracting for non-fossil generation or the purchase of energy attribute certificates (EACs). These sorts of electricity procurement practices could eliminate the off-site fossil fuel consumption attributed to a building's consumption of electricity. Even so, the availability of these procurement options does not persuade DOE to conclude that section 433 should be read to cover off-site consumption of fossil fuels for two reasons. First, again, section 433 states clearly that the standards it prescribes are to be achieved through design measures in new or renovated buildings. 42 U.S.C. 6834(a)(3)(D)(i)(I) ("buildings

shall be designed so that the fossil fuel-generated energy consumption of the buildings is reduced[.]") (emphasis added). A requirement to procure electricity from particular sources or to purchase EACs is not a building design requirement. Indeed, whether a federal building manager elects to purchase electricity from one source or another has nothing to do with how the building is designed.<sup>9</sup>

Second, a reading that section 433 of EISA, a provision aimed at Federal building design, was also intended to encompass the procurement of electricity is hard to square with Congress' direct treatment of that subject in section 203 of the Energy Policy Act of 2005. That provision, enacted just two years earlier, required the Federal government to procure renewable energy at levels no less than three percent in fiscal years 2007 through 2009, 5 percent in fiscal years 2010 through 2012, and 7.5 percent in fiscal years 2013 and each fiscal year thereafter. 42 U.S.C. 15852. That Congress had addressed renewable energy procurement by the Federal Government in explicit terms so recently, and had set standards that differ so markedly from those in section 433, is yet another reason to disfavor a reading of section 433 that would necessitate the purchase of non-fossil fuel derived electricity as a necessary means of compliance.

Several commenters noted that the definition for "fossil fuel-generated energy consumption" proposed in the 2022 SNOPI, and the scope of the rule, differed from what was proposed in the 2010 NOPR and 2014 SNOPI. In the 2022 SNOPI, in proposing to limit the scope of the rule to only on-site energy consumption from on-site fossil fuel used by equipment and systems designed to support the building, DOE acknowledged that the proposed definition was a shift from the proposed scope of the 2014 SNOPI. 87 FR 78382, 78385. In discussing this shift, DOE observed that it received a comment in response to the 2014 SNOPI that argued that the term should only apply to the on-site energy consumption. 87 FR 78382, 78390, (see American Public Power Association (APPA), Doc. No. 71, pg. 2). After considering the comment and reviewing the relevant statutory language, DOE agreed with APPA's analysis and proposed limiting the

<sup>9</sup> Further, depending on the geographic location, building managers have limited discretion to elect the source from which they procure electricity. Federal agencies (with limited exceptions) must procure utility services from their serving utility, which may not sell non-fossil fuel derived electricity. See 40 U.S.C. 501 & 501; FAR Part 41.

scope of the rule accordingly.<sup>10</sup> Upon further review, and as proposed in the 2022 SNOPI, this final rule adopts the definition of "fossil fuel-generated energy consumption" that limits the scope of the rule to on-site energy consumption.

Commenters also stated that the 2022 SNOPI proposed definition of "fossil fuel-generated energy consumption" would have less impact and potential savings (particularly in terms of emissions) than the potential savings under the definition proposed in the 2010 NOPR and 2014 SNOPI. ASHRAE Doc. No. 96, pg. 3; BCSE Doc. No. 115, pg. 2; Gas Associations, Doc. No. 99, pg. 2; Doc. No. 122, pg. 1; Doc. No. 80, pg. 3. These commenters suggested that DOE include all or some off-site generated energy (particularly purchased electricity generated by fossil fuels) in the definition of "fossil fuel-generated energy consumption."

Regarding comments on the effects of focusing the rule on on-site energy use, DOE has further analyzed the impacts of the rule. DOE projects site energy and full fuel cycle emissions savings even when the rule is limited to on-site fossil fuel-generated energy consumption. The expected savings are shown in section V.A-C and the accompanying technical support document ("TSD"). DOE notes that the estimated benefits of the rule are derived from purchasing and installing less expensive electric equipment, along with the health and climate benefits from the associated emissions reductions, while the estimated costs come from the operation of such equipment. DOE also expects the net benefits of this rulemaking to increase over time as electricity rates decrease relative to those of natural gas and as the grid continues to shift to a cleaner mix of generation.

DOE also notes that there are other tools available to Federal agencies to reduce the use of off-site fossil fuel-generated energy, such as on-site solar and procurement of renewable EACs. Although Federal building managers can procure fossil fuel-free electricity, primarily through EACs, such procurement measures are not building design measures that reduce on-site fossil fuel-generated energy consumption.<sup>11</sup> Accordingly, requiring

<sup>10</sup> A key attribute to the notice and comment rulemaking process is that agencies invite the public to comment on their proposed rules and agencies can benefit from this feedback. Accordingly, agencies may revise their proposed rules based the feedback they received.

<sup>11</sup> Additionally, at the design stage, the agency controlling the design process would not necessarily be able to guarantee that the building occupant would, in fact, procure the EACs that



such actions are outside the scope of DOE's authority under section 433 of EISA. Further, Congress did not give clear authority for fossil fuel-free electricity procurement under section 433 of EISA, as it did under the Energy Policy Act of 2005, which set forth the total electricity from renewable sources that must be procured by the Federal government (*see* 42 U.S.C. 15852). Therefore, although there are means to reduce emissions from the electricity use in buildings, which DOE encourages agencies to pursue, this final rule only requires building design measures to reduce the use of on-site fossil fuel-generated energy.

Commenters also argued that the rule's proposed focus on the use of on-site fossil fuel-generated energy is a departure from DOE's general position of fuel neutrality. AGA, Doc. No. 100, pg. 9; Gas Associations, Doc. No. 99, pg. 2 n.8. These commenters cite rulemakings related to the energy conservation program for certain consumer and commercial appliances under the Energy Policy and Conservation Act (EPCA). Pursuant to EPCA, any new or amended energy conservation standard must be designed to achieve the "maximum improvement in energy efficiency" that DOE determines is technologically feasible and economically justified. 42 U.S.C. 6295(o)(2)(A). In applying that standard, DOE considers the improvement in energy efficiency feasible and justified for electric products separately from gas- or oil-fueled products, consistent with 42 U.S.C. 6295(q)(1)(A), which required establishment of a separate standard for any covered products that "consume a different kind of energy from that consumed by other covered products within" the regulated type of products.

In contrast, the language of section 433 is clearly not "fuel neutral," as the text singles out and disfavors fossil fuels relative to other sources of energy. Further, as discussed above, the language and structure of the statutory text strongly support limiting the scope of the requirement to just the use of on-site fossil fuel-generated energy. Accordingly, the specific applicable statutory text here requires a departure from the fuel neutral approach that DOE uses when setting energy conservation standards for certain consumer and commercial appliances under EPCA.

After further considering the proposed approach in light of the comments received, DOE determines that focusing on direct emissions best

aligns with section 433's directive to reduce and ultimately eliminate fossil fuel-generated energy consumption through building design measures of Federal buildings.

The final rule adopts the definition of "fossil fuel-generated energy consumption" as proposed in the 2022 SNOFR, with three revisions. First, the final rule revises the term to be defined from "Scope 1 fossil fuel-generated energy consumption" to "fossil fuel-generated energy consumption." This clarifies that the scope of this rule aligns with the directive in section 433 of EISA. Second, the final rule revises the definition so that it applies to "on-site stationary consumption" of fossil fuels. This revision uses language that is consistent with section 433 and clarifies that the definition includes the on-site consumption of natural gas. Third, the final rule deletes, "for the purposes of this final rule" from the definition because this language is not necessary.

#### b. Exemptions and Exceptions

As proposed in the 2022 SNOFR, not all Scope 1 emissions are included under this final rule. DOE identifies several on-site uses that are exempted or excepted from this final rule. First, the standards only apply to on-site fossil fuel use or Scope 1 emissions from stationary combustion sources. Again, section 433 of EISA requires that certain new Federal buildings and Federal buildings undergoing major renovations be designed to reduce fossil fuel-generated energy consumption. As such, this rule does not apply to emissions associated with natural gas for alternatively fueled vehicles ("AFVs") (or any other "alternative fuel," defined at 42 U.S.C. 13211) because building design measures do not include use of AFVs. In addition, DOE notes that because the CBECS and RECS data that provide the energy use targets for this rule do not contain manufacturing or industrial process loads, DOE excludes these loads from the scope of the energy performance standards at this time. 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 such loads would not be subject to the percentage reductions in fossil fuel-generated energy consumption (Scope 1 GHG emissions) required for the building related loads as related to this rule.

Second, this final rule does not apply to the on-site consumption of fossil fuel (or the subsequent emissions) from energy generation associated with the supply of emergency backup electricity. Again, section 433 of EISA requires

building design measures for certain Federal buildings to reduce fossil fuel-generated energy consumption. Thus, this rule is focused on the use of on-site energy as *designed* for standard building operations. Emergency backup generation is generally used infrequently and for short periods, for emergency services only when Federal buildings are not operating as designed. In addition, given their limited use, the impact from emergency backup generators, in terms of both direct fossil fuel consumption and emissions, is usually quite small relative to the impact from ongoing building operations. However, *non-emergency* generation from backup generators (such as those for peak shaving or peak shifting) is within the scope of this rule. DOE also notes that if Federal agencies use their backup generators for both purposes, they will be required to calculate the fraction of their backup generator emissions that is associated with emergency use and the fraction associated with non-emergency use.

Third, the final rule does not apply to on-site energy generation or Scope 1 emissions associated with biomass fuels because biomass fuels are not fossil fuels. Because EISA 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 fuels out of the CBECS and RECS targets developed for this rule. DOE acknowledges that guidance from the Council on Environmental Quality<sup>12</sup> takes a somewhat different approach on biomass fuels, but DOE believes CEQ's guidance is complementary to this final rulemaking. CEQ's guidance states that the CO<sub>2</sub> emissions from biomass and biofuel combustion are considered biogenic and are reported separately from fossil fuel-generated GHGs and biomass and biofuel-generated CH<sub>4</sub> and N<sub>2</sub>O. This CEQ guidance ensures that any GHG emissions associated with biomass or biofuel use at a covered Federal building are still taken into account in reporting emissions (though reported separately). This rule does not cover such fuels, however, as they are not fossil fuel derived and therefore fall outside the statutory authority.

DOE received numerous comments on the exemptions and exceptions included in the final rule. These comments ranged from supporting limiting the application of the standards to stationary combustion sources and the exemptions for emergency backup

<sup>12</sup> would be necessary to meet the applicable fossil fuel energy standards.

<sup>12</sup> Federal Greenhouse Gas Accounting and Reporting Guidance," Council on Environmental Quality (CEQ), January 17, 2016 (CEQ's guidance).

generators<sup>13</sup> and the exception of biomass fuels, to urging DOE to adopt additional exemptions or opposing some of the exemptions.

Two commenters opposed exempting backup generators from the final rule. CHP Alliance and MRC both noted that emergency backup generators run on fossil fuel. CHP Alliance, Doc. No. 104, pg. 4; MRC, Doc. No. 105, pg. 8. MRC also stated that that emergency backup generators must run on a regular basis to keep them in good operating condition.<sup>14</sup> CHP Alliance argued that reducing GHG emissions from this type of fossil fuel-generated energy consumption is the purpose of section 433 of EISA. CHP Alliance, Doc. No. 104, pg. 4. Thus, these commenters argued, exempting backup generators is counter to the entire purpose of the final rule.

DOE notes that although this rule exempts emergency backup systems, this exemption is limited to when these generators are used solely for emergencies. Therefore, any use of these backup generators for peak shaving, peak shifting, or other demand management activities must be included in the building energy consumption.

An individual commenter urged DOE to reconsider the exception for emissions resulting from biomass fuel. Doc. No. 79, pg. 3. Although this commenter acknowledged that biomass fuel is not fossil fuel-based, the commenter argued that the rule should apply to biomass fuels because they still emit GHG. *Id.* However, as previously noted, biomass fuels are not fossil fuels. Because EISA directed DOE to establish regulations that require Federal agencies to reduce their fossil fuel-generated energy consumption, and biomass fuels are not fossil fuel-based, Congress intentionally excluded biomass fuels from the targets developed for this rule.

DOE received several comments urging DOE to exclude renewable fuels such as biomethane (renewable natural gas), biopropane (renewable propane), and clean hydrogen from the final rule. AGA and NPGA stated that it is appropriate for DOE to exclude biomass fuels from this rule, but argued that DOE should also consider excluding other renewable fuels. AGA, Doc. No. 100, pg. 32–34; NPGA, Doc. No. 90, pg. 8; see WGL, Doc. No. 101, pg. 6. Specifically, AGA and NPGA noted that there have been developments in the production of synthetic hydrocarbon. AGA, Doc. No. 100, pg. 32–34; NPGA, Doc. No. 90, pg.

8. Similarly, CHP Alliance observed that combined heat and power (CHP) systems are extremely efficient and some approach 90-percent efficiency. CHP Alliance, Doc. 104, pg. 5.

DOE acknowledges that purely renewable fuels would not fall within the scope of this rulemaking as long as they are not fossil fuel-based or made from blends that contain fossil fuels. A Federal building may use renewable fuels if the Federal agency is able to verify the use of such fuels on-site do not also include fossil fuels in their mixture. Additional specification about fuel content of biofuels will be provided in a companion implementation guidance.

DOE also received several comments on the NOPR and the 2014 SNOPIR about differentiating between fossil fuels used to generate purchased electricity (*i.e.*, natural gas versus crude oil). DOE notes that because the rule is now focused on on-site fossil fuel use only, these comments no longer apply. DOE acknowledges that the source emission factors related to electricity are used in DOE's analysis of the impacts of the rule and notes that DOE will use the latest available source emission factors from DOE and EPA.

DOE also received several comments on the treatment of distributed energy resources (DERs) in the 2022 SNOPIR suggesting that DOE treat DERs as a "Scope 2" impact and, thus, exempt DERs from these standards. These commenters argued that because emissions from DERs are considered Scope 2 emission for reporting purposes, these emissions should also be considered as Scope 2 emissions for the purposes of this rule.

DOE does not agree with this interpretation because the energy generated by DERs is generated on-site and is consumed directly by one building. Accordingly, the energy consumed by building processes supplied by DERs and generated from fossil fuels falls within the definition of "fossil fuel-generated energy consumption." When an EISA subject building is connected to an existing DER resource that is located off the building site and is servicing more than one building it may then be treated as energy generated off-site and the energy stream would not be subject to this rule. New DER resources, when qualified as an EISA-subject building, would be subject to this final rule. Additionally, DOE notes that the terms "Scope 1" and "Scope 2" are more commonly utilized when performing GHG emissions calculations and reporting. Here, DOE uses these terms to help describe the scope of building energy use covered by

this rule (as discussed in Section III.A). The statutory authority for this rulemaking is based upon the fossil fuel consumption of the energy source and systems that service an applicable building, and the building must be subject to the reduction targets, regardless of how subsequent emissions may be accounted.

#### *B. Performance Standards for Fossil Fuel-Generated Energy Consumption*

To provide flexibility, the final rule establishes standards for a fossil fuel-generated energy consumption metric expressed in thousand British thermal units ("kBtu") per square foot ("ft<sup>2</sup>") of building gross area and provides an equivalent conversion of the energy metric measured in greenhouse gas ("GHG") metrics. 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 CEQ's guidance. The final rule aligns the quantifications and terminologies with those established in the Federal Greenhouse Gas Accounting and Reporting Guidance. Although CEQ's guidance categorizes Scope 1 emissions as "Generation of electricity, heat, cooling, or steam", "Mobile sources", "Fugitive emissions", or "Process emissions," this final rule focuses only on the on-site fossil fuel use associated with the "Generation of electricity, heat, cooling, or steam".

This final rule 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 ft<sup>2</sup> of building gross area, and (2) a new carbon dioxide equivalent ("CO<sub>2</sub>e") per ft<sup>2</sup> metric based on the emissions associated with the on-site fossil fuel-generated energy consumption. Agencies may use either metric for their design targets. The CO<sub>2</sub>e metric is based upon the stationary combustion of natural gas and is most appropriate when that is the only fossil fuel being utilized. When a building is burning fuels other than standard natural gas, it would be most appropriate to use the on-site fossil fuel energy metric in units of kBtu per ft<sup>2</sup> of building gross area.

To develop these fossil fuel generated energy consumption targets, DOE utilized CBECS and RECS data to determine the on-site fossil fuel usage by fossil fuel type for each building type in CBECS or RECS. The CBECS and RECS data was parsed into the format commonly utilized by DOE to evaluate building energy codes and standards,

<sup>13</sup> WGL, Doc. No. 101, pg. 5.

<sup>14</sup> MRC, Doc. No. 105, pg. 8. MRC asserted that this results in approximately 0.79 metric tons of GHG per MWh of backup supply.



such as organizing by climate zone, which aligns with the technical analysis methodology used to evaluate the Federal baseline standards for commercial and multi-family high-rise residential buildings, which rely on Standard 90.1–2019, as well as the Federal baseline standards for low-rise residential buildings, which rely on the 2021 IECC.

DOE determined the kBtu per square foot targets by dividing fossil fuel consumption data by the building area, applying the weighting factors associated with the building, and assigning each building to one of the building type/climate zone categories. DOE determined the CO<sub>2</sub>e (in metric tons of CO<sub>2</sub>e) per square foot targets by 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 categories. The resulting targets are shown in Table A–1a and Table A–1b of appendix A to subpart B of parts 433 and 435.

For the purposes of establishing the targets, the final rule identifies and defines 16 categories of commercial buildings and five categories of residential dwelling units that cover all relevant buildings in the Federal building portfolio, including low-rise (single-family and multi-family), mid-rise apartment buildings, and high-rise apartment buildings, to be utilized when referencing the target defining tables in the regulatory text.

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: mobile home, 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 (DOE chose to use 2005

RECS data because the RECS was conducted in 2001 and 2005 but not 2003). 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. In analyzing the rule, DOE assumes that most multi-family high-rise residential buildings will fall into the “multi-family in 5 or more-unit buildings” category based on the most typical buildings representative of the Federal buildings.

Federal agencies must select from these 53 building categories (including commercial building subcategories) to identify the fossil fuel-generated energy consumption target (expressed in both kBtu per ft<sup>2</sup> and Scope 1 GHG emissions in CO<sub>2</sub>e per ft<sup>2</sup>) for a specific building. 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”) and that agencies should exercise their best judgement to select the building category that best matches the building’s intended use. Additionally, some buildings may be mixed use, so agencies may need to area-weight the floor space of these CBECS and RECS targets for Federal buildings that do not correspond directly to the CBECS or RECS building types. For example, a Department of Defense (“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.

#### 1. New Construction and Major Renovations of a Whole Building

DOE developed quantitative requirements to determine compliance with the fossil fuel reduction targets within the revised energy performance standards for new construction and major renovations (*i.e.*, major renovation of on-site fossil fuel-using systems or components in a building) of EISA-subject buildings. The adopted quantitative requirements require agencies to calculate the on-site fossil fuel-generated energy consumption in kBtu of fossil fuels or the Scope 1 GHG emissions in CO<sub>2</sub>e 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 of subpart B to 10 CFR parts 433 and 435. This is done by identifying the allowable target (in either kBtu of on-site fossil fuels or Scope 1 GHG emissions attributed to the

generation of electricity, heat, cooling, or steam) for stationary combustion sources as per the “Federal Greenhouse Gas Accounting and Reporting Guidance.” The agencies then divide the kBtu values or the metric tons of CO<sub>2</sub>e Scope 1 emissions by the floor area of the building to calculate the per square foot (metric tons of CO<sub>2</sub>e per square foot) value to compare 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 will be used to calculate the maximum allowable fossil fuel-generated energy consumption of the combined building.

#### 2. Major Renovations Within a Building

DOE developed streamlined prescriptive requirements to determine compliance with the energy performance standards for major renovations of systems or components within EISA-subject buildings. Such prescriptive requirements include requiring the systems within the building undergoing major renovation to be brought up to the performance requirements of the individual sections of Standard 90.1–2019 (chapters 5–10). Under the rule, agencies will begin implementing the energy performance standards upon the effective date of the rule. For major renovations in EISA-subject buildings that meet the project cost threshold and coverage requirements and are less than whole building renovations (*i.e.*, projects within the existing building comprising retrofits to a single system or component, such as a HVAC system or a chiller), agencies are required to adhere to the following requirements.

For component level renovations, meaning an individual product or piece of equipment, the final rule requires agencies 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, meaning a group of equipment pieces that function together to satisfy a building load, agencies must utilize electric or non-fossil fuel-using FEMP designated or ENERGY STAR equipment, in alignment with 10 CFR part 436, subpart C and must also meet the system level requirements for the systems being renovated, as specified in the model energy codes used to establish baseline energy efficiency standards for Federal buildings (*i.e.*, the current 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).

DOE received three comments in response to the 2022 SNOPR from BCSE, Polyisocyanurate Insulation Manufacturers Association (PIMA), and Aeroseal stating that DOE should require agencies to implement energy efficiency upgrades before undertaking larger scale electrification renovations. BCSE, Doc. No. 115, pg. 2; PIMA, No. 83, pg. 2; Aeroseal, No. 97, pg. 3. DOE agrees with the commenters that energy efficiency is a key component of decarbonization. Not only does energy efficiency provide more traditional payback periods from operational cost savings, but it can often result in additional capital savings, such as when equipment can be downsized due to the associated energy load reductions. Additional details on the order of application will be provided in separate implementation guidance, but DOE encourages agencies and individual project teams to meet the energy efficiency requirements of 10 CFR parts 433 and 435 prior to applying additional design changes to meet the emissions reduction targets defined in this final rule.

Although this final rule only covers 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, appliance 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 energy storage systems 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 of fossil fuels directly consumed, even though on-site solar is a means to reduce emissions from the electricity use in buildings.

In response to the 2022 SNOPR, DOE received multiple comments discussing the base reference code for Federal building efficiency, noting that newer and different codes or above-code programs (e.g., Standard 90.1–2022 or Passive House) may be able to demonstrate additional energy savings. NECA, Doc. No. 123, pg. 2; Build SMART, Doc. No. 111, pg. 1. In response, DOE acknowledges that ECPA establishes energy performance requirements for Federally owned residential and commercial buildings,

based on the IECC and Standard 90.1, respectively. The statutory authority for this rule is an amendment to the existing requirements for Federal buildings, as established by Section 305 of the ECPA, and it does not change the reference code in question. In fact, under ECPA, minimum standards, including the reference code (IECC or Standard 90.1), must be satisfied, and then *in addition* the fossil fuel reduction targets must be applied and adhered to by the building design. DOE does, however, generally encourage the use of updated and advanced building energy codes, innovative codes, and standards, which achieve increased levels of energy efficiency, thereby decreasing fossil fuel use in accordance with the objectives of EISA and this rule.

### 3. Shift Adjustment Multiplier

In the 2022 SNOPR, because many types of Federal buildings are operated for longer hours than typical for private sector buildings covered in CBECS and RECS, DOE introduced a shift adjustment multiplier. 87 FR 78382, 78391. In addition, DOE notes that hours of operation are already considered in tools such as ENERGY STAR Portfolio Manager, which agencies must use as part of their building benchmarking activities. 42 U.S.C. 8253(f)(8). A building's hours of operation 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 shift multiplier<sup>15</sup> in this final rule is based on analysis by Oak Ridge National Laboratory and was originally developed for ASHRAE Standard 100–2018. It is expressed in “number of operating shifts,” as opposed to actual hours of operation. Shift multipliers vary by building type. For example, for government offices, operating the building for two shifts does not increase the energy usage, but operating the building for three shifts increases the energy use by a multiplier of 1.4. Because residential buildings by their very nature are already considered to be 24-hour operation, the final rule only applies the shift multiplier to Federal commercial buildings regulated under 10 CFR part 433.

### 4. Compliance Date

The final rule provides individual fossil fuel generated energy consumption phase down targets (mandated by EISA) that apply to EISA-subject buildings depending on whether

the design for construction or major renovations began in FY 2024, FY 2025 to FY 2029, or during or after FY 2030. The date after which all EISA-subject buildings that have not yet begun design for construction must comply with this final rule is one year after is published in the **Federal Register**.

For buildings for which design for construction or whole building renovation began in FY 2024 or during the FY 2025 to FY 2029 range, phase down target tables of the maximum allowable on-site fossil fuel-generated energy consumption (expressed in both kBtu per ft<sup>2</sup> and Scope 1 GHG emissions in CO<sub>2</sub>e per ft<sup>2</sup>) by building type and climate zone are provided in Appendix A of 10 CFR parts 433 and 435, subpart B. The 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 CO<sub>2</sub>e. For EISA-subject buildings for which design for construction or whole building renovation begins in FY 2030 or later, 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.

DOE received comments regarding the compliance dates proposed in the 2022 SNOPR. Washington Gas Light Company (WGL) noted that the rule is overdue and that the directive in Section 433 of EISA assumed that DOE would promulgate energy efficiency performance standards to meet the emission reduction targets in December 2008. WGL, Doc. No. 101, pg. 6. WGL expressed concern that the standards proposed in the 2022 SNOPR “sets up an unrealistic expectation that [F]ederal agencies can achieve a sharp reduction in onsite fossil fuel energy consumption in less than 7 years.” *Id.*

In response WGL's comment, DOE is issuing this final rule to meet its statutory obligations under EISA and cannot change the clearly delineated dates for fossil fuel consumption reductions. The performance standards in this final rule will enable Federal agencies to meet the reduction targets established in EISA. Furthermore, DOE notes that the final rule does not require all Federal buildings to meet the performance standards. These requirements only apply to certain new Federal buildings or Federal buildings undergoing major renovations. Thus, if an existing Federal building is not being renovated, then the performance standards do not apply. Also, as discussed below, DOE is confident that

<sup>15</sup> Sharp, Terry, ORNL/TM–2014/215, Derivation of Building Energy Use Intensity Targets for ASHRAE Standard 100, August 31, 2011; <https://info.ornl.gov/sites/publications/files/Pub49965.pdf>.



as a practical matter, agencies can meet the requirements of the final rule.

In addition, if Federal agencies (other than GSA) are unable to meet the energy performance standards adopted by this final rule, they may petition DOE to adjust the applicable standard. 42 U.S.C. 6834(a)(3)(D)(i)(II). DOE may adjust the applicable standard if it believes that it is technically impracticable for the agency to meet the energy performance standards.

The Alliance to Save Energy (ASE) stated 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. ASE, Doc. No. 76, pg. 1. Others, such as ACEEE *et al.* stated that the final rule is overdue, and that DOE should require compliance as soon as possible.

In response to these comments, DOE believes that agencies can meet the requirements of this revised final rule, especially considering the focus on on-site fossil fuel usage, and the widespread availability of electrified appliances (such as heat pumps and electrified cooking equipment) that can completely substitute for fossil fuel-generated energy consumption on-site. The ENERGY STAR program provides extensive details and lists of commercially available electric appliances and equipment, including air source heat pumps that can be found at [https://www.energystar.gov/products/air\\_source\\_heat\\_pumps](https://www.energystar.gov/products/air_source_heat_pumps), commercial heat pump and VRF equipment that can be found at [https://www.energystar.gov/products/heating\\_cooling/light\\_commercial\\_hvac\\_key\\_product\\_criteria](https://www.energystar.gov/products/heating_cooling/light_commercial_hvac_key_product_criteria), and electric cooking products that can be found at [https://www.energystar.gov/products/electric\\_cooking\\_products](https://www.energystar.gov/products/electric_cooking_products). These technologies have now become far more well known and commercially available than they were at the time Congress adopted the requirements in EISA. It is also worth noting that the rule's requirements apply at the design for construction stage, when an agency has the maximum flexibility to develop a design for a new building that will meet the standards, or has the flexibility to select an approach to a major renovation that will meet the more limited requirements that apply to major renovations. Not only are the standards in the final rule required by the statute, they are also reasonable and achievable, given the point in the design and construction process when the standards become applicable and the real world options now available for agency compliance.

### C. Petitions for Downward Adjustment

Under section 433 of EISA, agencies other than GSA may petition DOE for an adjustment to the fossil fuel-generated energy performance standard with respect to a specific building if meeting the requirement is technically impracticable in light of the agency's functional needs for the building. 42 U.S.C. 6834(a)(3)(D)(i)(II). As proposed in the 2022 SNOPIR, the final rule allows GSA tenant agencies that have significant control over building design to petition DOE. This rule specifies the information petitioning agencies must provide when requesting a downward adjustment. Specifically, as proposed in the 2022 SNOPIR, the final rule requires petitioning agencies to describe the building and associated components and equipment; explain why compliance with the requirements is technically impracticable considering the functional needs of the building; demonstrate that all cost-effective energy efficiency and on-site renewable energy measures were included in the building design; provide the largest feasible reduction in fossil fuel-generated energy consumption that can reasonably be achieved; and discuss measures that were evaluated but rejected.

When filing petitions for downward adjustment related to new construction, Federal agencies must include the maximum applicable allowable fossil fuel-generated energy consumption for the proposed building, the requested alternative allowable fossil fuel-generated energy consumption for the 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 includes, but is not limited to, location, use type, floor area, stories, expected number of occupants and occupant schedule, functional needs of the building, and any other information the agency deems pertinent. Federal agencies must describe 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, emergency backup generators and other energy consuming systems or components. This information will provide DOE the necessary information to review petitions, and help agencies address key questions and options during the design process.

This final rule adopts the standard and requires information for downward adjustment related to major renovations. For major renovations that are whole building renovations, a downward adjustment would 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. For whole building renovations, Federal agencies must provide the same information that is required for new construction. DOE believes the cost of processing the petitions will be de minimis, as DOE already works extensively with Federal agencies on energy-efficiency and decarbonization efforts.

For major renovations that are limited to system or component level retrofits, DOE will 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 by using ENERGY STAR or FEMP designated products. Unlike the required standard, however, the ENERGY STAR or FEMP designated products are not required to be electric or non-fossil fuel based. A major renovation that is limited to a single system or multiple systems could 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 (Standard 90.1–2019) or 10 CFR part 435 (2021 IECC).

DOE received a comment that supported the changes made to the petition requirements proposed in the 2022 SNOPIR from the American Council for an Energy-Efficient Economy (ACEEE), Earthjustice, Rewiring America, RMI, and Sierra Club. They stated that requiring Federal agencies to submit the information proposed in the 2022 SNOPIR “will help ensure the petition process meets EISA requirements.” ACEEE *et al.*, Doc. No. 126, pg. 3.

However, other commenters expressed concern with the required information Federal agencies must file with their petitions. CHP Alliance stated that the rule proposed in the 2022 SNOPIR is flawed because the new building baseline energy efficiency standard for major renovation is based on replacing all equipment included in the renovation with ENERGY STAR or

FEMP designated products. CHP Alliance, Doc. No. 104, pg. 6. CHP Alliance noted that this requirement excludes CHP systems from being both an onsite power and heating/cooling source option for major renovations because neither ENERGY STAR nor FEMP have products designated for CHP systems. *Id.* CHP Alliance urged DOE to eliminate this requirement or immediately designate CHP systems that use renewable fuels or non-fossil fuels as products which Federal agencies can use. *Id.*

DOE requires the use of FEMP and ENERGY STAR designated products when such designations are available as specified in 10 CFR part 436 subpart C because when setting efficiency requirements, both FEMP and ENERGY STAR have integrated life-cycle cost effectiveness into their guiding principles that demonstrate compliance with 10 CFR part 436 subpart A. 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.

Although there are no such FEMP or ENERGY STAR designated products for CHP systems, this does not preclude an agency from utilizing such systems. If an agency determines that it would like to utilize a CHP system in an EISA-subject building, it may do so but must ensure that the fossil fuel utilization of the system complies with the energy performance standard. This can be done by utilizing renewable, non-fossil fuel based fuels and is discussed in more detail in section III.A.3.b. Defining Technical Impracticability.

In the 2022 SNOPIR, DOE proposed that a “technical impracticability” exists when achieving the 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.

87 FR 78382, 78421 and 78430. Upon determination that complying with these standards 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.

In response to the 2022 SNOPIR, DOE received one comment on this topic that claimed that the definition of “technical impracticability” is too ambiguous and could lead to agencies taking advantage of loopholes. Doc. No. 79, pg. 4. DOE notes that Congress directed DOE to base its petition adjudication decisions on agency determinations of technical impracticability. Due to the range of issues and challenges related to technical impracticability that could be faced by agencies, DOE will review each petition on a case-by-case basis and make the ultimate determination as to whether meeting the applicable standard is technically impracticable for that building and project. DOE may also provide further guidance on this topic via an implementation guidance.

#### 1. DOE Review of Petitions

In the 2022 SNOPIR, DOE proposed that the Director of FEMP will review the petitions for downward adjustment and make a best effort to return the complete petition within 45 calendar days of submittal. 87 FR 78382, 78397. DOE stated that it would review petitions in a timely manner and if the petitioning agency has 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. *Id.* If DOE does not concur, it would forward its reasons to the petitioning agency.

In this final rule, DOE is modifying the proposed timing. DOE will make a best effort to notify an agency within 30 calendar days of submittal whether a petition is approved or rejected. However, the timeframe does not apply to incomplete petitions, which may result in delays. Complete petitions are described in the regulatory text at the end of this final rulemaking notice, specifically sections § 433.202 and § 435.202. DOE recognizes that agencies want assurance that DOE will respond to petitions in a timely manner in order to avoid project delays. If DOE rejects the petition, it will include its reasons for doing so in its response to the agency.

Additionally, in the 2022 SNOPIR, for new construction or major renovations of the whole building, DOE proposed that DOE could establish an adjusted value of on-site fossil fuel-generated energy consumption standard, other than the adjusted value requested in a petition. 87 FR 78382, 78424. DOE is

finalizing this provision. If DOE finds that the petition does not support the requested adjusted value but that the statutorily required level was nonetheless technically impracticable, DOE can establish a new adjusted value. 87 FR 78382, 78424. DOE intends this provision to provide flexibility in the petition process and reduce the need for agencies to resubmit petitions in the instance of a rejection. In addition, this provision will likely reduce the likelihood of an agency disagreeing with the result of its petition request, as it will be an active participant in an exchange of information with DOE.

#### 2. Making Petitions for Downward Adjustment Public

Throughout this rulemaking proceeding, DOE received comments urging DOE to make petitions for downward adjustment publicly available. In the 2022 SNOPIR, DOE stated that it 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) to the DOE website. 87 FR 78382, 78396. ACEEE *et al.* supports making petitions for downward adjustments and DOE responses subject to public scrutiny. ACEEE *et al.*, Doc. No. 126, pg. 3–4. However, ACEEE noted that the 2022 SNOPIR did not propose regulatory text requiring such public scrutiny and urged DOE to include such language in the final rule.

DOE opts not to include regulatory language requiring it to make petitions public. DOE notes there is nothing in the statutory text that requires the information be made publicly available. In addition, there are instances where information included with the petitions for downward adjustment cannot be made public (*e.g.*, information with national security implications). However, DOE acknowledges the importance of transparency and will make its best effort to publish any petitions for downward adjustment that are filed, deemed complete, and screened for national security concerns.

#### 3. Bundling Petitions

DOE will allow agencies to bundle petitions for new buildings or whole renovations to buildings that are the same design, have the same set of reduction targets, and would require similar measures to reduce fossil fuel-generated energy consumption. The bundled petitions must clearly state any differences between the buildings and explain why the differences do not warrant the submission of separate



evaluations. For component-level major renovations, DOE will allow bundling petitions that are of the same component and building type. DOE will provide more specific details on the bundling process and criteria in the accompanying implementation guidance.

#### 4. GSA Tenant Agencies

ECPA, as amended, precludes GSA from petitioning DOE for a downward adjustment of the applicable percentage reduction requirement. 42 U.S.C. 6834(a)(3)(D)(i)(II). In the 2022 SNOPIR, DOE noted although ECPA prohibits GSA from petitioning DOE for a downward adjustment, it makes no reference to GSA tenant agencies. 87 FR 78382, 78396. DOE stated that allowing GSA tenant agencies to submit a petition for downward adjustment will provide an option for some buildings for which the required fossil fuel-generated energy consumptions reductions may be technically impracticable in light of the building's functional needs, but for which GSA may not submit a petition. *Id.* In the 2022 SNOPIR, DOE proposed that for construction of a new Federal building or major renovations of a federal building, if a GSA tenant agency is providing substantive and significant design criteria in the design process, the tenant agency may petition DOE for a downward adjustment of the applicable percentage reduction requirements. *Id.*

DOE received one comment on this topic in response to the 2022 SNOPIR. ACEEE *et al.* commented that DOE may not allow GSA tenant agencies to petition for downward adjustments because ECPA specifically excludes GSA from the downward adjustment petition process. ACEEE *et al.*, Doc. No. 126, pg. 4. They stated that allowing GSA tenant agencies to petition DOE for downward adjustment would expand the number of buildings eligible for such adjustments in a manner that directly contravenes the ECPA. *Id.*

DOE reiterates that although 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 ACEEE notes, the statute only prohibits GSA from submitting a petition. Thus, in cases in which the GSA tenant

agency exercises significant control of design choices in the building, and GSA does not, it makes little sense to prohibit the GSA tenant agency from petitioning for a downward adjustment if such a prohibition is not required by statute. Moreover, these petitions are still subject to the same criteria and review process as other petitions, including that meeting the requirement would be technically impracticable, which is defined as achieving the 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, 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. DOE does not expect that GSA tenant agencies would commonly be able to make such showings for the more generic types of buildings typical of GSA's holdings. Rather, DOE expects this petition process to be applied in the rare situations where building design needs specific to a GSA tenant agency's unique situation make application of the percentage reduction requirements technically impracticable.

#### 5. Petitions Submitted by the Department of Defense

DOE also considered whether it should have a separate petition process for Department of Defense or other agency projects that serve critical national security functions whereby classified or sensitive information can be withheld, and such petitions will not be subject to public disclosure.

Two commenters stated that DOE should not have a separate petition process for buildings serving national security functions. An individual commenter argued that instead of exempting buildings with national security risks, the Federal government must navigate and balance these national security challenges with policies to reduce fossil fuel-generated energy consumption. Doc. No. 81, pg. 2. Similarly, ACEEE *et al.* commented that buildings serving national security functions must be subject to the same petition review process and policies as other Federal buildings. ACEEE *et al.*, Doc. No. 126, pg. 5.

DOE agrees that there will be no blanket exemptions for national security sites. Section 433(a) of EISA does not provide an exemption from the standard for national security. For some buildings, it may be technically impracticable to achieve the consumption targets so the petition process may be appropriate.<sup>16</sup> Each agency must provide a petition if they believe their facility cannot meet the statutory requirements due to technical impracticability. DOE intends to review all petitions using the same process. DOE believes the petition process will sufficiently vet buildings and agencies' proposed reasoning as to why achieving the reductions will be technically impracticable.

In addition, DOE is sensitive to classification issues and will work with agencies to ensure that sensitive information is treated appropriately. 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 intends to work closely with agencies pertaining to petitions for projects with critical national security functions as part of its implementation guidance following publication of the rule.

#### D. Definitions

The final rule adds definitions for "construction cost," "design for renovation," "EISA-subject building or project," "Federal building," "Fiscal year (FY)," "Fossil fuel-generated energy consumption," "Major renovation," "Major renovation cost," "Major renovation of all Scope 1 fossil fuel-using systems," "Major renovation of a Scope 1 fossil fuel-using building system or component," "Multi-family high-rise residential building," "Shift adjustment multiplier," and "Technical impracticability," and it revises the definition for "proposed building" to 10 CFR 433.2 and 10 CFR 435.2. Any comments relating to specific definitions have been previously discussed in Section III. In addition to

<sup>16</sup> The definition of "technical impracticability" in this rule is defined as achieving the 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, 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.

the substantive edits to the definitions of “construction cost,” “fossil fuel-generated energy consumption,” and “major renovation cost,” discussed previously, DOE also makes minor revisions to the definitions of “EISA-subject building or project,” “Federal building,” “fiscal year (FY),” “major renovation,” and “technical impracticability” to remove unnecessary language or to provide clarification. These minor revisions do not change the nature of the definitions proposed in the 2022 SNOPIR.

#### IV. Additional Issues Raised by Commenters

##### A. Authority

AGA argued in its comments that DOE’s authority to promulgate performance standards to reduce emissions from fossil fuel-generated energy consumption expired in December 2008.<sup>17</sup> AGA noted that section 433 of EISA directs DOE to establish by rule revised Federal building energy efficiency performance standards for both new Federal buildings and for Federal buildings undergoing major renovations, “[n]ot later than 1 year after December 19, 2008.” AGA, Doc. No. 100, pg. 4. Because “agencies may act only when and how Congress lets them [.]” AGA asserted that DOE’s authority to establish these standards has lapsed. *Id.*, pg. 5 (citing *Cent. United Life Ins. Co. v. Burwell*, 827 F.3d 70, 73 (D.C. Cir. 2016)). However, the Supreme Court of the United States has routinely held that unless a statute specifies a consequence for noncompliance with a statutory deadline, an agency’s obligation does not disappear when a statutory deadline passes. *United States v. James Daniel Good Real Prop.*, 510 U.S. 43, 63 (1993); see *Barnhart v. Peabody Coal Co.*, 537 U.S. 149, 159 (2003); *Regions Hosp. v. Shalala*, 522 U.S. 448, 459 n.3 (1998). The EISA does not specify any consequence for noncompliance with its deadlines.

##### B. APA Concerns

Two commenters raised procedural concerns related to the 2022 SNOPIR. First, APGA expressed concern that stakeholders were deprived from meaningfully commenting on the 2022 SNOPIR. APGA, Doc. No. 102, pg. 9. APGA argued that interested parties needed additional time to review the 2022 SNOPIR because the rule proposed marked a significant departure from the

previous proposed rules. *Id.* In addition, APGA stated that DOE failed to provide a timely copy of the transcript of the January 5, 2023, public meeting, and, as a result, stakeholders that were not able to attend the meeting were unable to review the relevant docket materials. *Id.*

DOE notes that it granted the requests from stakeholders for a 30-day extension of the public comment period. 88 FR 12267. As a result, interested parties had 90 days to review the 2022 SNOPIR. Multiple parties used this period as an opportunity to file revised comments. See e.g., ASHRAE, Doc. Nos. 96 and 113, Business Council for Sustainable Energy, Doc. Nos. 87 and 115, and joint comments from local officials, Doc. Nos. 94 and 125.

In addition, a copy of the transcript of the January 5, 2023, public meeting is on the docket web page for this rulemaking. Although the transcript was posted after the initial 60-day comment period closed, it was available when DOE re-opened the comment period for an additional 30 days, providing sufficient time for parties to review and comment on that material in the docket.

#### V. Methodology, Analytical Results, and Conclusion

This final rule implements fossil fuel reduction targets established under EISA, which will begin to reduce GHG emissions in the near term and prepare Federal buildings for a clean energy future. By ensuring that Federal buildings are designed—either from the ground up, or when being renovated—to reduce fossil fuel use, the rule ensures that long-term, as the electric grid integrates more carbon free energies, emissions will be reduced. DOE recognizes that exchanging on-site fossil fuel generated energy for increased reliance on the electric grid, which may still be generating energy with fossil fuels, will not in every application lead to an immediate reduction in emissions of GHGs and SO<sub>2</sub> and in some cases could result in some increase in energy costs. This is explored in more detail in Chapter 1. Section 1.8 of the technical support document by examining the overall sensitivity of the rule to future grid cleaning scenarios. However, agencies must make decisions for the long-term, making capital investments today which will have lasting impacts well into the future, resulting in net benefits over the time and the life of the asset. Net benefits will increase significantly as the grid incorporates cleaner sources of electricity, as illustrated by the supporting technical analysis. 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 conducted an Environmental Assessment (EA) for this final rulemaking.<sup>18</sup> In addition, DOE referenced a previous technical analysis conducted by the DOE Building Energy Codes Program that evaluated the energy and cost savings impacts, as well as cost effectiveness, of Standard 90.1–2019.<sup>19</sup> 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 V–1. Starting in 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 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, DOE estimated new Federal commercial and multi-family high-rise residential building construction volume will be 2.2 million square feet per year, with a distribution of building types as shown in Table V–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 final rule for cases both before and after the 25,000 Sf minimum triggering E.O. 14057 compliance.<sup>20</sup>

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

<sup>18</sup> 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 rulemaking and at [www.energy.gov/node/472482](http://www.energy.gov/node/472482).

<sup>19</sup> 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](http://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](http://www.energycodes.gov/sites/default/files/2021-07/90.1-2019_National_Cost-Effectiveness.pdf), respectively.

<sup>20</sup> See [www.realpropertyprofile.gov/FRPPMS/FRPP\\_Login](http://www.realpropertyprofile.gov/FRPPMS/FRPP_Login).

<sup>17</sup> AGA, Doc. No. 100, pg. 4. NPGA supported AGA comments with respect to “the questionable foundation on which this rulemaking was proposed.” NPGA, Doc. No. 90, pg. 7.



Compliance Tracking System (“CTS”) where agencies report data on building efficiency improvement projects. The data from CTS was queried to include only those projects that 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. As CTS does not supply data on the types of buildings for the reported projects, the distribution of eligible Federal buildings for a renovation that would meet the cost threshold was applied to the estimated total project square footage. DOE identified an estimated 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 V–1. As noted above, Executive Order 14057 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 V–1 and Table V–2 of this document.

These tables also show the prototype buildings incorporated into 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<sup>21</sup> using its Commercial Prototype Building models.<sup>22</sup> Of the 16 prototype buildings, DOE developed costs for 6 prototype buildings that represent the majority of the building types used by Federal agencies to determine the cost effectiveness of Standard 90.1–2016 and Standard 90.1–2019.<sup>23</sup> 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.

TABLE V–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.

<sup>21</sup> 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.

<sup>22</sup> DOE’s prototype buildings are described at [www.energycodes.gov/prototype-building-models](http://www.energycodes.gov/prototype-building-models).

<sup>23</sup> See DOE’s technical support document chapter 1 for more information on DOE’s analysis of building prototypes.

TABLE V-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 estimated incremental construction first cost information for the building types and

climate zones analyzed for buildings compliant with this final rule

(compliant buildings) versus Standard 90.1–2019 (see Table V–3).<sup>24</sup>

TABLE V-3—INCREMENTAL CONSTRUCTION FIRST COST (2022\$) FOR COMPLIANT BUILDING DESIGN UNDER THE FINAL RULE VS. STANDARD 90.1–2019

| Prototype                | Value                  | ASHRAE Climate Zone * |           |           |           |           |
|--------------------------|------------------------|-----------------------|-----------|-----------|-----------|-----------|
|                          |                        | 2A                    | 3A        | 3B        | 4A        | 5A        |
| Small Office .....       | First Cost .....       | \$673                 | \$584     | \$515     | \$1,666   | \$641     |
|                          | /ft <sup>2</sup> ..... | 0.12                  | 0.11      | 0.09      | 0.30      | 0.12      |
| Large Office .....       | First Cost .....       | 261,781               | 268,194   | 196,408   | 354,808   | 223,553   |
|                          | /ft <sup>2</sup> ..... | 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    |
|                          | /ft <sup>2</sup> ..... | 0.79                  | 0.82      | 0.80      | 0.87      | 0.78      |
| Primary School .....     | First Cost .....       | (126,946)             | (121,994) | (116,139) | (94,722)  | (122,894) |
|                          | /ft <sup>2</sup> ..... | (1.72)                | (1.65)    | (1.57)    | (1.28)    | (1.66)    |
| Small Hotel .....        | First Cost .....       | (104,866)             | (104,624) | (104,396) | (101,194) | (103,044) |
|                          | /ft <sup>2</sup> ..... | (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)  |
|                          | /ft <sup>2</sup> ..... | (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 on-site combustion.

<sup>24</sup> Note that the values in Table V–3 have been adjusted to reflect 2022\$ from the table that appears in DOE's determination of energy savings for Standard 90.1–2019, which were in 2020\$. This adjustment was made using the GDP deflator value

to correct for inflation between 2020 and 2022. 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/](https://fred.stlouisfed.org/series/)

USAGDPDEFSAIMEI. These values have also been adjusted to reflect the same underlying economic assumptions as the 2019 version, and sales tax has also been removed.



DOE used data from Table V–3 to calculate preliminary values for overall estimated 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 V–1 of this document. DOE then calculated the weighted average incremental cost for mapped Federal building types based on their corresponding 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 was calculated by multiplying the incremental cost for each Federal building type by the fraction of Federal construction shown in Table V–1.

The estimated national incremental first cost for building types was developed by multiplying the average (across climate zones) incremental first cost of the prototypes Standard 90.1 cost-effectiveness analysis by the fraction of the Federal sector construction volume shown in Table V–1, and then multiplying that by the total estimate of Federal new construction floorspace.<sup>25</sup> DOE estimates that total first cost outlays for new Federal buildings will be less under compliant designs than under Standard 90.1–2019, primarily due to lower HVAC equipment costs for some building types (see Table V–3). The decrease in capital cost is primarily driven by lower equipment cost as well as the avoidance of gas infrastructure costs, which can include gas lines and venting. See Chapter 1, section 3 of DOE's technical support document for more information.

The resulting total incremental first cost estimate is a savings of \$8.44 million per year. The average first cost decrease is \$1.82 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, but include a cost effectiveness caveat that can reduce the goal down to minimal compliance. As can be seen in Table V–4,<sup>26</sup> most building types are projected to switch their space heating systems from a fossil fuel burning system over to an electric resistance-based system.

TABLE V–4—BREAKDOWN OF PROPOSED HEATING SYSTEM BY BUILDING PROTOTYPE

| 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 the 10 CFR parts 433 and 435 requirements) 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 applicable efficiency targets. As such, the analysis presented in this final rule intends to capture the base-level compliance cases only. DOE encourages agencies to

carefully consider and select higher efficiency equipment (such as even higher efficiency heat pumps and/or more widespread adoption) to the greatest extent possible, given project-specific needs and constraints. Higher efficiency equipment can often provide projects with a lifecycle cost effective solution that saves even more energy and emissions (potentially with higher up-front capital costs) than agencies would achieve through just base compliance with this rule.

DOE also analyzed the relative impact of the final rule on the first cost of newly constructed Federal buildings as

<sup>25</sup> 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.

<sup>26</sup> See Chapter 1 of DOE's technical support document supporting this rulemaking for more information.

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 from RS Means (2020)<sup>27</sup> 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 estimated average cost of a new Federal building of \$198 per square foot, as shown in Table V-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, which is \$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 V-5—FIRST COST OF TYPICAL NEW FEDERAL BUILDING IN \$/FT<sup>2</sup>

| 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 V-1) is a savings of \$149.2 million (at a 3-percent discount rate) and a savings of \$91.5 million (based on a 7-percent discount rate), with an average first cost decrease of \$1.07 per square foot (at a 3-percent discount rate) and \$0.66 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<sup>28</sup> for building types by multiplying the average (across climate zones) energy cost savings (determined from the same Standard 90.1 cost-effectiveness analysis) by the fraction of the Federal sector construction volume shown in Table V-1, and then multiplying that by the total estimate of Federal new construction floorspace.<sup>29</sup> DOE notes that it used the best publicly-available data in its

analysis, but data about the location of future new construction or major renovations in the Federal sector are limited. Table V-6 shows the estimated annual energy cost savings by prototype buildings for a compliant building compared to buildings meeting only Standard 90.1-2019. This comparison shows projected increases in energy costs across the board because despite the increases in equipment efficiency and overall site energy savings, the projected difference between the cost of fossil fuels (primarily natural gas) and purchased electricity, when evaluated at a national level, are too high for the improvements to overcome. EIA's Annual Energy Outlook for 2023 (AEO 2023)<sup>30</sup> outlook rate projections indicate that for the same amount of site energy consumed, electricity is about 3.68 times more expensive than natural gas. This number is projected to gradually fall over time to 3.34 times more expensive by the year 2050.

As it did for the incremental cost analysis, DOE adjusted the 2019 energy cost savings analysis to use the same underlying economic assumptions for its analysis of compliant building designs, 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 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 \$11.05 million per year (at a 3-percent discount rate) and \$8.43 million per year (at a 7-percent discount rate). The annualized energy cost impacts were estimated to be an additional \$2.38 per square foot (at a 3-percent discount rate) and an additional \$1.82 per square foot (at a 7-percent discount rate). The annual energy cost impacts are estimated for one year of Federal commercial and high-rise multi-family

<sup>27</sup> RS Means. 2020. RS Means Building Construction Cost Data, 78th Ed. Construction Publishers & Consultants. Norwell, MA.

<sup>28</sup> 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 Standard 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 Standard 90.1-2019."

<sup>29</sup> 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.

<sup>30</sup> DOE—U.S. Department of Energy. 2022. Annual Energy Outlook 2023 with Projections to 2050. Washington, DC. Available at [www.eia.gov/outlooks/aeo/](http://www.eia.gov/outlooks/aeo/).



residential construction, and those impacts accumulate over the evaluation period.

TABLE V-6—ANNUALIZED ENERGY COSTS (2022\$) FOR COMPLIANT BUILDING DESIGN VS. STANDARD 90.1-2019

| Building prototype               | Total prototype usage (%) | Annualized energy cost savings (M\$2022) |                  | Annualized energy cost savings intensity (M\$2022/SF) |                  |
|----------------------------------|---------------------------|------------------------------------------|------------------|-------------------------------------------------------|------------------|
|                                  |                           | 3% Discount rate                         | 7% Discount rate | 3% Discount rate                                      | 7% Discount rate |
| Small Office .....               | 14.78                     | (\$1.63)                                 | (\$1.25)         | (\$0.35)                                              | (\$0.27)         |
| Medium Office .....              | 5.53                      | (0.61)                                   | (0.47)           | (0.13)                                                | (0.10)           |
| Large Office .....               | 2.26                      | (0.25)                                   | (0.19)           | (0.05)                                                | (0.04)           |
| Stand-Alone Retail .....         | 8.76                      | (0.97)                                   | (0.74)           | (0.21)                                                | (0.16)           |
| Strip Mall .....                 | 0.00                      | 0.00                                     | 0.00             | 0.00                                                  | 0.00             |
| Primary School .....             | 1.02                      | (0.11)                                   | (0.09)           | (0.02)                                                | (0.02)           |
| Secondary School .....           | 18.06                     | (2.00)                                   | (1.52)           | (0.43)                                                | (0.33)           |
| Outpatient Health Care .....     | 5.76                      | (0.64)                                   | (0.49)           | (0.14)                                                | (0.10)           |
| Hospital .....                   | 12.68                     | (1.40)                                   | (1.07)           | (0.30)                                                | (0.23)           |
| Small Hotel .....                | 1.18                      | (0.13)                                   | (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                      | (0.99)                                   | (0.75)           | (0.21)                                                | (0.16)           |
| High-Rise Apartment .....        | 7.90                      | (0.87)                                   | (0.67)           | (0.19)                                                | (0.14)           |
| Non-Refrigerated Warehouse ..... | 13.12                     | (1.45)                                   | (1.11)           | (0.31)                                                | (0.24)           |
| Total .....                      | 100.00                    | (11.05)                                  | (8.43)           | (2.38)                                                | (1.82)           |

**Note:** Negative numbers (shown in parentheses) represent an increased 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<sup>31</sup> for the entire rule by multiplying the average (across climate zones) LCC net savings (determined from the same Standard 90.1 cost-effectiveness analysis) by the fraction of the Federal sector construction volume shown in Table V-1, and then multiplying that result by the total estimate of Federal new construction floorspace.<sup>32</sup> DOE only used the climate zones per table V-3 to help further estimate first cost of equipment given

variances in equipment type requirements per building type per climate zone. Table V-7 shows annual LCC net savings by prototype buildings for the compliant buildings compared to buildings meeting only Standard 90.1-2019. As DOE did for the incremental cost analysis, DOE adjusted the 2019 LCC analysis to use the same underlying economic assumptions as the compliant buildings, 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 \$54.87 million (at a 3-percent discount rate) and a savings of \$0.089 million (based on a 7 percent discount rate). The average LCC net impacts in year 1 was estimated to be a cost of \$2.97 million (at a 3 percent discount rate) and a savings of \$0.01 million (based on a 7-percent discount rate). The annual LCC savings are for one year of Federal commercial and high-rise multi-family residential construction, and those savings would accumulate over the LCC evaluation period. For the purpose of this analysis, DOE relied on a 30-year period.<sup>33</sup>

TABLE V-7—ANNUAL NET LIFE-CYCLE COST (LCC) (2022\$) FOR COMPLIANT BUILDING DESIGN VS. STANDARD 90.1-2019

| Building prototype       | Total prototype usage | Cumulative LCC cost savings, (M\$2022) |                  | Annualized LCC cost savings, annualized (M\$2022) |                  |
|--------------------------|-----------------------|----------------------------------------|------------------|---------------------------------------------------|------------------|
|                          |                       | 3% Discount rate                       | 7% Discount rate | 3% Discount rate                                  | 7% Discount rate |
| Small Office .....       | 14.78                 | (\$8.11)                               | \$0.013          | (\$0.44)                                          | \$0.0015         |
| Medium Office .....      | 5.53                  | (3.03)                                 | 0.005            | (0.16)                                            | 0.0006           |
| Large Office .....       | 2.26                  | (1.24)                                 | 0.002            | (0.07)                                            | 0.0002           |
| Stand-Alone Retail ..... | 8.76                  | (4.81)                                 | 0.008            | (0.26)                                            | 0.0009           |

<sup>31</sup> 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 Standard 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 Standard 90.1-2019."

<sup>32</sup> 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.

<sup>33</sup> 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 V-7—ANNUAL NET LIFE-CYCLE COST (LCC) (2022\$) FOR COMPLIANT BUILDING DESIGN VS. STANDARD—  
Continued  
90.1–2019

| Building prototype               | Total<br>prototype<br>usage | Cumulative LCC<br>cost savings,<br>(M\$2022) |                     | Annualized LCC<br>cost savings, annualized<br>(M\$2022) |                     |
|----------------------------------|-----------------------------|----------------------------------------------|---------------------|---------------------------------------------------------|---------------------|
|                                  |                             | 3%<br>Discount rate                          | 7%<br>Discount rate | 3%<br>Discount rate                                     | 7%<br>Discount rate |
| Strip Mall .....                 | 0.00                        | 0.00                                         | 0.000               | 0.00                                                    | 0.0000              |
| Primary School .....             | 1.02                        | (0.56)                                       | 0.001               | (0.03)                                                  | 0.0001              |
| Secondary School .....           | 18.06                       | (9.91)                                       | 0.016               | (0.54)                                                  | 0.0018              |
| Outpatient Health Care .....     | 5.76                        | (3.16)                                       | 0.005               | (0.17)                                                  | 0.0006              |
| Hospital .....                   | 12.68                       | (6.96)                                       | 0.011               | (0.38)                                                  | 0.0013              |
| Small Hotel .....                | 1.18                        | (0.65)                                       | 0.001               | (0.04)                                                  | 0.0001              |
| Large Hotel .....                | 0.00                        | 0.00                                         | 0.000               | 0.00                                                    | 0.0000              |
| Quick-service Restaurant .....   | 0.00                        | 0.00                                         | 0.000               | 0.00                                                    | 0.0000              |
| Full-service Restaurant .....    | 0.00                        | 0.00                                         | 0.000               | 0.00                                                    | 0.0000              |
| Mid-Rise Apartment .....         | 8.95                        | (4.91)                                       | 0.008               | (0.27)                                                  | 0.0009              |
| High-Rise Apartment .....        | 7.90                        | (4.33)                                       | 0.007               | (0.23)                                                  | 0.0008              |
| Non-Refrigerated Warehouse ..... | 13.12                       | (7.20)                                       | 0.012               | (0.39)                                                  | 0.0013              |
| Total .....                      | 100.00                      | (54.87)                                      | 0.089               | (2.97)                                                  | 0.0100              |

**Note:** Negative numbers (shown in parentheses) represent an increased cost or disbenefit.

DOE calculated the net present value (“NPV”) of the change in equipment cost and reduced operating cost associated with the difference between the compliant case and Standard 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 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 AEO 2023. DOE forecasted energy prices based on projected average annual price changes in AEO 2023 to develop the operating cost savings through the analysis period.

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*.<sup>34</sup> 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 final rule and Standard 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 final rule and Standard 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 final rule compared to Standard 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 site (where applicable) combustion emissions of CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub>, and Hg. The second component estimates the impacts of potential Federal building energy standards on emissions of two additional greenhouse gases, CH<sub>4</sub> and N<sub>2</sub>O, 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<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub>, 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 2023, including a set of side cases that implement a variety of efficiency-related policies. The analysis presented in this notice uses projections from AEO 2023. Power sector emissions of CH<sub>4</sub> and N<sub>2</sub>O

<sup>34</sup> U.S. Office of Management and Budget, *Circular A-4: Regulatory Analysis* (Sept. 17, 2003) (Available at: [www.whitehouse.gov/wp-content/uploads/legacy\\_drupal\\_files/omb/circulars/A4/a-4.pdf](http://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/circulars/A4/a-4.pdf)) (Last accessed Oct. 23, 2023).



from fuel combustion are estimated using Emission Factors for Greenhouse Gas Inventories published by the Environmental Protection Agency (“EPA”).<sup>35</sup>

To demonstrate this final rule’s effects under the Biden-Administration clean-electricity goals, DOE analyzed an additional case where the future grid emission factors were assumed to follow a “100% reduction by 2035” (100 by 2035) profile as utilized in the National Renewable Energy Lab’s 100% Clean Electricity by 2035 Study and as defined in NREL’s “Cambium 2022 Scenario Descriptions and Documentation” report<sup>36</sup> detailed in the accompanying TSD for this final rule. This case represents a change in national electricity generation that assumes national power sector CO<sub>2</sub> emissions reach 100-percent below 2005 levels by 2035. This more aggressive case results in the final rule producing immediate decreases in CO<sub>2</sub>e gas emissions on a yearly basis (starting in the first analysis year of 2025). Details of this analysis can be found in Chapter 1 of the TSD for this final rule.

Until 2030, the on-site operation of construction subject to this final rule allows combustion of fossil fuels and results in emissions of CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O where these products are used. Site emissions of these gases were estimated using Emission Factors for Greenhouse Gas Inventories and, for NO<sub>x</sub> and SO<sub>2</sub> emissions intensity factors from an EPA publication.<sup>37</sup>

Full fuel cycle 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<sub>4</sub> and CO<sub>2</sub>, are estimated based on the methodology described in Chapter 1 of the 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 the Standard 90.1–2019 prototype models.

#### 1. Air Quality Regulations Incorporated in DOE’s Analysis

DOE’s analysis for the electric power sector reflects the AEO, which incorporates the projected impacts of existing air quality regulations on emissions. AEO 2023 reflects, to the extent possible, laws and regulations adopted through mid-November 2022, including the emissions control programs discussed in the following paragraphs and the Inflation Reduction Act.<sup>38</sup>

SO<sub>2</sub> 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<sub>2</sub> for affected EGUs in the 48 contiguous States and the District of Columbia (“D.C.”). 42 U.S.C. 7651 *et seq.* SO<sub>2</sub> emissions from numerous States in the eastern half of the United States are also limited under the Cross-State Air Pollution Rule (“CSAPR”). 76 FR 48208 (Aug. 8, 2011). CSAPR requires these States to reduce certain emissions, including annual SO<sub>2</sub> emissions, and went into effect as of January 1, 2015. The AEO 2023 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). 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<sub>2</sub> emissions limits under CSAPR, any excess SO<sub>2</sub> 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<sub>2</sub> emissions by another regulated EGU.

However, beginning in 2016, SO<sub>2</sub> emissions began to fall as a result of the Mercury and Air Toxics Standards (“MATS”) for power plants. 77 FR 9304 (Feb. 16, 2012). The final MATS rule establishes power plant emission standards for mercury, acid gases, and non-mercury metallic toxic pollutants. Because of the emissions reductions under the MATS, it is unlikely that excess SO<sub>2</sub> emissions allowances resulting from the lower electricity demand would be needed or used to permit offsetting increases in SO<sub>2</sub> emissions by another regulated EGU.

<sup>38</sup> For further information, see the Assumptions to AEO 2023 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/](http://www.eia.gov/outlooks/aeo/assumptions/).

DOE estimated SO<sub>2</sub> emissions impacts using emissions factors based on AEO 2023.

CSAPR also established limits on NO<sub>x</sub> emissions for numerous States in the eastern half of the United States. Federal building energy standards would have little effect on NO<sub>x</sub> emissions in those States covered by CSAPR emissions limits if excess NO<sub>x</sub> emissions allowances resulting from the lower electricity demand could be used to permit offsetting increases in NO<sub>x</sub> emissions from other EGUs. In such case, NO<sub>x</sub> emissions would remain near the limit even if electricity generation goes down. Depending on the configuration of the power sector in the different regions and the need for allowances, however, NO<sub>x</sub> emissions might not remain at the limit in the case of lower electricity demand. That would mean that Federal building energy standards might reduce NO<sub>x</sub> emissions in covered States. Despite this possibility, DOE has chosen to be conservative in its analysis and has maintained the assumption that Federal building energy standards will not reduce NO<sub>x</sub> emissions in States covered by CSAPR. Federal building energy standards would be expected to reduce NO<sub>x</sub> emissions in the States not covered by CSAPR. DOE used AEO 2023 data to derive NO<sub>x</sub> emissions factors for the group of States not covered by CSAPR.

The MATS limit mercury emissions from power plants, but they do not include emissions caps and, as such, DOE’s Federal building energy standards would be expected to slightly reduce Hg emissions. DOE estimated mercury emissions reduction using emissions factors based on AEO 2023, which incorporates the MATS.

#### C. Monetizing Emissions Impacts

As part of the development of this final rule, for the purpose of complying with the requirements of Executive Order 12866, DOE considered the estimated monetary benefits from the reduced emissions of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, NO<sub>x</sub>, and SO<sub>2</sub> that are expected to result from the energy performance standards considered. This section summarizes the basis for the values used for monetizing the emissions benefits and presents the values considered in this final rule.

To monetize the benefits of reducing GHG emissions, this analysis uses the interim 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

<sup>35</sup> Available at [www.epa.gov/sites/production/files/2023-04/documents/emission-factors-apr2023.pdf](http://www.epa.gov/sites/production/files/2023-04/documents/emission-factors-apr2023.pdf) (last accessed July 12, 2023).

<sup>36</sup> Available at [www.nrel.gov/analysis/100-percent-clean-electricity-by-2035-study.html](http://www.nrel.gov/analysis/100-percent-clean-electricity-by-2035-study.html) (last accessed January 19, 2024).

<sup>37</sup> 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 [www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors](http://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors) (last accessed April 15, 2022).

Greenhouse Gases (“IWG”) (“February 2021 SC–GHG TSD”).

1. Monetization of Greenhouse Gas Emissions

DOE estimates the monetized benefits of the reductions in emissions of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O by using a measure of the social cost (“SC”) of each pollutant (e.g., SC–CO<sub>2</sub>). 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 as directed by applicable Executive orders, and DOE would reach the same conclusion presented in this rule in the absence of the social cost of greenhouse gases. That is, the social costs of greenhouse gases, whether measured using the February 2021 interim estimates presented by the Interagency Working Group on the Social Cost of Greenhouse Gases or by another means, did not affect the rule ultimately finalized by DOE because section 433 of EISA specifically directs DOE to establish regulations that require certain new Federal buildings and Federal buildings undergoing major renovations to reduce their on-site fossil fuel-generated energy consumption by specific amounts and by specific dates; that is, the achievable emissions reductions, and their monetized benefits, would not have changed the energy-consumption reductions required by this rule.

DOE estimated the global social benefits of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O reductions using SC–GHG values that were based on the interim values presented in the February 2021 SC–GHG TSD. The SC–GHG is the monetary value of the net harm to society

associated with a marginal increase in emissions in a given year, or the benefit of avoiding that increase. In principle, the SC–GHG includes the value of all climate change impacts, including (but not limited to) changes in net agricultural productivity, human health effects, property damage from increased flood risk and natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services. The SC–GHG therefore, reflects the societal value of reducing emissions of the gas in question by one metric ton. The SC–GHG is the theoretically appropriate value to use in conducting benefit-cost analyses of policies that affect CO<sub>2</sub>, N<sub>2</sub>O and CH<sub>4</sub> emissions. As a member of the IWG involved in the development of the February 2021 SC–GHG TSD, DOE agreed that the interim SC–GHG estimates represent the most appropriate estimate of the SC–GHG until revised estimates were developed reflecting the latest, peer-reviewed science. See 87 FR 78382, 78406–78408 for discussion of the development and details of the IWG SC–GHG estimates.

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. 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<sub>2</sub> 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.

DOE’s derivations of the SC–GHGs (i.e., SC–CO<sub>2</sub>, SC–N<sub>2</sub>O, and SC–CH<sub>4</sub>) 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 VI.A. of this document.

a. Social Cost of Carbon

The SC–CO<sub>2</sub> values used for this rule were based on the values developed for the February 2021 SC–GHG TSD, which are shown in Table V–8 in five-year increments from 2020 to 2050. The set of annual values that DOE used, which was adapted from estimates published by EPA,<sup>39</sup> is presented in the final rule TSD. These estimates are based on methods, assumptions, and parameters identical to the estimates published by the IWG, which were based on EPA modeling, and include values for 2051 to 2070. DOE expects additional climate benefits to accrue for products still operating after 2070, but a lack of available SC–CO<sub>2</sub> estimates for emissions years beyond 2070 prevents DOE from monetizing these potential benefits in this analysis.

TABLE V–8—ANNUAL SC–CO<sub>2</sub> VALUES FROM 2021 INTERAGENCY UPDATE, 2020–2050 (2020\$ PER METRIC TON CO<sub>2</sub>)

| Year       | Discount rate |         |         |                 |
|------------|---------------|---------|---------|-----------------|
|            | 5%            | 3%      | 2.5%    | 3%              |
|            | Average       | Average | Average | 95th percentile |
| 2020 ..... | 14            | 51      | 76      | 152             |
| 2025 ..... | 17            | 56      | 83      | 169             |

<sup>39</sup> See EPA, Revised 2023 and Later Model Year Light-Duty Vehicle GHG Emissions Standards:

Regulatory Impact Analysis, Washington, DC, December 2021. Available at [nepis.epa.gov/Exe/](https://nepis.epa.gov/Exe/)

[ZyPDF.cgi?Dockey=P1013ORN.pdf](https://www.epa.gov/sites/default/files/2023-02/zyPDF.cgi?Dockey=P1013ORN.pdf) (last accessed February 21, 2023).



TABLE V-8—ANNUAL SC-CO<sub>2</sub> VALUES FROM 2021 INTERAGENCY UPDATE, 2020–2050 (2020\$ PER METRIC TON CO<sub>2</sub>)—Continued

| Year       | Discount rate |         |         |                 |
|------------|---------------|---------|---------|-----------------|
|            | 5%            | 3%      | 2.5%    | 3%              |
|            | Average       | Average | Average | 95th percentile |
| 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             |

DOE multiplied the CO<sub>2</sub> emissions reduction estimated for each year by the SC-CO<sub>2</sub> value for that year in each of the four cases. DOE adjusted the values to 2022\$ using the implicit price deflator for gross domestic product ("GDP") from the Bureau of Economic Analysis. To calculate a present value of the stream of monetary values, DOE discounted the values in each of the four cases using the specific discount

rate that had been used to obtain the SC-CO<sub>2</sub> values in each case.

b. Social Cost of Methane and Nitrous Oxide

The SC-CH<sub>4</sub> and SC-N<sub>2</sub>O values used for this rule were based on the values developed for the February 2021 SC-GHG TSD. Table V-9 shows the updated sets of SC-CH<sub>4</sub> and SC-N<sub>2</sub>O 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 final rule TSD. To capture the uncertainties involved in regulatory impact analysis, DOE has determined it is appropriate to include all four sets of SC-CH<sub>4</sub> and SC-N<sub>2</sub>O values, as recommended by the IWG. DOE derived values after 2050 using the approach described above for the SC-CO<sub>2</sub>.

TABLE V-9—ANNUAL SC-CH<sub>4</sub> AND SC-N<sub>2</sub>O VALUES FROM 2021 INTERAGENCY UPDATE, 2020–2050 (2020\$ PER METRIC TON)

| Year       | SC-CH <sub>4</sub><br>Discount rate and statistic |         |         |                 | SC-N <sub>2</sub> O<br>Discount rate and statistic |         |         |                 |
|------------|---------------------------------------------------|---------|---------|-----------------|----------------------------------------------------|---------|---------|-----------------|
|            | 5%                                                | 3%      | 2.5%    | 3%              | 5%                                                 | 3%      | 2.5%    | 3%              |
|            | Average                                           | Average | Average | 95th percentile | Average                                            | Average | Average | 95th percentile |
| 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<sub>4</sub> and N<sub>2</sub>O emissions change estimated for each year by the SC-CH<sub>4</sub> and SC-N<sub>2</sub>O estimates for that year in each of the cases. DOE adjusted the values to 2022\$ using the implicit price deflator for GDP from the Bureau of Economic Analysis. To calculate a present value of the stream of monetary values, DOE discounted the values in each of the cases using the specific discount rate that had been used to obtain the SC-CH<sub>4</sub> and SC-N<sub>2</sub>O estimates in each case.

c. Sensitivity Analysis Using Updated 2023 SC-GHG Estimates

In December 2023, EPA issued a new set of SC-GHG estimates (2023 SC-GHG) in connection with a final rulemaking under the Clean Air Act.<sup>40</sup> These estimates incorporate recent

research and address recommendations of the National Academies (2017) and comments from a 2023 external peer review of the accompanying technical report. For this rulemaking, DOE used these updated 2023 SC-GHG values to conduct a sensitivity analysis of the value of GHG emissions reductions associated with alternative standards for energy standards for Federal buildings. This sensitivity analysis provides an expanded range of potential climate benefits associated with energy standards for Federal buildings. The final year of EPA's new 2023 SCGHG estimates is 2080; therefore, DOE did not monetize the climate benefits of GHG emissions reductions occurring after 2080. The overall climate benefits are greater when using the higher, updated 2023 SC-GHG estimates, compared to the climate benefits using the older IWG SC-GHG estimates. The results of the sensitivity analysis are

presented in appendix 2A of the final rule TSD.

2. Monetization of Other Emissions Impacts

For the final rule, DOE estimated the monetized value of NO<sub>x</sub> and SO<sub>2</sub> emissions changes from electricity generation using benefit-per-ton estimates for that sector from the EPA's Benefits Mapping and Analysis Program.<sup>41</sup> DOE used EPA's values for PM<sub>2.5</sub>-related benefits associated with NO<sub>x</sub> and SO<sub>2</sub> and for ozone-related benefits associated with NO<sub>x</sub> for 2025, 2030, and 2040, calculated with 3-percent and 7-percent discount rates.

<sup>41</sup> U.S. Environmental Protection Agency. Estimating the Benefit per Ton of Reducing Directly-Emitted PM<sub>2.5</sub>, PM<sub>2.5</sub> Precursors and Ozone Precursors from 21 Sectors. Available at [www.epa.gov/benmap/estimating-benefit-ton-reducing-directly-emitted-pm25-pm25-precursors-and-ozone-precursors](http://www.epa.gov/benmap/estimating-benefit-ton-reducing-directly-emitted-pm25-pm25-precursors-and-ozone-precursors).

<sup>40</sup> See [www.epa.gov/environmental-economics/scghg](http://www.epa.gov/environmental-economics/scghg).

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 (rather than extrapolated) to be conservative. DOE combined the EPA regional benefit-per-ton estimates with regional information on electricity consumption and emissions from AEO 2023 to define weighted-average national values for NO<sub>x</sub> and SO<sub>2</sub>.

DOE also estimated the monetized value of NO<sub>x</sub> and SO<sub>2</sub> 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 called "area sources" would be a reasonable proxy for Federal buildings.<sup>42</sup> The EPA document provides high and low estimates for 2025 and 2030 at 3- and 7-percent discount rates.<sup>43</sup> 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.

#### D. Public Comment

DOE received several comments in response to the 2014 and 2022 SNOPIs relating to methodology. These comments covered potential exclusions for thermal and electrical energy storage systems, basing this rule on an agency portfolio (as opposed to on a building-by-building basis), potential credits for nuclear and hydropower electricity, and suggesting a need to rewrite the main equation in the rule.

In response to the comments about the role of energy storage systems in limiting fossil fuel generated energy consumption from purchased electricity, DOE's decision in the final rule to focus only on on-site combustion of fossil fuels makes discussion of electrical energy storage irrelevant. For example, if an agency chooses to burn fossil fuels to store heat in a thermal energy storage system, that fossil fuel use would be counted as part of the consumption of the building. DOE also notes that this rule applies to individual buildings based on statutory requirements, so DOE cannot change this rule to a portfolio approach.

DOE also notes that credits for nuclear and hydropower electricity are no longer relevant to this final rule and that the governing equation in this final rule has been extensively rewritten and simplified in accordance with the change of scope to focus on only on-site fossil fuel use.

#### E. Conclusion

Table V–10 provides DOE's estimate of cumulative emissions changes expected to result from this rulemaking. DOE recognizes exchanging on-site fossil fuel generated energy for reliance on the electric grid, which may still be generating energy with fossil fuels, does not necessarily lead to an immediate reduction in emissions of GHGs and SO<sub>2</sub> in all cases. In some areas, there will likely be an immediate reduction in GHG emissions, while in other areas, emissions will fall over time as the amount of clean energy on the grid increases. By ensuring that Federal buildings are designed—either from the ground up, or when being renovated—to reduce fossil fuel use, the rule ensures that long-term, as the grid integrates more renewable energies, emissions will be reduced.

TABLE V–10—CUMULATIVE PHYSICAL EMISSIONS CHANGES IN 2025–2084

| Pollutant                                   | Total     |
|---------------------------------------------|-----------|
| <b>Primary (plant) Emissions Changes</b>    |           |
| CO <sub>2</sub> (million metric tons) ..... | 0.7       |
| Hg (tons) .....                             | – 0.0028  |
| NO <sub>x</sub> (thousand tons) .....       | 1.1       |
| SO <sub>2</sub> (thousand tons) .....       | – 0.4     |
| CH <sub>4</sub> (thousand tons) .....       | – 0.1     |
| N <sub>2</sub> O (thousand tons) .....      | – 0.01    |
| <b>Upstream Emissions Changes</b>           |           |
| CO <sub>2</sub> (million metric tons) ..... | 0.1       |
| Hg (tons) .....                             | – 0.00001 |
| NO <sub>x</sub> (thousand tons) .....       | 2.3       |
| SO <sub>2</sub> (thousand tons) .....       | – 0.01    |
| CH <sub>4</sub> (thousand tons) .....       | 15.8      |
| N <sub>2</sub> O (thousand tons) .....      | – 0.0001  |
| <b>Total Emissions Changes</b>              |           |
| CO <sub>2</sub> (million metric tons) ..... | 0.9       |
| Hg (tons) .....                             | – 0.003   |
| NO <sub>x</sub> (thousand tons) .....       | 3.3       |
| SO <sub>2</sub> (thousand tons) .....       | – 0.4     |
| CH <sub>4</sub> (thousand tons) .....       | 15.8      |
| N <sub>2</sub> O (thousand tons) .....      | – 0.009   |

Negative values refer to an increase in emissions.  
Numbers may not sum due to rounding.

<sup>42</sup> "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.

<sup>43</sup> "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](http://www.epa.gov/sites/default/files/2018-02/documents/sourceapportionmentbpttsd_2018.pdf).



Table V-11 presents the present value of monetized climate disbenefits associated with the CO<sub>2</sub> emissions changes using the full set of SC-CO<sub>2</sub> estimates described previously.

TABLE V-11—PRESENT VALUE OF MONETIZED CLIMATE BENEFITS FROM CHANGES IN CO<sub>2</sub> EMISSIONS FOR CONSTRUCTION IMPACTS 2025–2054 WITH A 30-YEAR LIFETIME

|                       | SC-CO <sub>2</sub> Case      |         |         |                 |
|-----------------------|------------------------------|---------|---------|-----------------|
|                       | Discount rate and statistics |         |         |                 |
|                       | 5%                           | 3%      | 2.5%    | 3%              |
|                       | Average                      | Average | Average | 95th percentile |
| <b>Million 2022\$</b> |                              |         |         |                 |
| Total .....           | 7.0                          | 31.6    | 50.1    | 95.7            |

**Note:** Climate benefits and disbenefits associated with CO<sub>2</sub> emissions changes occur over 2025–2070. DOE expects additional climate impacts to accrue from CO<sub>2</sub> emissions changes post 2070, but a lack of available SC-CO<sub>2</sub> estimates for years beyond 2070 prevents DOE from monetizing these additional impacts in this analysis.

Table V-12 presents the monetized climate benefits associated with the estimated CH<sub>4</sub> emissions reduction, and Table V-13 presents the monetized climate disbenefits associated with the estimated changes in N<sub>2</sub>O emissions.

TABLE V-12—PRESENT VALUE OF MONETIZED CLIMATE BENEFITS FROM CHANGES IN METHANE EMISSIONS FOR CONSTRUCTION IMPACTS 2025–2054 WITH A 30-YEAR LIFETIME

|                       | SC-CH <sub>4</sub> Case      |         |         |                 |
|-----------------------|------------------------------|---------|---------|-----------------|
|                       | Discount rate and statistics |         |         |                 |
|                       | 5%                           | 3%      | 2.5%    | 3%              |
|                       | Average                      | Average | Average | 95th percentile |
| <b>Million 2022\$</b> |                              |         |         |                 |
| Total .....           | 6.5                          | 19.8    | 27.8    | 52.5            |

**Note:** Climate benefits and disbenefits associated with CH<sub>4</sub> emissions changes occur over 2025–2070. DOE expects additional climate impacts to accrue from CH<sub>4</sub> emissions changes post 2070, but a lack of available SC-CH<sub>4</sub> estimates for years beyond 2070 prevents DOE from monetizing these additional impacts in this analysis.

TABLE V-13—PRESENT VALUE OF MONETIZED CLIMATE DISBENEFITS FROM CHANGES IN NITROUS OXIDE EMISSIONS FOR CONSTRUCTION IMPACTS 2025–2054 WITH A 30-YEAR LIFETIME

|                       | SC-N <sub>2</sub> O Case     |         |         |                 |
|-----------------------|------------------------------|---------|---------|-----------------|
|                       | Discount rate and statistics |         |         |                 |
|                       | 5%                           | 3%      | 2.5%    | 3%              |
|                       | Average                      | Average | Average | 95th percentile |
| <b>Million 2022\$</b> |                              |         |         |                 |
| Total .....           | 0.0                          | –0.1    | –0.2    | –0.3            |

**Note:** Negative numbers represent an increase cost or disbenefit. Climate benefits and disbenefits associated with N<sub>2</sub>O emissions changes occur over 2025–2070. DOE expects additional climate impacts to accrue from N<sub>2</sub>O emissions changes post 2070, but a lack of available SC-N<sub>2</sub>O estimates for years beyond 2070 prevents DOE from monetizing these additional impacts in this analysis.

DOE is aware that scientific and economic knowledge about the contribution of CO<sub>2</sub> 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<sub>2</sub> 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<sub>x</sub> and SO<sub>2</sub> 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 V-14 presents the present value for NO<sub>x</sub> emissions reduction calculated using 7-percent and 3-percent discount rates, and Table V-15 presents similar results for SO<sub>2</sub> emissions increases. The results in these tables reflect application of EPA's low dollar-per-ton values, which DOE used to be conservative.

TABLE V-14—PRESENT VALUE OF NO<sub>x</sub> EMISSIONS REDUCTION

|                       | 3% Discount rate | 7% Discount rate |
|-----------------------|------------------|------------------|
| <b>Million 2022\$</b> |                  |                  |
| Total .....           | 81.2             | 28.8             |

TABLE V-15—PRESENT VALUE OF SO<sub>2</sub> EMISSIONS INCREASE

|                       | 3% Discount rate | 7% Discount rate |
|-----------------------|------------------|------------------|
| <b>Million 2022\$</b> |                  |                  |
| Total .....           | -25.3            | -10.4            |

**Note:** Negative numbers represent an increase cost or disbenefit.

Not all the public health and environmental benefits from the reduction of greenhouse gases, NO<sub>x</sub>, and SO<sub>2</sub> are captured in the values above, and additional unquantified benefits from the reductions of those pollutants as well as from the reduction of direct PM and other co-pollutants may be significant. DOE has not included monetary benefits of the reduction of Hg emissions because the amount of reduction is very small.

DOE's analysis estimates the energy impacts, emissions savings, and cost savings over a 30-year period. The Federal building energy standards in this final rule are projected to result in an estimated national increased energy use of 0.029 quads. The increase is for the full fuel cycle which is essentially accounting for source energy impacts. The actual breakdown is .00221 quads of upstream energy savings and an increase of 0.031 quads of 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. However, the Federal building

energy standards are projected to result in estimated savings of 0.9 million metric tons ("MMT") of CO<sub>2</sub> emissions according to DOE's base analysis, which uses AEO 2023. When combining CO<sub>2</sub> savings with methane (CH<sub>4</sub>) savings and slight increases N<sub>2</sub>O emissions into a CO<sub>2</sub> equivalent metric, there results in an overall net savings of CO<sub>2</sub>e emissions of approximately 1.29 MMT CO<sub>2</sub>e.

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, DOE has projected that U.S. economy-wide greenhouse gas emissions will decline to 35 to 41% below 2005 levels in 2030,<sup>44</sup> 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.B of this document, have a large effect on the net emissions impacts of the rulemakings and present larger environmental and overall net benefits. With these policy drivers now in place, power sector reductions beyond those projected would only further increase the emissions benefits of this rulemaking in the future. These scenarios do not present comprehensive profiles for all additional climate factors beyond CO<sub>2</sub> emissions (such as NO<sub>x</sub>, Hg, N<sub>2</sub>O, CH<sub>4</sub>, and SO<sub>2</sub>), and have been presented only in the corresponding TSD for reference.

The cumulative NPV of the final rule for compliant buildings ranges from \$70 million (at a 7-percent discount rate) to \$52 million (at a 3-percent discount rate). This NPV expresses the estimated total value of future operating-costs and the estimated increased capital costs for a compliant building constructed in 2025-2054, although in reality, those costs will be realized throughout the 30-year project time period analyzed.

In addition, compliant buildings are projected to impact emissions of multiple greenhouse gases and other pollutants. DOE estimates that the rule would result in cumulative emissions

(over the same period as for energy savings) impacts of a decrease of 0.9 MMT of carbon dioxide ("CO<sub>2</sub>"), an increase of 0.4 thousand tons of sulfur dioxide ("SO<sub>2</sub>"), a decrease of 3.3 thousand tons of nitrogen oxides ("NO<sub>x</sub>"), a decrease of 15.8 thousand tons of methane ("CH<sub>4</sub>"), an increase of 0.009 thousand tons of nitrous oxide ("N<sub>2</sub>O"), and an increase of 0.003 tons of mercury ("Hg").<sup>45</sup>

DOE estimates the value of climate benefits and disbenefits from a change in emissions of greenhouse gases using four different estimates of the social cost of CO<sub>2</sub> ("SC-CO<sub>2</sub>"), the social cost of methane ("SC-CH<sub>4</sub>"), and the social cost of nitrous oxide ("SC-N<sub>2</sub>O"). Together these represent the social cost of greenhouse gases ("SC-GHG"). DOE used interim SC-GHG values developed by the "IWG".<sup>46</sup> The derivation of these values is discussed in section V.C of this document. For presentational purposes, the climate benefits (including both the climate benefits and disbenefits) associated with the average SC-GHG at a 3-percent discount rate is \$51.3 million, primarily driven by savings in CH<sub>4</sub>. DOE does not have a single central SC-GHG point estimate and DOE emphasizes the value of considering the benefits calculated using all four SC-GHG estimates.

DOE also estimates health benefits and disbenefits from changes of SO<sub>2</sub> and NO<sub>x</sub> emissions.<sup>47</sup> DOE estimates the present value of the health benefits would be \$18.4 million using a 7-percent discount rate, and \$55.9 million using a 3-percent discount rate.<sup>48</sup> DOE is currently only monetizing PM<sub>2.5</sub> precursor health effects and (for NO<sub>x</sub>) ozone precursor health benefits, but will continue to assess the ability to monetize other effects such as health effects from reductions in direct PM<sub>2.5</sub> emissions.<sup>49</sup>

Table VI-1 summarizes the economic benefits and costs expected to result from this final rule. There are other important unquantified effects, including certain unquantified climate benefits, unquantified public health benefits from the reduction of toxic air pollutants and other emissions, unquantified energy security benefits, and distributional effects, among others.

<sup>44</sup> U.S. Department of Energy's Office of Policy. Investing in American Energy, DOE OP Economy Wide Report\_0.pdf (energy.gov), August 2023.

<sup>45</sup> DOE calculated emissions changes relative to the no-new-standards case, which reflects key assumptions in the AEO2023. AEO 2023 represents current federal and state legislation and final implementation of regulations as of the time of its preparation. See section VLK of this document for

further discussion of AEO 2023 assumptions that effect air pollutant emissions.

<sup>46</sup> 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, DC, February 2021, available at [www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument\\_SocialCostofCarbonMethaneNitrousOxide.pdf?source=email](http://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf?source=email).

<sup>47</sup> DOE estimated the monetized value of NO<sub>x</sub> and SO<sub>2</sub> emissions changes associated with this final rule using benefit per ton estimates from the scientific literature. See section IV.L.2 of this document for further discussion.

<sup>48</sup> DOE estimates the economic value of these emissions changes resulting from the considered TSLs for the purpose of complying with the requirements of Executive Order 12866.



TABLE VI-1—SUMMARY OF MONETIZED ECONOMIC BENEFITS AND COSTS (2025–2054 PLUS 30-YEAR LIFETIME)

[Million 2022\$]

|                                           | Million 2022\$   |                  |
|-------------------------------------------|------------------|------------------|
|                                           | 3% discount rate | 7% discount rate |
| Capital Cost Savings of Equipment * ..... | 149.2            | 91.5             |
| Climate Benefits ** .....                 | 51.3             | 51.3             |
| Health Benefits *** .....                 | 55.9             | 18.4             |
| Total Benefits † .....                    | 256.4            | 161.1            |
| Operating Costs †† .....                  | –204.1           | –91.4            |
| Net Benefits .....                        | 52.3             | 69.7             |

**Note:** This table presents the costs and benefits associated with compliant buildings built and operated in 2025–2084. These results include consumer, climate, and health benefits and disbenefits that accrue after 2054 from the buildings constructed or renovated in 2025–2054.

\* Capital costs are a savings to consumers due to the base level efficiency electric equipment being less expensive than equivalent gas equipment as well as infrastructure savings from avoided gas line installation and exhaust venting.

\*\* Climate benefits are calculated using four different estimates of the social cost of carbon (SC–CO<sub>2</sub>), methane (SC–CH<sub>4</sub>), and nitrous oxide (SC–N<sub>2</sub>O) (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; however, DOE emphasizes the importance and value of considering the benefits calculated using all four sets of SC–GHG estimates. To monetize the benefits of reducing GHG emissions, this analysis uses the interim estimates presented in the February 2021 SC–GHG TSD.

\*\*\* Health benefits are calculated using benefit-per-ton values for NO<sub>x</sub> and SO<sub>2</sub>. DOE is currently only monetizing (for SO<sub>2</sub> and NO<sub>x</sub>) PM<sub>2.5</sub> precursor health benefits and (for NO<sub>x</sub>) ozone precursor health benefits but will continue to assess the ability to monetize other effects such as health benefits from reductions in direct PM<sub>2.5</sub> emissions. See section V.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.

†† Negative number indicates an increased cost to building owners, driven primarily by higher relative cost of electricity compared to natural gas.

A more detailed discussion of the basis for these tentative conclusions is contained in the remainder of this document and the accompanying TSD.

#### F. 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/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. Specific resources to support this Final Rule will include, but are not limited to:

Implementation Guidance  
Petition Template

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

*U.S. Department of Energy, Better Buildings Program.* Decarbonization Resource Hub. (<https://betterbuildingsolutioncenter.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.* Zero Energy Buildings Database. (<https://newbuildings.org/resource/getting-to-zero-database/>).

#### VI. Procedural Issues and Regulatory Review

##### A. Review Under Executive Orders 12866, 13563, and 14094

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) and amended by E.O. 14094, “Modernizing Regulatory Review,” 88 FR 21879 (April 11, 2023), 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, the Office of Information and Regulatory Affairs (“OIRA”) in the Office of Management and Budget 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 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 regulatory action constitutes a “significant regulatory action” under section 3(f)(1) 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 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. Further detail can be found in the TSD accompanying this final rule.

DOE’s analyses indicate that the final rule saves a significant amount of site energy. Switching from gas loads burned on-site to electric loads produced off-site, at national average level emission rates, would result in a decrease in CO<sub>2</sub>, NO<sub>x</sub> and CH<sub>4</sub> emissions and an increase of N<sub>2</sub>O, Hg, and SO<sub>2</sub> 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 amended standards, compliant buildings constructed in the 30-year

period that begins in the anticipated year of compliance with the amended standards (2025–2034) are projected to result in an increased full fuel cycle lifetime energy use of 0.029 quadrillion Btus.

The benefits and costs of this final rule presented in Section V.A can also be expressed in terms of annualized values. The monetary values for the total annualized net benefits are (1) the decrease in capital cost, (2) the increase in operating costs, plus (3) the monetized value of changes in GHG, and NO<sub>x</sub>, and SO<sub>2</sub> emissions, all annualized.<sup>50</sup> The benefits and disbenefits associated with estimated changes in emissions as a result of the rule are also calculated based on the lifetime of a compliant building constructed in 2025–2054.

Estimates of annualized benefits and costs of this final rule are shown in Table VI–1 and Table VI–2. The results shown as the primary estimate utilize a 7-percent discount rate for operating benefits, costs, and health benefits and disbenefits (from changes to NO<sub>x</sub> and SO<sub>2</sub> emissions), and a 3-percent discount rate case for climate benefits (from GHG emissions) as follows:

Capital cost of impacts of the standards in this case are estimated to be \$8.44 million per year in decreased equipment costs.

Annual operating disbenefits are estimated to be \$8.43 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 \$2.77 million per year, primarily driven by savings from CH<sub>4</sub>.

Net health benefits total \$1.69 million per year, primarily driven by NO<sub>x</sub> emissions savings overshadowing increased SO<sub>2</sub> emissions.

Overall net monetized benefits would amount to a savings of \$4.48 million per year.

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

Capital cost impacts of the standards in this case are estimated to be \$8.08 million per year in decreased equipment costs.

Annual operating disbenefits are estimated to be \$11.05 million per year in increased equipment operating costs, driven by the higher relative cost of electricity compared to natural gas.

Net climate benefits total \$2.77 million per year, primarily driven by savings from CH<sub>4</sub>.

Net health benefits total \$3.03 million per year, primarily driven by NO<sub>x</sub> emissions savings overshadowing increased SO<sub>2</sub> emissions.

Overall net monetized benefits would amount to a savings of \$2.83 million per year.

TABLE VI–2—ANNUALIZED MONETIZED BENEFITS AND COSTS OF FINAL REGULATION BASE SCENARIO USING AEO 2023  
[Million 2022\$]

| Category                             | Million 2022\$/year |                  |
|--------------------------------------|---------------------|------------------|
|                                      | 3% discount rate    | 7% discount rate |
| Capital Costs of Equipment Savings * | 8.08                | 8.44             |
| Climate Benefits **                  | 2.77                | 2.77             |
| Health Benefits ***                  | 3.03                | 1.69             |
| Total Benefits †                     | 13.88               | 12.91            |
| Operating Costs ††                   | – 11.05             | – 8.43           |
| Net Benefits                         | 2.83                | 4.48             |

**Note:** This table presents the costs and benefits associated with this final rule impacted buildings in 2025–2084. These results include consumer, climate, and health benefits and disbenefits which accrue after 2054 from the buildings constructed in 2025–2054.

\* Capital costs of equipment are a savings to consumers due to the base level efficiency electric equipment being less expensive than equivalent gas equipment as well as infrastructure savings from avoided gas line installation and exhaust venting.

\*\* Climate benefits are calculated using four different estimates of the SC–GHG (see section V.C 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; however, DOE emphasizes the importance and value of considering the benefits calculated using all four sets of SC–GHG estimates. To monetize the benefits of reducing GHG emissions, this analysis uses the interim estimates presented in the February 2021 SC–GHG TSD.

\*\*\* Health benefits are calculated using benefit-per-ton values for NO<sub>x</sub> and SO<sub>2</sub>. DOE is currently only monetizing (for SO<sub>2</sub> and NO<sub>x</sub>) PM<sub>2.5</sub> precursor health benefits and (for NO<sub>x</sub>) ozone precursor health benefits, but will continue to assess the ability to monetize other effects such as health benefits from reductions in direct PM<sub>2.5</sub> emissions.

† Total benefits for both the 3-percent and 7-percent cases are presented using the average SC–GHG with 3-percent discount rate.

<sup>50</sup> To convert the time-series of costs and benefits into annualized values, DOE calculated a present value in \$2022, 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 construction or renovations in the year in which the construction or renovation 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.



<sup>††</sup> Negative number indicates an increased cost to building owners, driven primarily by higher relative cost of electricity compared to natural gas.

DOE's analysis of the national impacts of the final standards is described in sections V.B. and V.C of this document.

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 AEO 2023. AEO 2023 reflects, to the extent possible, laws and regulations adopted through mid-November 2022, including the Inflation Reduction Act (IRA). 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 2023 does not fully account for President Biden's goal to achieve 100-percent carbon pollution-free electricity by 2035. Such accelerated clean grid scenarios significantly impact the overall emissions profile of the rule allowing for more climate benefits sooner in the lifecycle of the expected projects.

Results and details for a 100-percent reduction by 2035 case are presented in the TSD. As noted previously, 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 utilizing AEO 2023 (the "business as usual" case).

DOE's analysis of the impacts of the final 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](http://www.energy.gov/gc/office-general-counsel)).

In the 2022 SNOPR, DOE stated that the proposed rule only applies to the fossil fuel-generated energy consumption of new Federal buildings and Federal buildings undergoing major renovations. 87 FR 78382, 78417. Thus, the only entities directly regulated by this rulemaking would be Federal agencies. *Id.* Accordingly, DOE determined that an IRFA was not required. *Id.*

APGA claimed that DOE erred in its determination that the rule would not have a significant economic impact on a substantial number of small businesses. APGA, Doc. No. 102, pg. 5. APGA asserted most of its members are small businesses. *Id.* APGA stated that "[r]educing fossil fuels to zero will certainly impact the load and revenue of many public gas systems across the country." *Id.* Thus, APGA argued that the rule would have a significant economic impact on a substantial number of small businesses and DOE must prepare an IRFA or withdraw the 2022 SNOPR. *Id.*

This final 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. Under the Regulatory Flexibility Act, an "agency may properly certify that no regulatory flexibility analysis is necessary when it determines that the rule will not have a significant economic impact on a substantial number of small entities that are subject to the requirements of the rule." *Mid-Tex Elec. Co-op., Inc. v. FERC*, 773 F.3d 327, 342 (D.C. Cir. 1985) (emphasis added); see *Cement Kiln Recycling Coalition v. EPA*, 255 F.3d 855, 870 (holding that the Regulatory Flexibility Act does not apply to small businesses indirectly affected by regulation of other entities).

On the basis of the foregoing, DOE certifies that this final 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 was 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 final rule 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 Supplemental Notice of Proposed Rulemaking, 10 CFR parts 433 and 435, 'Clean Energy 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).

This draft EA addressed the possible environmental effects attributable to the implementation of this final rule. The draft EA stated that the rule, by its fundamental intent, would have a positive impact on the environment and the anticipated impacts of this rulemaking would be an overall decrease in CO<sub>2</sub> equivalent gases (despite modest increases in base CO<sub>2</sub> and N<sub>2</sub>O emissions, CH<sub>4</sub> emission reductions result in net savings) with an additional decrease in NO<sub>x</sub> emission and an increase in SO<sub>2</sub> 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. In the draft EA, DOE concluded that the new Federal buildings designed and constructed and major renovations of Federal buildings designed and completed to be compliant with the proposed rule would not have a significant environmental impact.

DOE posted this draft EA on its Office of NEPA Policy and Compliance website on December 7, 2022.<sup>51</sup> The draft EA requested interested parties to submit comments by December 22, 2022. No comments were received.

DOE recently updated its analysis to include data made available since it prepared the draft EA. DOE again

<sup>51</sup> Available at [www.energy.gov/nepa/articles/doeca-2183-draft-environmental-assessment](http://www.energy.gov/nepa/articles/doeca-2183-draft-environmental-assessment).

concludes that the new Federal buildings designed and constructed and major renovations of Federal buildings designed and completed to be compliant with this rule will not have a significant environmental impact in a Finding of No Significant Impact (FONSI).<sup>52</sup>

In its comments on the rule, APGA stated that it is unclear how the draft EA addresses the possible environmental effects attributable to the implementation of the 2022 SNOPI. APGA, Doc. No. 102, pg. 4. APGA asserted that because the rule proposed in the 2022 SNOPI is significantly different than the rule proposed in the 2010 NOPR, DOE cannot rely on the draft EA that was developed over a decade ago in support of the 2010 NOPR. *Id.* However, as explained in the 2022 SNOPI, DOE prepared a new draft EA that considered the possible environmental effects attributable to the implementation of the rule proposed in the 2022 SNOPI. 87 FR 78382, 78417. Thus, DOE did not rely on the draft EA prepared in 2010, but rather prepared a new draft EA prior to publishing the 2022 SNOPI.

#### *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 final 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.

<sup>52</sup> Available at [www.energy.gov/nepa/listings/findings-no-significant-impact-fonsis](http://www.energy.gov/nepa/listings/findings-no-significant-impact-fonsis).

#### *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 final 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. Public Law 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](http://www.energy.gov/sites/prod/files/gcprod/documents/umra_97.pdf).

This final 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 final 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 final 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](http://www.energy.gov/sites/prod/files/2019/12/f70/DOE%20Final%20Updated%20IQA%20Guidelines%20Dec%202019.pdf). DOE has reviewed this final rule 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.

One commenter raised procedural concerns related to the preparation of a Statement of Energy Effects in response to the 2022 SNOPIR. APGA, Doc. No. 102, pg. 4. Specifically, APGA stated that DOE's conclusion that the proposed rule would not have a significant energy impact does not mean that it would not, especially when the Federal government is the largest energy consumer in the nation, *Id.*, pg. 5.

Although it may be true that the government as whole is the largest energy consumer in the nation, this rule affects a subset of qualified new Federal buildings and major renovation projects and does not directly affect the supply, distribution, or consumption of energy for all Federal buildings. Rather, the impact of this rule is estimated to be less than an additional 0.029 quads of full fuel cycle energy. When compared with the total estimated use of 22 quads of energy per year in the U.S. buildings sector, the impact of this rule only represents 0.004 percent of the total energy consumption of the sector over the 30-year analysis period. Furthermore, the rule is not anticipated to have any direct effect on energy supplies.

This final rule would not have a significant adverse effect on the supply,

distribution, or use of energy. Moreover, as the rulemaking would result in increased building level 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 (Jan. 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.

#### VII. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this final rule.

#### List of Subjects

##### 10 CFR Part 433

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

##### 10 CFR Part 435

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

#### Signing Authority

This document of the Department of Energy was signed on April 12, 2024, by Mary Sotos, the 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 April 12, 2024.

**Treena V. Garrett,**

*Federal Register Liaison Officer, U.S. Department of Energy.*

For the reasons set forth in the preamble, DOE amends 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 May 1, 2025.

\* \* \* \* \*

■ 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)," "Fossil fuel-generated energy consumption," "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 definitions of “Shift adjustment multiplier,” and “Technical impracticability”.

The additions and revision read as follows:

#### § 433.2 Definitions.

\* \* \* \* \*

*Construction cost* means all costs associated with the construction of a new Federal building. It includes, but is not limited to, the cost of preliminary planning, engineering, architectural, permitting, fiscal and economic investigations and studies, surveys, designs, plans, working drawings, specifications, procedures, and other similar actions necessary for the construction of a new Federal building. It does not include 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 Energy Independence and Security Act of 2007 (EISA) ((Pub. L. 110–140, codified at 42 U.S.C. 6834(a)(3)(D)(i))).

\* \* \* \* \*

*Federal building* 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)* means the 12-month period beginning on October 1 of the year prior to the specified calendar year and ending on September 30 of the specified calendar year.

*Fossil fuel-generated energy consumption* means the on-site stationary consumption 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). This includes, but is 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).

\* \* \* \* \*

*Major renovation* means either major renovation of all Scope 1 fossil fuel-using 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 all costs associated with the repairing, remodeling, improving, extending, or other changes in a federal building. It includes, but is not limited to, the cost of preliminary planning, engineering, architectural, permitting, fiscal and economic investigations and studies, surveys, designs, plans, working drawings, specifications, procedures, and other similar actions necessary for the alteration of a Federal building.

*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.

\* \* \* \* \*

*Shift adjustment multiplier* means a multiplication factor that agencies may apply 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 used as a basis for the shift adjustment multiplier lookup include the time in which the building is actively occupied and operating per its intended use type and unoccupied hours or other times of limited use (such as night-time setback hours).

*Technical impracticability* means achieving the 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, 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.

■ 4. 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 May 1, 2025 must be designed to meet the requirements of paragraph (c) of this section if:

(i) For Federally owned public buildings or leased Federal buildings, the construction cost of the new building exceeds GSA’s Annual Prospectus Thresholds that are found at <https://www.gsa.gov/real-estate/design-construction/gsa-annual-prospectus-thresholds>; or

(ii) For Federally owned non-public buildings, the cost of the building is at least \$2,500,000 (in 2007 dollars, adjusted for inflation). For the purposes of calculating this threshold, projects should set the Bureau of Labor and



Statistics CPI Inflation calculator to \$2,500,000 in October of 2006 (to represent the value of the original cost threshold) and then set for October of the FY during which the design for construction of the project began or is set to begin.

(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 May 1, 2025, must be designed to meet the requirements of paragraphs (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). For the purposes of calculating this threshold, projects should set the Bureau of Labor and Statistics CPI Inflation calculator to \$2,500,000 in October of 2006 (to represent the value of the original cost threshold) and then set for October of the FY during which the design for construction of the project began or is set to begin. The cost of a major renovation for a Federally leased building is at least the amount listed for

alterations in leased buildings that would need to transmit a prospectus to Congress under section 3307 of title 40. See GSA Annual Prospectus Thresholds at <https://www.gsa.gov/real-estate/design-construction/gsa-annual-prospectus-thresholds>.

(2) This subpart only applies to major renovations that meet the definition of “major renovation of all Scope 1 fossil fuel-using systems in a federal building” or “major renovation of a Scope 1 fossil fuel-using building system or Scope 1 fossil fuel-using component.”

(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 FY 2024 through FY 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 FY 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 begins.

(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. 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 of this section for their building type.

(B) The Scope 1 fossil fuel-generated energy consumption target for the building is the applicable value in either Tables A–1a to A–2a or Tables A–1b to A–2b multiplied by the shift adjustment multiplier calculated for that building.

TABLE 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 |

TABLE 1—SHIFT ADJUSTMENT MULTIPLIER BY HOURS OF OPERATION AND BUILDING TYPE—Continued

| Building activity type              | Weekly hours of operation |           |     |
|-------------------------------------|---------------------------|-----------|-----|
|                                     | 50 or less                | 51 to 167 | 168 |
| 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 FY 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 FY 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.

(C) *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 of this chapter. 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 of this chapter.

(D) *Mixed-use buildings.*

(1) For Federal buildings subject to the requirements of paragraph (c)(1)(A) 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

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

(2) For example, if a proposed building for which design for construction began in FY 2026 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:

$$[(100 \text{ sqft.} \times 3 \text{ kBtu/yr.-sqft.}) + (100 \text{ sqft.} \times 10 \text{ kBtu/yr.-sqft.})] / 200 \text{ sqft.} = 6.5 \text{ kBtu/yr.-sqft.}$$

(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 method required in § 433.101(a)(5) 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. For buildings with manufacturing or industrial process loads, the 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, major renovations of all Scope 1 fossil fuel-using systems, and major renovations of a Scope 1 fossil fuel-using building system or component 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 or major 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 the following (which is not an exhaustive list and whose components may be further modified by guidance):

(i) A statement from the Head of the Agency or their designee requesting the petition for downward adjustment for the building or renovation, that the building or renovation reduces consumption of Scope 1 fossil fuel energy consumption in accordance with the applicable energy performance standard to the maximum extent practicable and that each fossil fuel using 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-based energy consumption targets would be technically impracticable;

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

(iv) A general description of the building or major renovation, 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;

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

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

(vii) A description of the proposed building's energy-related features, such as:

(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 industrial process loads; and

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

(2)(i) Agencies may file one petition for a project with multiple buildings if the buildings are

(A) Of the same building, building system, or component type and of similar size, location, and functional purpose;

(B) Are being designed and constructed to the same set of targets for fossil fuel-generated energy consumption reduction; and

(C) would require similar measures to reduce fossil fuel-generated energy consumption and similar adjustment to the numeric reduction requirement.

(ii) The bundled petition must include the information in paragraph (a) of this section that pertains to all buildings, building systems, or components included in the petition and an additional description of the differences between each building, building system, or component. The agency is only required to show work for adjustment once.

(3) Petitions for downward adjustment should be submitted to [cer-petition@hq.doe.gov](mailto:cer-petition@hq.doe.gov), or to: U.S. Department of Energy, FEMP, Director, Clean Energy 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 30 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) *Exclusions.* The General Services Administration (GSA) may not submit petitions under paragraph (a) 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 Scope 1 Fossil  
Fuel-Generated Energy Consumption**

(a) For purposes of the tables in this appendix, the climate zones are the same as those listed in the performance standards required by § 433.100(a)(5)(i).

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

(1) *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.”

(2) *Food sales* means a category of buildings used for retail or wholesale of food. For example, grocery stores are “Food Sales.”

(3) *Food service* means a category of buildings used for preparation and sale of food and beverages for consumption. For example, restaurants are “Food Service.”

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

(5) *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).

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

(7) *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.

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

(9) *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.

(10) *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).

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

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

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

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

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

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

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**Table A-1a – FY 2020-FY 2024 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<sub>2</sub>e/yr-sqft)**

| Building Category           | Climate Zone:<br>Building Type           | Fossil Fuel-Generated Energy Use Intensity (CO <sub>2</sub> e/yr-sqft) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-----------------------------|------------------------------------------|------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                             |                                          | 0A                                                                     | 0B   | 1A   | 1B   | 2A   | 2B   | 3A   | 3B   | 3C   | 4A   | 4B   | 4C   | 5A   | 5B   | 5C   | 6A   | 6B   | 7    | 8    |
| Education                   | College/<br>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/<br>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<br>classroom<br>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/<br>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<br>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<br>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<br>store with gas<br>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<br>store/food<br>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<br>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<br>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 | 10.0 | 13.4 |
| Food<br>Service             | Other food<br>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<br>Service             | Restaurant/<br>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<br>Health<br>Care | Hospital/<br>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/frat<br>ernity/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/<br>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/                          | 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:                   | Fossil Fuel-Generated Energy Use Intensity (CO <sub>2</sub> e/yr-sqft) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 7    | 8    |
|------------------------|---------------------------------|------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                        | Building Type                   | 0A                                                                     | 0B   | 1A   | 1B   | 2A   | 2B   | 3A   | 3B   | 3C   | 4A   | 4B   | 4C   | 5A   | 5B   | 5C   | 6A   | 6B   |      |      |
| Office                 | professional 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 |
|                        | 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 |



| Building Category   | Climate Zone:                | Fossil Fuel-Generated Energy Use Intensity (CO <sub>2</sub> e/yr-sqft) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|---------------------|------------------------------|------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
|                     |                              | Building Type                                                          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|                     |                              | 0A                                                                     | 0B   | 1A   | 1B   | 2A   | 2B   | 3A   | 3B   | 3C   | 4A   | 4B   | 4C   | 5A   | 5B   | 5C   | 6A   | 6B   | 7    | 8    |  |
| 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 |  |
| 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 – FY 2020-FY 2024 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:                      |    | Fossil Fuel-Generated Energy Use Intensity (site kBtu/yr-sqft) |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |
|-----------------------|------------------------------------|----|----------------------------------------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
|                       | Building Type                      | 0A | 0B                                                             | 1A | 1B | 2A | 2B | 3A | 3B | 3C | 4A | 4B | 4C | 5A | 5B | 5C | 6A | 6B | 7  | 8   |
| 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  |
| 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/                    | 3  | 3                                                              | 3  | 4  | 4  | 4  | 6  | 5  | 6  | 8  | 8  | 8  | 10 | 9  | 8  | 11 | 11 | 13 | 18  |



| Building Category      | Climate Zone:                  | Fossil Fuel-Generated Energy Use Intensity (site kBtu/yr-sqft) |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 7  | 8 |
|------------------------|--------------------------------|----------------------------------------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|
|                        |                                | 0A                                                             | 0B | 1A | 1B | 2A | 2B | 3A | 3B | 3C | 4A | 4B | 4C | 5A | 5B | 5C | 6A | 6B |    |    |   |
| Office                 | Building Type                  |                                                                |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
|                        | professional office            |                                                                |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| Office                 | Bank/other financial           | 2                                                              | 2  | 2  | 2  | 3  | 3  | 4  | 3  | 4  | 5  | 5  | 5  | 6  | 6  | 5  | 7  | 7  | 8  | 11 |   |
|                        | Government office              | 3                                                              | 3  | 3  | 4  | 5  | 4  | 6  | 5  | 6  | 8  | 8  | 8  | 10 | 9  | 8  | 12 | 12 | 14 | 18 |   |
| Office                 | Medical office                 | 3                                                              | 3  | 3  | 4  | 5  | 5  | 7  | 6  | 7  | 9  | 8  | 9  | 11 | 10 | 9  | 13 | 13 | 15 | 20 |   |
|                        | (non-diagnostic)               |                                                                |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| 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 |   |
|                        |                                |                                                                |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| 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 |   |
|                        |                                |                                                                |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |

| 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 |
|                     |                                    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |               |
| Service             | Post office/<br>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<br>service/<br>repair shop | 3  | 3  | 4  | 4  | 5  | 5  | 7  | 6  | 7  | 9  | 9  | 9  | 12 | 11 | 10 | 14 | 14 | 16 | 22 |               |
| Service             | Vehicle<br>storage/<br>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/<br>shipping center   | 2  | 2  | 2  | 2  | 3  | 3  | 4  | 4  | 4  | 5  | 5  | 5  | 6  | 6  | 5  | 7  | 8  | 9  | 12 |               |
| Warehouse           | Non-<br>refrigerated<br>warehouse  | 2  | 2  | 2  | 2  | 3  | 3  | 4  | 3  | 4  | 5  | 5  | 5  | 6  | 6  | 5  | 7  | 7  | 8  | 11 |               |
| Warehouse           | Refrigerated<br>warehouse          | 0  | 0  | 0  | 0  | 1  | 0  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 2  | 2  |               |

**Table A-2.3 – FY 2025-FY 2029 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<sub>2</sub>e/yr-sqft)**

| Building Category     | Climate Zone: |      | Fossil Fuel-Generated Energy Use Intensity (CO <sub>2</sub> e/yr-sqft) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|-----------------------|---------------|------|------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
|                       | 0A            | 0B   | 1A                                                                     | 1B   | 2A   | 2B   | 3A   | 3B   | 3C   | 4A   | 4B   | 4C   | 5A   | 5B   | 5C   | 6A   | 6B   | 7    | 8    |  |
| Building Type         |               |      |                                                                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Education             | 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             | 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             | 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             | 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             | 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         | 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            | 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            | 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            | 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            | 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          | 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          | 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          | 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 | 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            | 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               | 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               | 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               | 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               | 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               | 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 |  |



| Building Category      | Climate Zone: |      | Fossil Fuel-Generated Energy Use Intensity (CO <sub>2</sub> e/yr-sqft) |      |      |      |      |      |      |      |      |      |      |      |      |      | 6B   | 7    | 8    |
|------------------------|---------------|------|------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                        | 0A            | 0B   | 1A                                                                     | 1B   | 2A   | 2B   | 3A   | 3B   | 3C   | 4A   | 4B   | 4C   | 5A   | 5B   | 5C   | 6A   |      |      |      |
| 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                 | 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 |
| 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                 | 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                 | 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                 | 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 | 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 | 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        | 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        | 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        | 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        | 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        | 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  | 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  | 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      | 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)  | 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)  | 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)  | 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 |

| 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 |
|                           |                                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |               |
| 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/<br>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<br>service/<br>repair shop | 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 |               |
| Service                   | Vehicle<br>storage/<br>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<br>Shopping<br>Mall | Strip shopping<br>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/<br>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-<br>refrigerated<br>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<br>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 – FY 2025-FY 2029 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: |    |    |    |    |    |    |    |    |    | Fossil Fuel-Generated Energy Use Intensity (site kBtu/yr-sqft) |    |    |    |    |    |    |    |    |  |
|-----------------------|---------------|----|----|----|----|----|----|----|----|----|----------------------------------------------------------------|----|----|----|----|----|----|----|----|--|
|                       | 0A            | 0B | 1A | 1B | 2A | 2B | 3A | 3B | 3C | 4A | 4B                                                             | 4C | 5A | 5B | 5C | 6A | 6B | 7  | 8  |  |
| Building Type         |               |    |    |    |    |    |    |    |    |    |                                                                |    |    |    |    |    |    |    |    |  |
| Education             | 1             | 1  | 1  | 1  | 2  | 1  | 2  | 2  | 2  | 3  | 3                                                              | 3  | 3  | 3  | 3  | 4  | 4  | 5  | 6  |  |
| Education             | 2             | 2  | 2  | 2  | 2  | 2  | 3  | 3  | 3  | 4  | 4                                                              | 4  | 5  | 5  | 5  | 6  | 6  | 7  | 10 |  |
| Education             | 0             | 0  | 0  | 1  | 2  | 1  | 3  | 2  | 3  | 4  | 4                                                              | 4  | 6  | 6  | 5  | 7  | 7  | 9  | 13 |  |
| Education             | 1             | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 2  | 2                                                              | 2  | 2  | 2  | 2  | 2  | 2  | 3  | 4  |  |
| Education             | 1             | 1  | 1  | 2  | 2  | 2  | 3  | 3  | 3  | 4  | 4                                                              | 4  | 5  | 5  | 4  | 6  | 6  | 7  | 9  |  |
| Enclosed Mall         | 2             | 2  | 2  | 2  | 3  | 2  | 3  | 3  | 3  | 5  | 4                                                              | 4  | 6  | 5  | 5  | 7  | 7  | 8  | 10 |  |
| Food Sales            | 2             | 2  | 2  | 2  | 2  | 2  | 3  | 3  | 3  | 4  | 4                                                              | 4  | 5  | 5  | 5  | 6  | 6  | 7  | 10 |  |
| Food Sales            | 1             | 1  | 1  | 1  | 2  | 2  | 2  | 2  | 2  | 3  | 3                                                              | 3  | 4  | 4  | 3  | 4  | 4  | 5  | 7  |  |
| Food Sales            | 2             | 2  | 2  | 2  | 3  | 2  | 4  | 3  | 4  | 5  | 4                                                              | 5  | 6  | 5  | 5  | 7  | 7  | 8  | 10 |  |
| Food Sales            | 5             | 5  | 5  | 6  | 8  | 8  | 11 | 10 | 11 | 14 | 14                                                             | 14 | 18 | 17 | 15 | 21 | 21 | 24 | 32 |  |
| Food Service          | 9             | 9  | 10 | 12 | 15 | 14 | 20 | 18 | 20 | 27 | 26                                                             | 26 | 34 | 32 | 28 | 39 | 39 | 46 | 61 |  |
| Food Service          | 1             | 1  | 1  | 2  | 2  | 2  | 3  | 2  | 3  | 3  | 3                                                              | 3  | 4  | 4  | 4  | 5  | 5  | 6  | 8  |  |
| Food Service          | 7             | 7  | 7  | 9  | 11 | 10 | 15 | 13 | 15 | 19 | 18                                                             | 19 | 24 | 23 | 20 | 28 | 28 | 33 | 43 |  |
| Inpatient Health Care | 5             | 5  | 5  | 6  | 7  | 7  | 9  | 8  | 9  | 11 | 11                                                             | 11 | 14 | 13 | 12 | 16 | 16 | 19 | 24 |  |
| Laboratory            | 4             | 4  | 4  | 5  | 6  | 5  | 8  | 7  | 8  | 10 | 10                                                             | 10 | 13 | 12 | 11 | 15 | 15 | 17 | 23 |  |
| Lodging               | 2             | 2  | 2  | 3  | 4  | 4  | 5  | 4  | 5  | 7  | 6                                                              | 6  | 8  | 8  | 7  | 10 | 10 | 11 | 15 |  |
| Lodging               | 2             | 2  | 2  | 3  | 3  | 3  | 5  | 4  | 5  | 6  | 6                                                              | 6  | 7  | 7  | 6  | 9  | 9  | 10 | 14 |  |
| Lodging               | 3             | 3  | 3  | 4  | 4  | 4  | 6  | 5  | 6  | 8  | 7                                                              | 8  | 10 | 9  | 8  | 11 | 11 | 13 | 18 |  |
| Lodging               | 1             | 1  | 1  | 1  | 2  | 2  | 2  | 2  | 2  | 3  | 3                                                              | 3  | 4  | 4  | 3  | 4  | 4  | 5  | 7  |  |
| Nursing               | 4             | 4  | 4  | 5  | 6  | 6  | 8  | 7  | 8  | 11 | 10                                                             | 10 | 13 | 13 | 11 | 15 | 15 | 18 | 24 |  |
| Office                | 1             | 1  | 1  | 2  | 2  | 2  | 3  | 3  | 3  | 4  | 4                                                              | 4  | 5  | 5  | 4  | 6  | 6  | 7  | 9  |  |



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

| 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) |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |    |
| 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**

■ 5. 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.*

■ 6. 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 May 1, 2025

■ 7. 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),” “Fossil fuel-generated energy consumption,” “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 definition of “Proposed building”; and
- c. Adding in alphabetical order, the definitions of “Shift adjustment multiplier” and “Technical impracticability”.

The additions and revision read as follows:

**§ 435.2 Definitions.**

**Construction cost** means all costs associated with the construction of a new Federal building. It includes, but not limited to, the cost of preliminary planning, engineering, architectural, permitting, fiscal, and economic investigations and studies, surveys, designs, plans, working drawings, specifications, procedures, and other similar actions necessary for the construction of a new Federal building. It does not include 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 ((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 1/2 of the cost threshold for renovation of Federally owned buildings.

**Federal building** 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)** means the 12-month period beginning on October 1 of the year prior to the specified calendar year and ending on September 30 of the specified calendar year.

**Fossil fuel-generated energy consumption** means the on-site stationary consumption 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). This includes, but is not limited to, 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).

**Major renovation** means either major renovation of all Scope 1 fossil fuel-using 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 all costs associated with the repairing, remodeling, improving, extending, or other changes in a Federal building. It includes, but is not limited to, the cost of preliminary planning, engineering, architectural, permitting, fiscal, and economic investigations and studies, surveys, designs, plans, working

drawings, specifications, procedures, and other similar actions necessary for the alteration of a Federal building.

**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.

**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-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, 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.

■ 8. 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 May 1, 2025, must be designed to meet the requirements of paragraph (c) of this section if:

(i) For all leased buildings, the construction cost of the new building exceeds GSA's Annual Prospectus Thresholds that are found at [www.gsa.gov/real-estate/design-construction/gsa-annual-prospectus-thresholds](http://www.gsa.gov/real-estate/design-construction/gsa-annual-prospectus-thresholds).

(ii) For all Federally owned non-public buildings, the cost of the building is at least \$2,500,000 (in 2007 dollars, adjusted for inflation). For the purposes of calculating this threshold, agencies must set the Bureau of Labor and Statistics CPI Inflation calculator to \$2,500,000 in October of 2006 (to represent the value of the original cost

threshold) and then set for October of the FY during which the design for construction of the project began or is set to begin.

(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 May 1, 2025, 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). For the purposes of calculating this threshold, projects should set the Bureau of Labor and Statistics CPI Inflation calculator to \$2,500,000 in October of 2006 (to represent the value of the original cost threshold) and then set for October of the FY during which the design for construction of the project began or is set to begin.

(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 for the purpose of 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 FY 2024 through FY 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 FY 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 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 |

TABLE 1—SHIFT ADJUSTMENT MULTIPLIER BY HOURS OF OPERATION AND BUILDING TYPE—Continued

| Building activity/type              | Weekly hours of operation |           |     |
|-------------------------------------|---------------------------|-----------|-----|
|                                     | 50 or less                | 51 to 167 | 168 |
| 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/cafe/teria .....         | 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 FY 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 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 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. 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 1 may be rewritten as:

*Scope 1 Fossil Fuel – Generated Energy Consumption for a Mixed Use Building*

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

**§ 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 method required in § 435.5(d), 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. For buildings with manufacturing or industrial process loads, such process loads shall be accounted for in the analysis for the building's fossil fuel consumption and GHG emissions, but the process loads 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 major renovations of all Scope 1 fossil fuel-using systems, and major renovations of a Scope 1 fossil fuel-using building system or component 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 from the Head of the Agency or their designee requesting the petition for downward adjustment for the building or renovation, that the building or renovation reduces consumption of Scope 1 fossil fuel energy consumption in accordance with the applicable energy performance standard to the maximum extent practicable and that each fossil fuel using 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-based 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, or their designee, must also include the following information in the petition:

(i) A general description of the building or major renovation, 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; and

(iv) A description of the proposed building's energy-related features, such as:

(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 industrial process loads; and

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

(3) (i) Agencies may file one petition for a project with multiple buildings if the buildings are

(A) Of the same building, building system, or component type and of similar size and location;

(B) Are being designed and constructed to the same set of targets for fossil fuel-generated energy consumption reduction; and

(C) Would require similar measures to reduce fossil fuel-generated energy consumption and similar adjustment to the numeric reduction requirement.

(ii) The bundled petition must include the information in section (a) that pertains to all buildings, building systems or components included in the petition and an additional description of the differences between each of the buildings, building systems or components. The agency is only required to show work for adjustment once.

(4) Petitions for downward adjustment should be submitted to *cer-petition@hq.doe.gov*, or to:

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

(5) 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 30 calendar days of submittal of a complete petition. If the Director rejects the petition or establishes a value other than that presented in the petition, the Director will forward the reasons for rejection to the petitioning agency.

(b) *Exclusions.* The General Services Administration (GSA) may not submit petitions under paragraphs (a) 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 Fossil Fuel  
Generated Energy Consumption**

(a) For purposes of the tables in this appendix, the climate zones are listed in the performance standards required by § 435.4(a)(4)(i).

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

(1) *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.

(2) *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.

(3) *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.

(4) *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.

(5) *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 – FY 2020-FY 2024 Maximum Allowable Fossil Fuel-Generated Energy Consumption by Building Category, Building Type and Climate Zone, Residential Buildings (CO<sub>2</sub>e/yr-sqft)**

| Building Category | Climate Zone:                       |  | Fossil Fuel-Generated Energy Use Intensity (CO <sub>2</sub> e/yr-sqft) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------|-------------------------------------|--|------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                   | Building Activity/ Type             |  | 0A                                                                     | 0B   | 1A   | 1B   | 2A   | 2B   | 3A   | 3B   | 3C   | 4A   | 4B   | 4C   | 5A   | 5B   | 5C   | 6A   | 6B   | 7    | 8    |
| Residential       | Mobile                              |  | 0.66                                                                   | 0.67 | 0.68 | 0.73 | 0.80 | 0.78 | 0.92 | 0.76 | 0.87 | 0.92 | 1.07 | 1.05 | 1.06 | 1.23 | 1.19 | 1.11 | 1.36 | 1.36 | 1.51 |
|                   | Single-family detached              |  | 0.40                                                                   | 0.41 | 0.41 | 0.45 | 0.50 | 0.48 | 0.58 | 0.47 | 0.55 | 0.58 | 0.69 | 0.67 | 0.68 | 0.79 | 0.76 | 0.71 | 0.88 | 0.88 | 0.99 |
| Residential       | Single-family attached              |  | 0.76                                                                   | 0.76 | 0.77 | 0.78 | 0.80 | 0.79 | 0.83 | 0.79 | 0.82 | 0.83 | 0.87 | 0.87 | 0.87 | 0.92 | 0.90 | 0.88 | 0.95 | 0.95 | 0.99 |
| Residential       | Multi-family (in 2-4 unit building) |  | 0.56                                                                   | 0.57 | 0.61 | 0.74 | 0.93 | 0.87 | 1.25 | 0.83 | 1.11 | 1.25 | 1.64 | 1.58 | 1.62 | 2.06 | 1.95 | 1.74 | 2.40 | 2.41 | 2.82 |
| Residential       | Multi-family (in 5+ unit building)  |  | 0.24                                                                   | 0.25 | 0.29 | 0.42 | 0.61 | 0.55 | 0.93 | 0.51 | 0.80 | 0.93 | 1.32 | 1.26 | 1.30 | 1.74 | 1.63 | 1.42 | 2.08 | 2.09 | 2.50 |

**Table A-1b – FY 2020-FY 2024 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:                       |  | Fossil Fuel-Generated Energy Use Intensity (site kBtu/yr-sqft) |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-------------------|-------------------------------------|--|----------------------------------------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|                   | Building Activity/<br>Type          |  | 0A                                                             | 0B | 1A | 1B | 2A | 2B | 3A | 3B | 3C | 4A | 4B | 4C | 5A | 5B | 5C | 6A | 6B | 7  | 8  |
|                   |                                     |  |                                                                |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 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 – FY 2025-FY 2029 Maximum Allowable Fossil Fuel-Generated Energy Consumption by Building Category, Building Type and Climate Zone, Residential Buildings (CO<sub>2</sub>e/yr-sqft)**

| Building Category | Climate Zone:                       | Fossil Fuel-Generated Energy Use Intensity (CO <sub>2</sub> e/yr-sqft) |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
|-------------------|-------------------------------------|------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|
|                   | Building Activity/<br>Type          | 0A                                                                     | 0B   | 1A   | 1B   | 2A   | 2B   | 3A   | 3B   | 3C   | 4A   | 4B   | 4C   | 5A   | 5B   | 5C   | 6A   | 6B   | 7    | 8   |
| Residential       | Mobile                              | 0.33                                                                   | 0.34 | 0.37 | 0.40 | 0.39 | 0.46 | 0.38 | 0.44 | 0.46 | 0.54 | 0.52 | 0.53 | 0.62 | 0.59 | 0.55 | 0.68 | 0.68 | 0.76 | 0.3 |
| Residential       | Single-family detached              | 0.20                                                                   | 0.21 | 0.22 | 0.25 | 0.24 | 0.29 | 0.24 | 0.27 | 0.29 | 0.34 | 0.33 | 0.34 | 0.40 | 0.38 | 0.35 | 0.44 | 0.44 | 0.50 | 0.2 |
| Residential       | Single-family attached              | 0.38                                                                   | 0.38 | 0.39 | 0.40 | 0.40 | 0.42 | 0.39 | 0.41 | 0.42 | 0.44 | 0.43 | 0.44 | 0.46 | 0.45 | 0.44 | 0.47 | 0.48 | 0.50 | 0.3 |
| Residential       | Multi-family (in 2-4 unit building) | 0.28                                                                   | 0.30 | 0.37 | 0.46 | 0.44 | 0.62 | 0.41 | 0.56 | 0.63 | 0.82 | 0.79 | 0.81 | 1.03 | 0.97 | 0.87 | 1.20 | 1.20 | 1.41 | 0.2 |
| Residential       | Multi-family (in 5+ unit building)  | 0.13                                                                   | 0.14 | 0.21 | 0.30 | 0.28 | 0.46 | 0.25 | 0.40 | 0.47 | 0.66 | 0.63 | 0.65 | 0.87 | 0.81 | 0.71 | 1.04 | 1.04 | 1.25 | 0.1 |
|                   |                                     |                                                                        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 3   |

**Table A-2b – FY 2025-FY 2029 Maximum Allowable Fossil Fuel-Generated Energy Consumption by Building Category, Building Type and Climate Zone, Residential Buildings (source kBtu/yr-sqft)**

| Building Type and Climate Zone: Residential Buildings (source: ASHRAE 90.1-2010) |                                     |  |                                                                |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----------------------------------------------------------------------------------|-------------------------------------|--|----------------------------------------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Building Category                                                                | Climate Zone:                       |  | Fossil Fuel-Generated Energy Use Intensity (site kBtu/yr-sqft) |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|                                                                                  | Building Activity/<br>Type          |  | 0A                                                             | 0B | 1A | 1B | 2A | 2B | 3A | 3B | 3C | 4A | 4B | 4C | 5A | 5B | 5C | 6A | 6B | 7  | 8  |
| Residential                                                                      | Mobile                              |  | 3                                                              | 3  | 3  | 3  | 4  | 4  | 4  | 4  | 4  | 4  | 5  | 5  | 5  | 6  | 5  | 5  | 6  | 6  | 7  |
|                                                                                  | Single-family detached              |  | 2                                                              | 2  | 2  | 2  | 2  | 2  | 3  | 2  | 2  | 3  | 3  | 3  | 3  | 4  | 3  | 3  | 4  | 4  | 4  |
|                                                                                  | 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  | 4  | 6  | 4  | 5  | 6  | 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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