MINNESOTA SB 2030 ENERGY STANDARD®

# An Introduction to the SB 2030 Small Building Method

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6/8/2021

# Agenda

- Logistics: webinar and education credits
- Goals and background SB 2030 Small Building method
- SB 2030 overview and cost-effectiveness
- Alignment and distinction between SB 2030 Small Building Method and B3 Guidelines Small Building Method
- Using the prescriptive approach—applicable standards
- Target setting and design energy estimates
- Renewable energy—supply options
- The review process—what will we be looking for?
- Questions (collected via the chat)

# Webinar Logistics & Education Credits

- Logistics
- A recording of this session will be posted on our training page at b3mn.org
- Those needing AIA credit – please send your AIA # to the presenters in the chat
- Attendees will be muted
- Please send questions in the chat. We'll leave time at the end to address questions not addressed during the presentation.

- Registration process question for the group

# SB 2030 Small Building Method

Goals

- Provide a path for smaller projects that more quickly establishes the minimum efficiency requirements
- Provides projects with prescriptive options
- More quickly determine the amount of renewable energy supply that will be needed for projects to hit their SB 2030 target
- Decrease cost and administration for small projects

# Related—B3 Guidelines Small Building Method

Small Buildings Method is a subset of the B3 Guidelines intended to

- Decrease cost and administration for small projects
- Refocus guidelines on topics with a high impact-to-burden ratio for small projects
- Retain as many of the environmental and IEQ benefits as possible

Handled using a modification of the Tracking Tool

- Some of the credits remain unchanged
- Others are removed
- Many simply have components/subsections removed or submittal requirements altered

# Applicability—SB 2030 Small Building Method

When can the SB 2030 Small Building Method be used?

- Projects with less than 20,000 gross conditioned square feet in area
  - Size requirement aligns with B3 Guidelines Small Building Method, some utility programs, and ASHRAE small building design guides
- Renovations and additions of less than 20,000 gsf are permitted to follow this approach as well

# Applicability of SB 2030 Small Building Method

| | Regularly occupied | Not regularly occupied | Not regularly occupied, and primarily inactive storage/industrial process |
|---|---|---|---|
| Conditioned space | Include for both B3, SB 2030 | Include for both B3, SB 2030 | Include for SB 2030, potentially excluded from B3* |
| Indirectly conditioned | Include for both B3, SB 2030 | Include for SB 2030, potentially excluded from B3* | Include for SB 2030, potentially excluded from B3* |
| Semiheated space | Include for both B3, SB 2030 | Include for SB 2030, potentially excluded from B3* | Include for SB 2030, potentially excluded from B3* |
| Unconditioned space | Do not include for B3, SB 2030 | Do not include for B3, SB 2030 | Do not include for B3, SB 2030 |

*Spaces noted as “potentially excluded” above must be approved by the B3 Guidelines Administrators.

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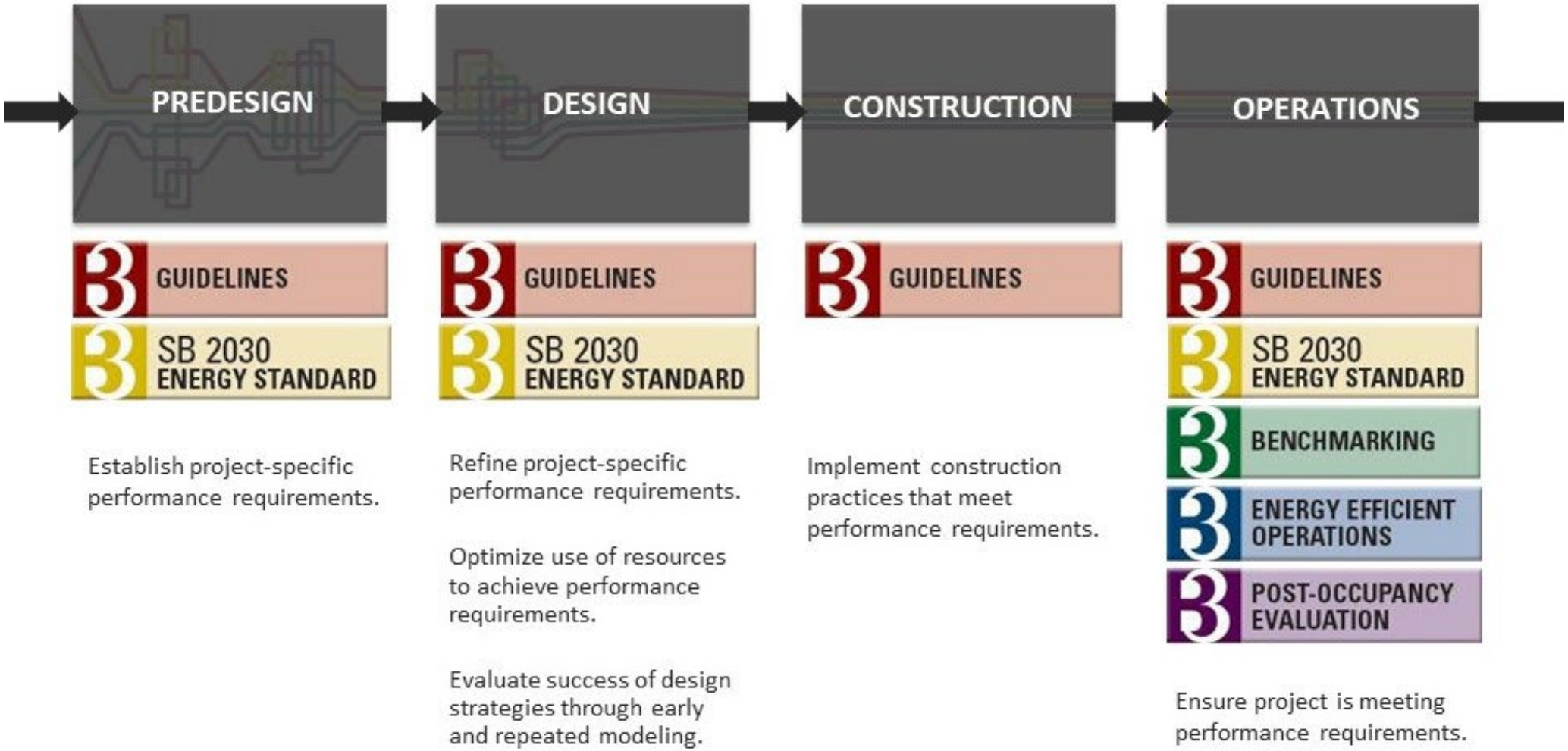
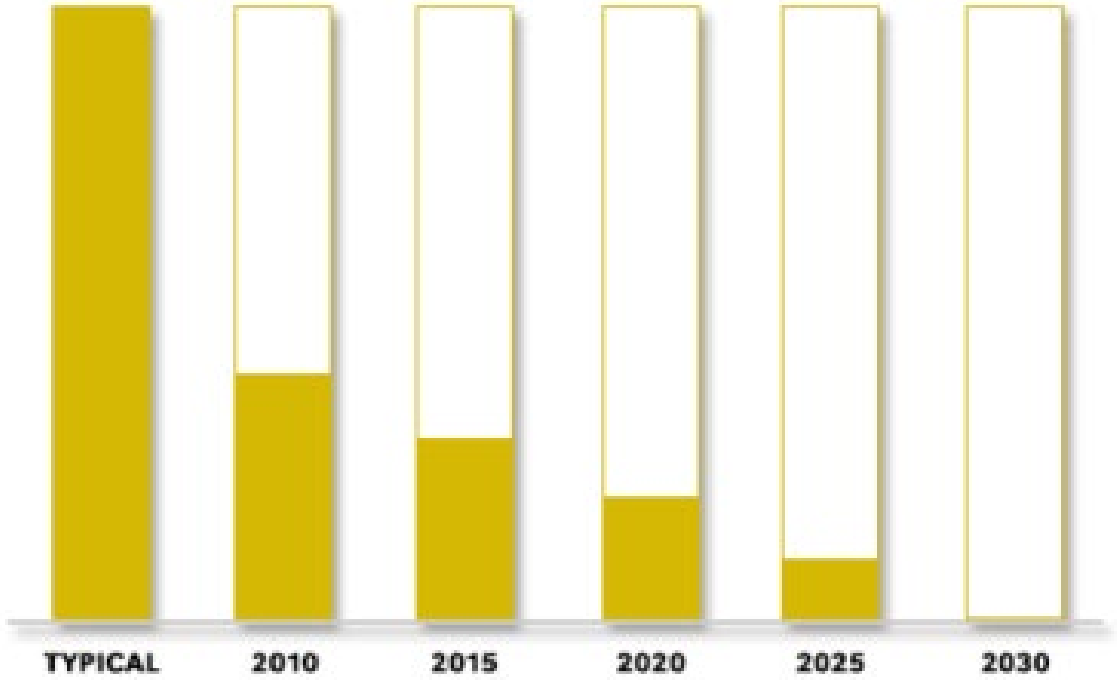
# SB 2030 and B3 Programs

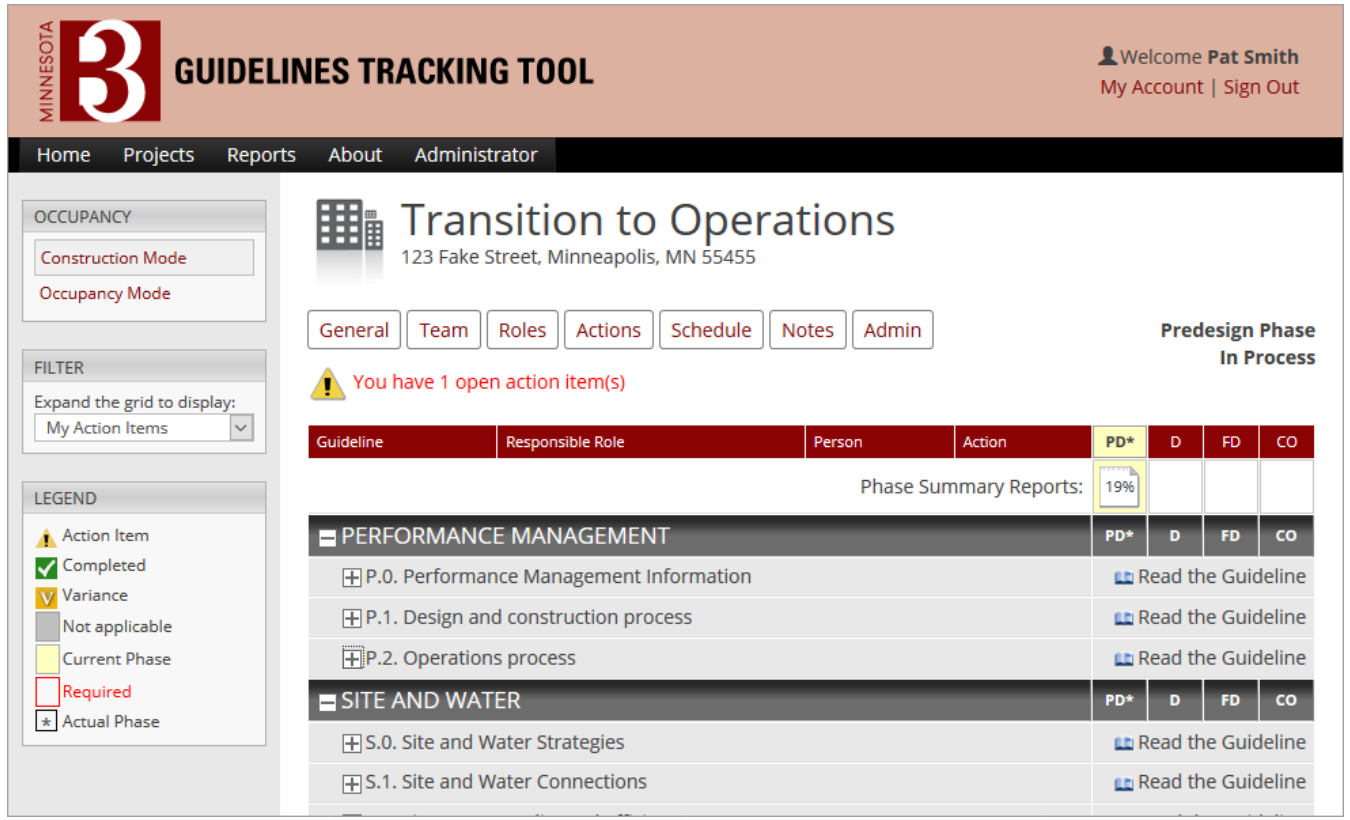


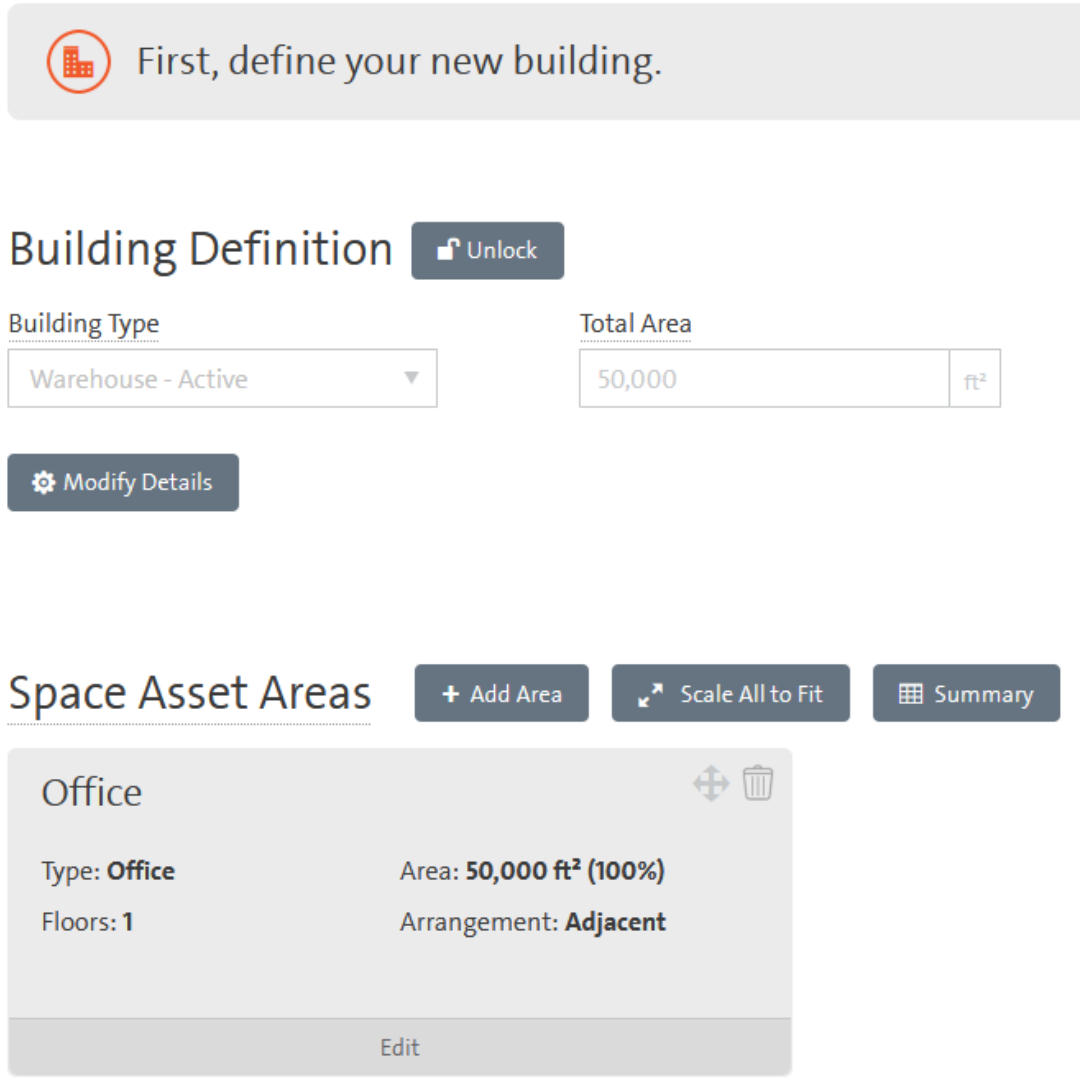
# SB 2030 Overview

SB 2030 is a progressive energy and carbon reduction program, modeled on the Architecture 2030 program; customized to better fit Minnesota's buildings, climate, and policies, and expanded to allow the inclusion of more building types.



# Tools – Tracking Tool and SB 2030 Energy Standard Tool



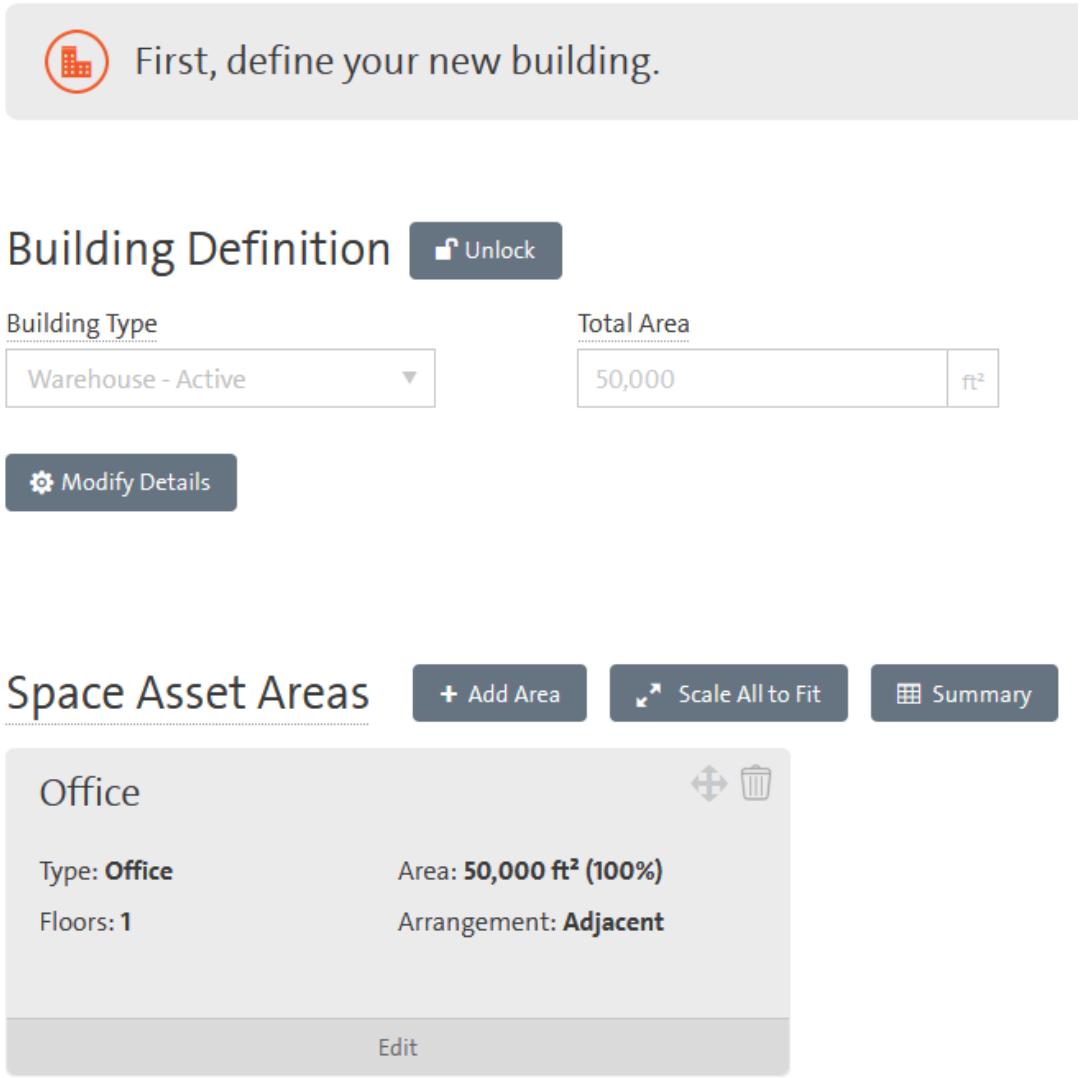

MINNESOTA 3 SB 2030 ENERGY STANDARD®

# Energy Standard Tool

This tool produces an energy model that simulates the energy use of a 2003 average building of the same function and operation as the SB 2030 project.

This modeled baseline is aligned with the CBECS 2003 Dataset, permitting a wider array of variables to be considered.

The reduction (60%, 70%, 80%, or 90% depending on the year) is then taken from that baseline to determine the SB 2030 Standard.

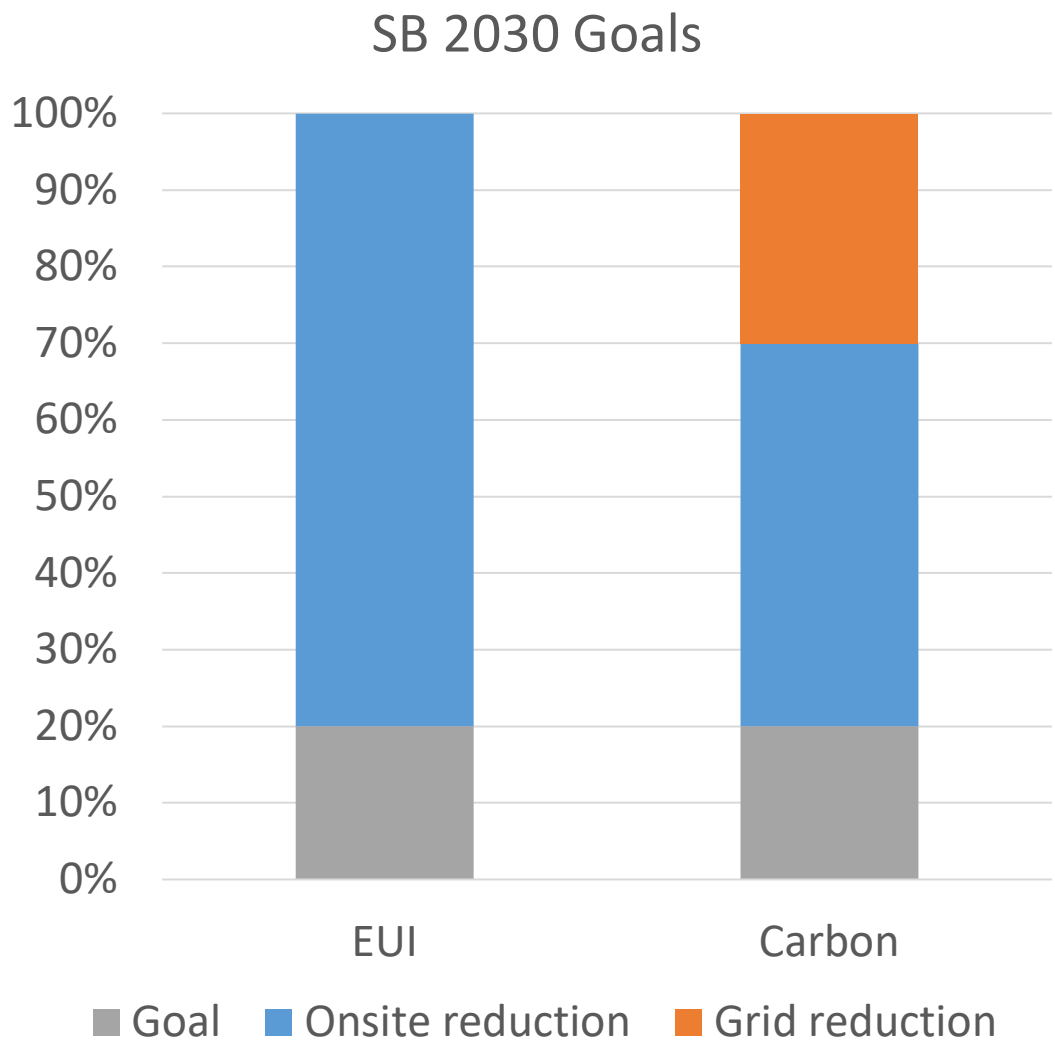


# Overview of a project's path in the program

- During Predesign an initial Energy and Carbon Standard is set for the project. Preset defaults for typical building type are included in the tool as often in early design these more detailed values may not be known.
- Through Schematic and Design Development the project performs initial design energy modeling.
- At the construction documents phase (called Final Design in the tracking tool) project teams submit a final energy model for the project and upload construction documents and related documentation, project reviewed by the SB 2030 Review Team.
- During operation – annual submission and as needed updates to the Energy Standard Tool (e.g. updating schedules if changed).

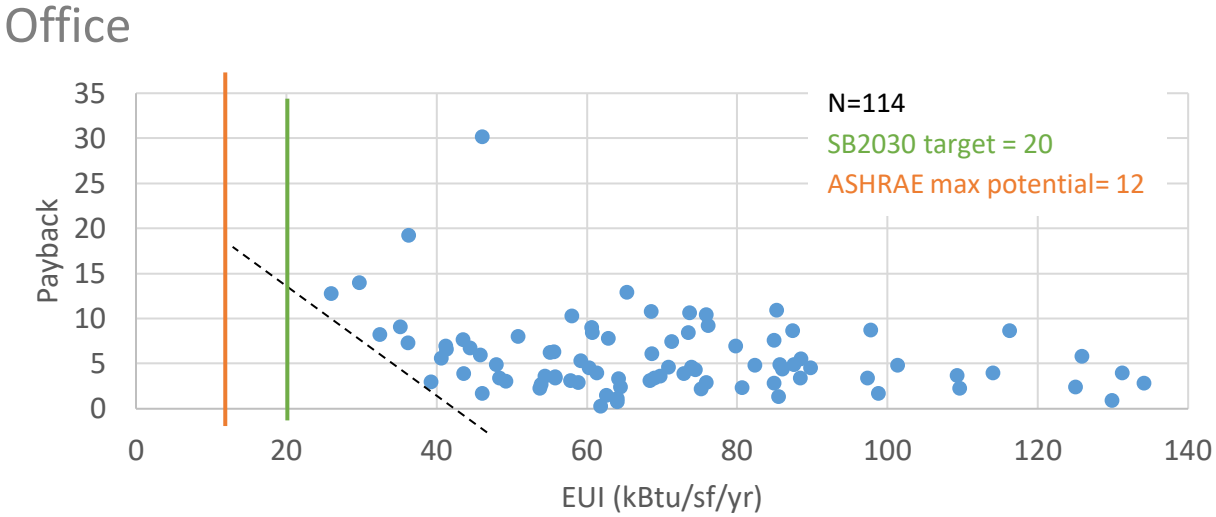
# Balancing Efficiency, Renewables, and Cost Effectiveness

- SB 2030 has 80% EUI and carbon goals
- Minnesota utilities have reduced carbon emissions by 30% for each kWh from 2005 to 2018
- Carbon reduction in the generation of electricity means
  **EUI goal will usually be harder**



# Efficiency Alone Is Not Enough to Get to 80%

- Technical and payback limitations for energy efficiency to achieve 80% alone
- Cost reductions in renewable energy
- Renewable energy will often be needed to meet the target
- Hierarchy of renewable energy location
- Cost effectiveness will more often be a factor




Data from Willdan Midwest EDA programs

# Program Update 2020: Cost effective method reevaluation

**From 2009:**

- Used a societal test, participant test, and utility test perspectives – determined that a simple payback threshold of longer than **15 years** would likely lead some individual building projects not being cost-effective.
- Initially was performed using a parametric analysis of 115 buildings to find this cost effective boundary.

**From 2019:**

- Updated analysis concludes that a payback period of **12 years** is now the cost-effective boundary for measures under the SB 2030 program.

# If needed—projects implement efficiency and renewable energy based on hierarchy

Projects not cost-effectively able to achieve the SB 2030 Energy and Carbon Standards with only energy efficiency measures are then required to provide sufficient carbon-neutral renewable energy (RE) to achieve the standards.

SB 2030 aligned their classification system with a scheme that NREL developed—though with some considerations based on the type of buildings and ownership organizations that participate in the SB 2030 Program.

# Hierarchy of renewables

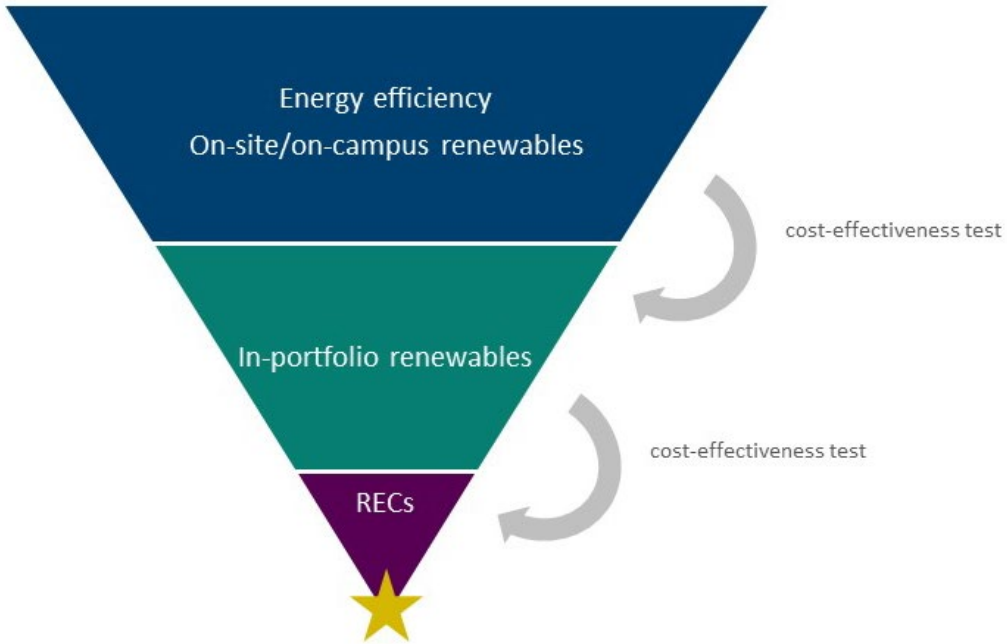
SB 2030 Program Energy Efficiency and Renewable Energy Supply Options Hierarchy

| Option Number | NZEB Supply-Side Options | Examples |
|---|---|---|
| 0 | Reduce site energy use through energy efficiency and demand-side renewable building technologies. | Daylighting; insulation; passive solar heating; high-efficiency heating, ventilation, and air-conditioning equipment; natural ventilation, evaporative cooling; ground-source heat pumps; ocean water cooling |
| **On-Site Supply Options** | | |
| 1 | Use RE sources available within the building footprint and connected to its electricity or hot/chilled water distribution system. | PV, solar hot water, and wind located on the building |
| 2 | Use RE sources available at the building site and connected to its electricity or hot/chilled water distribution system. | PV, solar hot water, low-impact hydro, and wind located on parking lots or adjacent open space, but not physically mounted on the building |
| **Off-Site Supply Options** | | |
| 3 | Use RE sources available off site to generate energy on site and connected to the building's electricity or hot/chilled water distribution system. | Biomass, wood pellets, ethanol, or biodiesel that can be imported from off site, or collected from waste streams from on-site processes that can be used on site to generate electricity and heat |
| 4 | Purchase recently added off-site RE sources, as certified from Green-E (2009) or other equivalent REC programs. Continue to purchase the generation from this new resource to maintain NZEB status. | Utility-based wind, PV, emissions credits, or other "green" purchasing options. All off-site purchases must be certified as recently added RE. A building could also negotiate with its power provider to install dedicated wind turbines or PV panels at a site with good solar or wind resources off site. In this approach, the building might own the hardware and receive credits for the power. The power company or a contractor would maintain the hardware. |

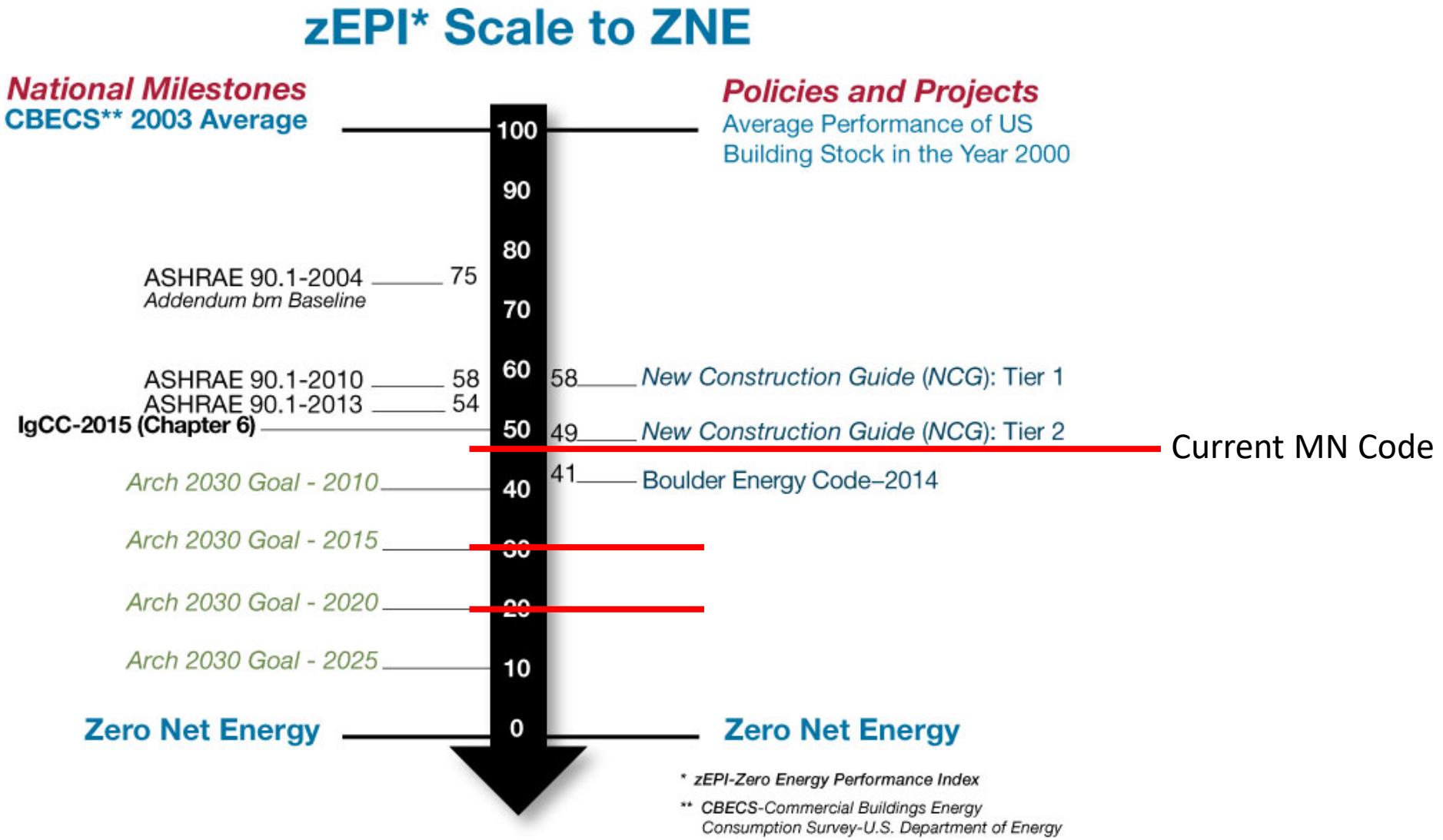
NZEB Supply Options 0, 1, and 2 must be considered first and implemented if cost-effective. On-campus development of Supply Option 2 is included in this evaluation and considered equivelant to on site Supply Option 2.

If the SB 2030 Standard cannot be met cost-effectively using supply options above, additional RE should be developed from within the project owner's portfolio (note that this in-portfolio RE development is not listed as a supply option number here). NZEB Supply Option 3 is also permitted, subject to evaluation by the SB 2030 Project Team.

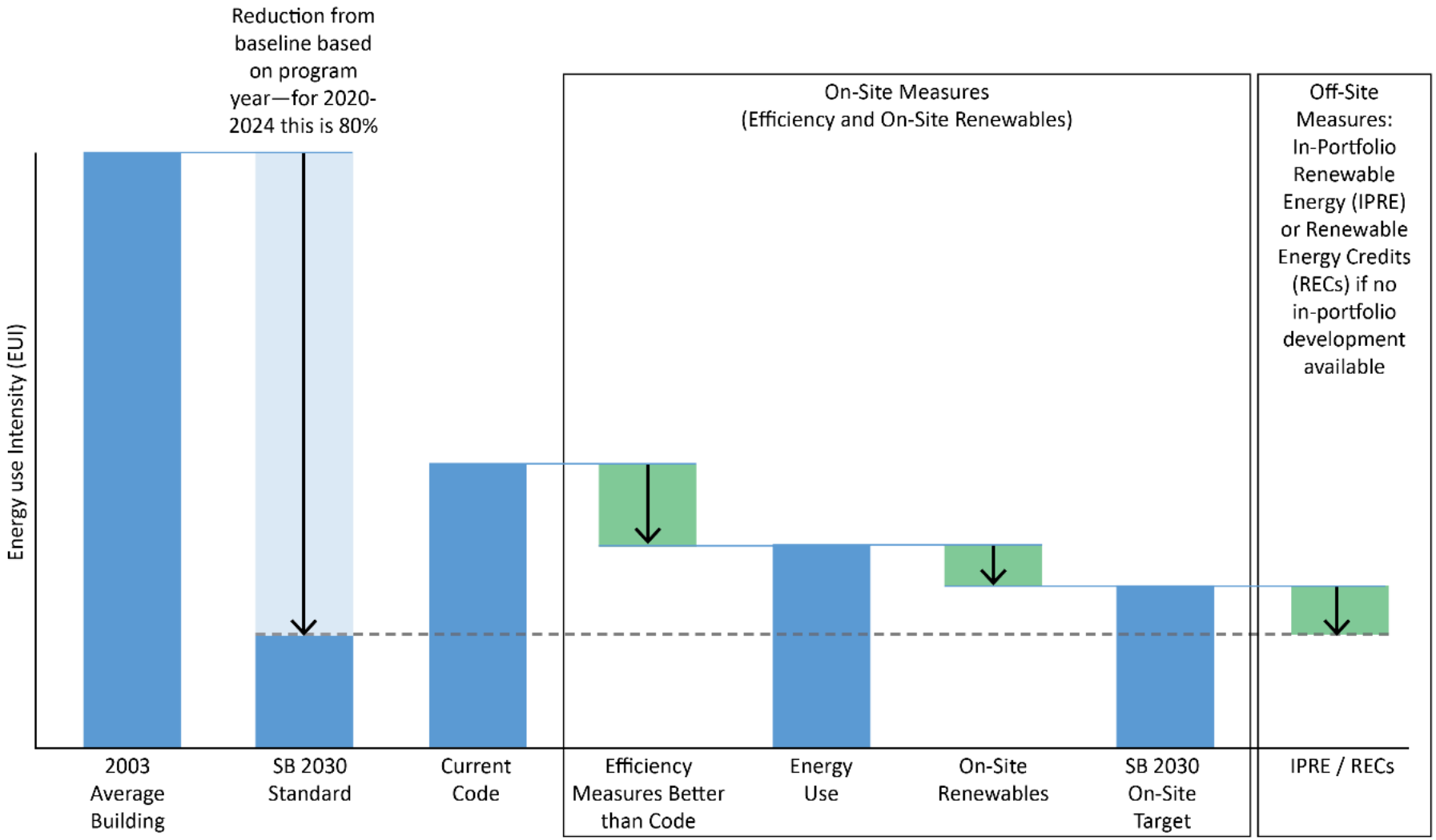
The remainder of RE needed to meet the SB 2030 Standard shall be procured through Renewable Energy Credits (RECs).



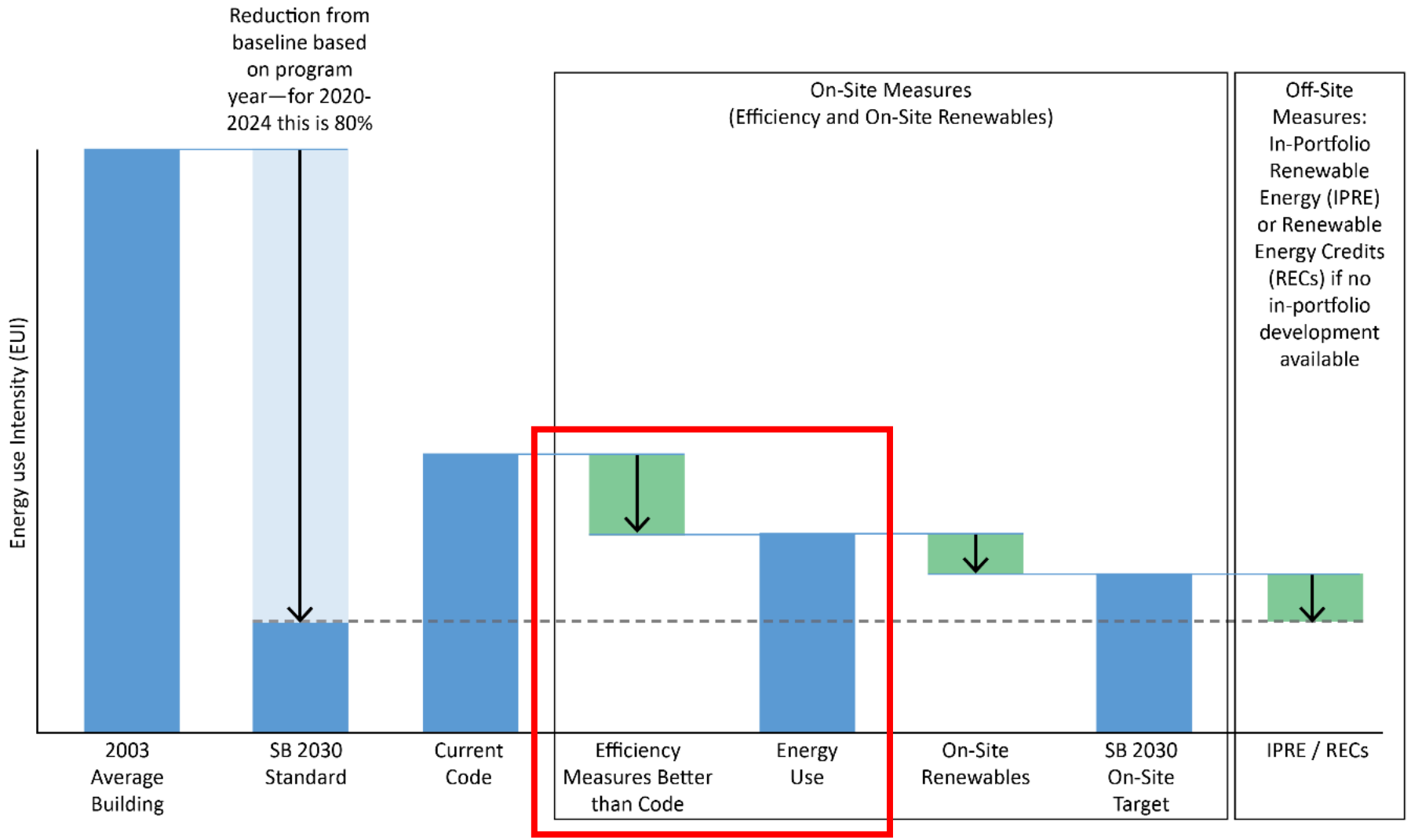
# zEPI Index


zEPI* Scale to ZNE
National Milestones
CBECS** 2003 Average
Policies and Projects
Average Performance of US
Building Stock in the Year 2000
100
90
80
70
60
50
40
30
20
10
0
ASHRAE 90.1-2004 75
Addendum bm Baseline
ASHRAE 90.1-2010 58
ASHRAE 90.1-2013 54
IgCC-2015 (Chapter 6)
58 New Construction Guide (NCG): Tier 1
49 New Construction Guide (NCG): Tier 2
Current MN Code
41 Boulder Energy Code–2014
Arch 2030 Goal - 2010
Arch 2030 Goal - 2015
Arch 2030 Goal - 2020
Arch 2030 Goal - 2025
Zero Net Energy
Zero Net Energy
* zEPI-Zero Energy Performance Index
** CBECS-Commercial Buildings Energy
Consumption Survey-U.S. Department of Energy

# Combining on-site and off-site measures



# The Small Building Method helps determine this part of the process



# SB 2030 Small Buildings Method

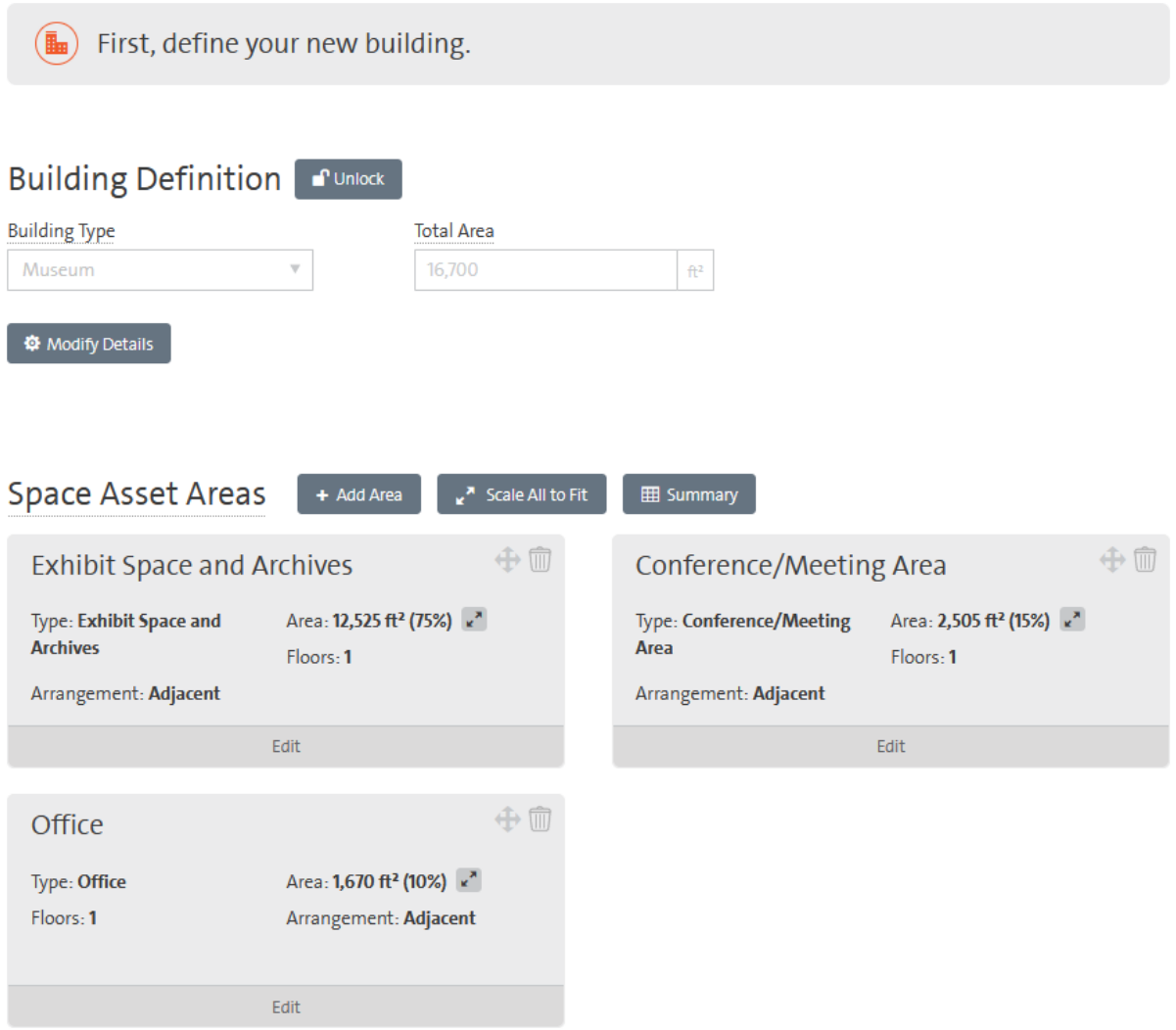
- Developed to reduce the need for energy simulations for small buildings and permit the minimum efficiency measures to be established using a prescriptive approach
- SB 2030 Energy Standard tool is still used to set energy target
- Updated to include newer prescriptive requirements + renewables + off-site options
- Aligns with the approach that larger projects but doesn't require the same amount of energy modeling & cost evaluation

# Small Building Method: 5 Parts

1. Establish the SB 2030 Target
2. Implement Energy Efficiency Measures
3. Estimate Energy Use
4. Implement On-Site Renewable Energy
5. (If needed) Implement or Procure Off-Site Renewable Energy

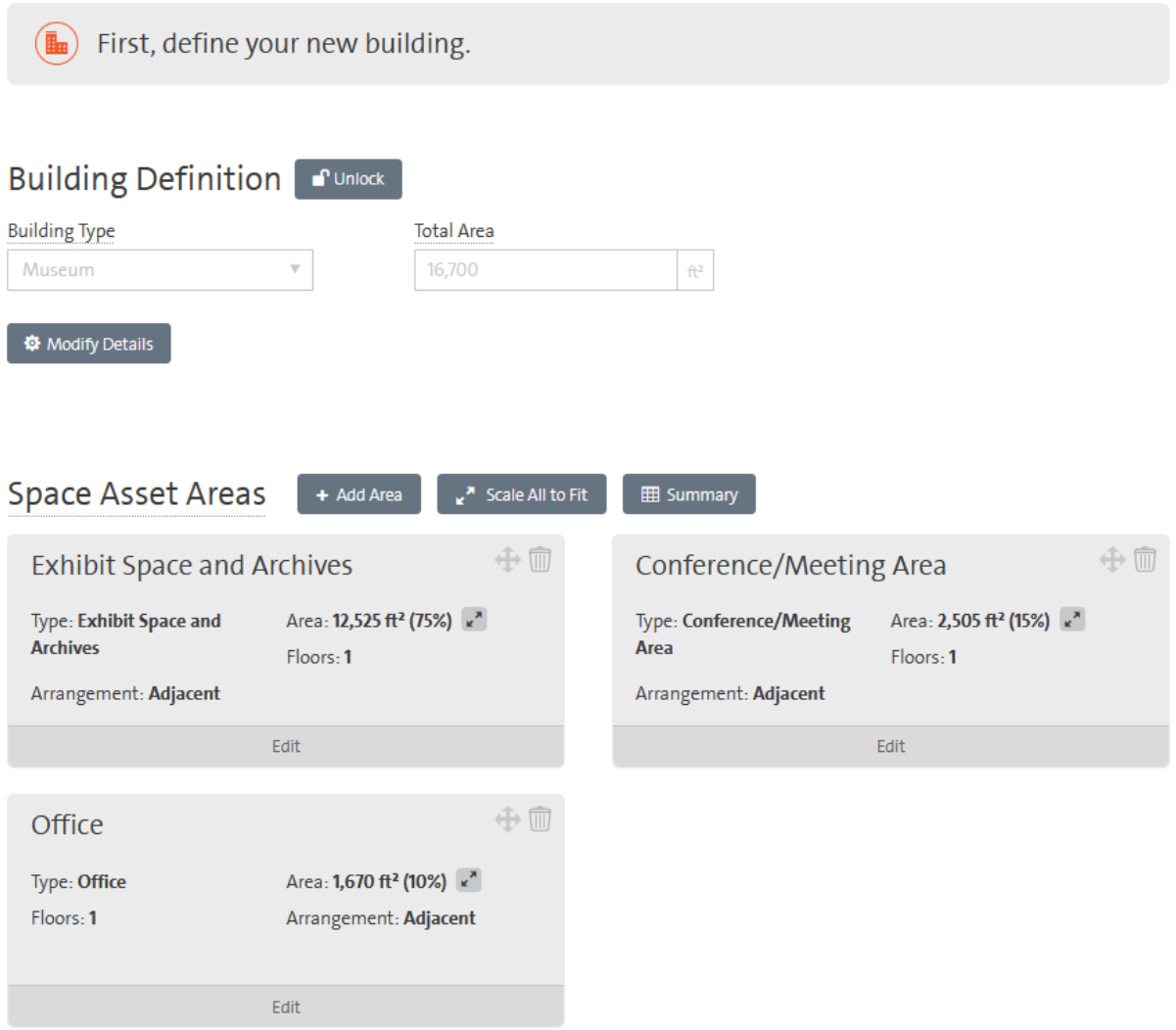
# Part 1: Set the SB 2030 Target

- Project teams input their building characteristics into the SB 2030 Energy Standard Tool, which produces an energy model that simulates the energy use of a 2003 average building of the same function and operation as the SB 2030 project.
- The reduction (currently at 80%) is then taken from that baseline to determine the SB 2030 Standard.
- This provides a customized standard depending on the use of the project.



# Part 1: Set the SB 2030 Target

- Buildings are defined by using “Space Asset Areas” which represent programmatic functions of a building that include attendant space such as corridors, etc. These space asset areas have default characteristics that can be updated as the design progresses.



# Part 2: Section 1—Building Performance Standards

Project teams may select from a number of better-than-code prescriptive standards to demonstrate they are meeting energy efficiency goals.

Specific requirements on:

- Envelope
- Electrical Design
- Mechanical Design
- Metering Plan

# Part 2: Section 1—Building Performance Standards

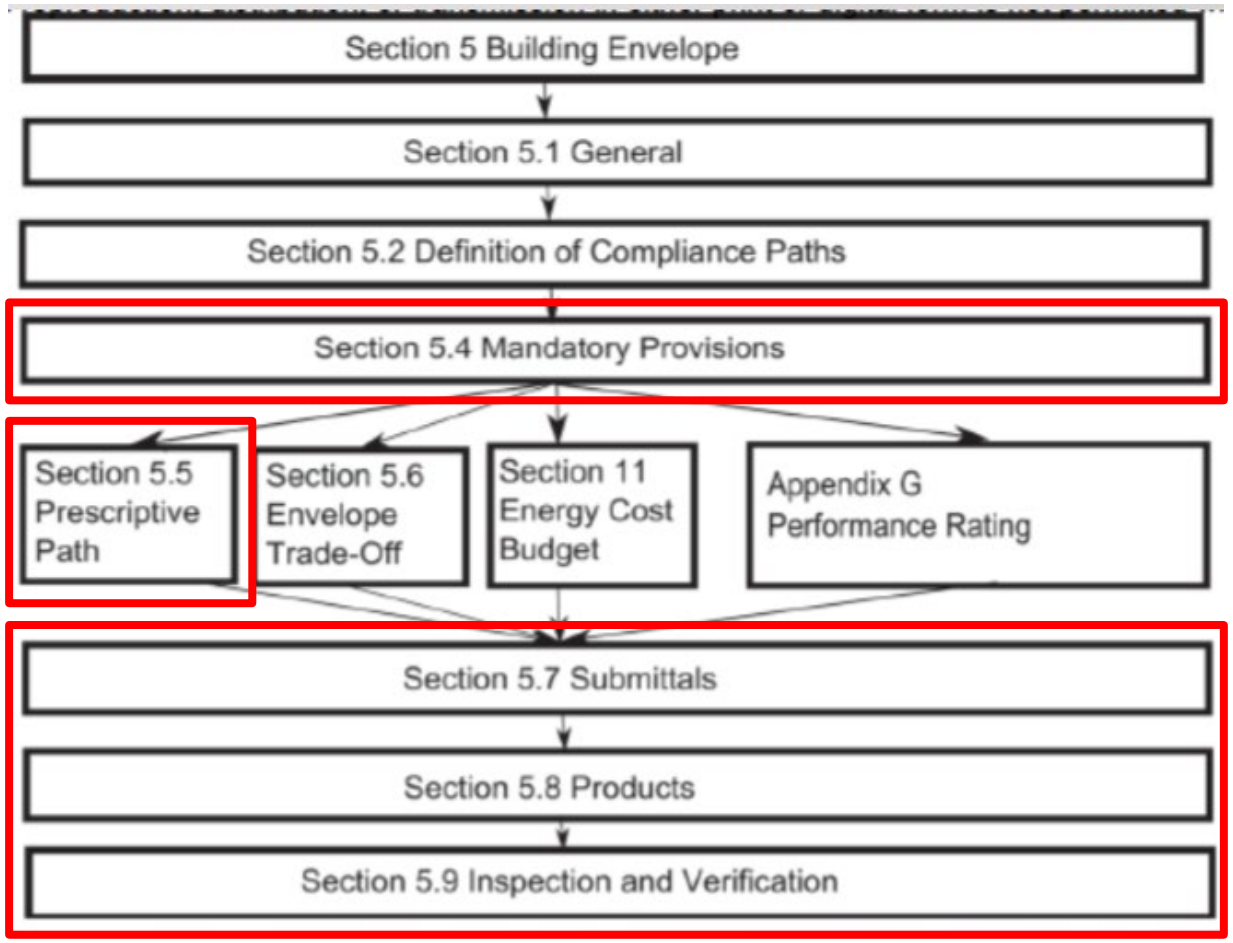
Commercial

- ASHRAE 90.1—2019
- New Buildings Institute 40% Stretch Energy Standard: Path B Stretch Prescriptive Measures
- International Green Construction Code (IgCC) + ASHRAE 90.1 2019
- ASHRAE Advanced Energy Design Guides—Zero Energy Ready series

Residential

- Department of Energy Zero Energy Ready Homes
- Passive House (either PHIUS or PHI)

# Applicable Standards—Commercial Buildings—ASHRAE 90.1—2019



# Applicable Standards—Commercial Buildings—ASHRAE 90.1—2019

## Key Items

| Reviewed Requirements | | Reviewed Requirements | |
|---|---|---|---|
| | | Envelope Requirements | Air Economizer-Unity Controls |
| Envelope Requirements | Roof Insulation | | Air Economizer-BAS Controls |
| | Above Grade Wall Insulation | | Economizer FDD-Unitary Controls |
| | Slab Edge Insulation | | Economizer FDD-BAS Controls |
| | Window U-Factor | | Economizer High Limit Shutoff |
| | Window SHGC | | Demand Control Ventilation (DCV) |
| | Window Area--Whole Building WWR | | Energy Recovery Ventilation (ERV) |
| | Window Orientation [Window Area - East] | | Duct Sealing & Testing |
| | Window Orientation [Window Area - West] | | Supply-Air Temperature Reset for Multizone |
| | | | Pool Cover |
| Envelope Requirements | Automatic Off Lighting Controls | | Low Leakage Intake and Exhaust Dampers |
| | Daylight Zone Control | | HVAC Commissioning |
| | Multi-Level Lighting | | Heating Setback |
| | Interior Lighting Power Density | | Cooling Setback |
| | Exterior Light Control - auto off | | Thermostat Deadband |
| | Exterior Light Control - 50% off | | Fan Power - VAV |
| | Automatic Outlet Shutoff* | | Optimum Start |
| | Lighting System Functional Testing | | Fan Speed Control on Medium Sized Units |
| | | | Demand Control of SHW Recirculation Pump |

# Applicable Standards—Commercial Buildings—New Buildings Institute 40% Stretch Energy Standard Path B Prescriptive Stretch Measures (NBI)

## TABLE OF CONTENTS

# Applicable Standards—Commercial Buildings—New Buildings Institute 40% Stretch Energy Standard Path B Prescriptive Stretch Measures (NBI)

Under Path B:

B.1 Envelope Requirements (5)

B.2 Building Mechanical System Requirements (5)

B.3 Efficient Service Water Heating (1)

B.4 Lighting and Lighting Control Systems (5)

B.5 Electric Systems (4)

B.6 Commissioning (1)

- **On top of ASHRAE 90.1-2019**

*List of additional ASHRAE requirements in the Guide*

- **Refer to ASHRAE 90.1-2019 or IECC 2018**

*B.2.1 Efficiency HVAC Equipment*

# Applicable Standards—Commercial Buildings—International Green Construction Code (IgCC)

## 7. ENERGY EFFICIENCY

**7.1 Scope.** This section specifies requirements for energy efficiency for buildings and appliances, for *on-site renewable energy systems*, and for energy measuring.

**7.2 Compliance.** The energy systems shall comply with Section 7.3, "Mandatory Provisions," and either

a. Section 7.4, "Prescriptive Option," or
b. Section 7.5, "Performance Option."

### 7.3 Mandatory Provisions

**7.3.1 General.** *Building projects* shall be designed to comply with Sections 5.4, 6.4, 7.4, 8.4, 9.4, and 10.4 of ANSI/ASHRAE/IES Standard 90.1.

**7.3.1.1 Continuous Air Barrier.** The exceptions to the requirement for a *continuous air barrier* in ANSI/ASHRAE/IES Standard 90.1, Section 5.4.3.1, for specific *climate zones* and constructions shall not apply. The testing criteria of Section 10.3.1.3.5(a) shall supersede ANSI/ASHRAE/IES Standard 90.1, Section 5.4.3.1.3(a).

**Table 7.3.3.1A Energy Source Thresholds**

| Energy Source | Threshold |
|---|---|
| Electrical service | >200 kVA |
| On-site renewable electric power | All systems > 1 kVA (peak) |
| Gas and district services | >1,000,000 Btu/h (300 kW) |
| *Geothermal energy* | >1,000,000 Btu/h (300 kW) heating |
| On-site renewable thermal energy | >100,000 Btu/h (30 kW) |

**Table 7.3.3.1B System Energy Use Thresholds**

| Use (Total of All Loads) | Subsystem Threshold |
|---|---|
| HVAC system | Connected electric load > 100kVA |
| | Connected gas or district services load > 500,000 Btu/h (150 kW) |
| People moving | Sum of all feeders > 50 kVA |

# Applicable Standards—Commercial Buildings—International Green Construction Code (IgCC)

7.3 Mandatory Requirements

7.4 Prescriptive Requirements

- **On top of ASHRAE 90.1-2019**

*List of additional ASHRAE requirements in the Guide*

- **Refer to ASHRAE 90.1-2019 or IECC 2018**

*List of applicable requirements in the Guide*

# Applicable Standards—Commercial Buildings—ASHRAE Advanced Energy Design Guides—Achieving Zero Energy Ready series

- Available:
  - Small to Medium Office Buildings
  - K-12 School Buildings

| | | |
|---|---|---|
| Envelope | Construction strategies | EN1–EN5 |
| | Opaque components | EN6–EN17 |
| | Recommended envelope construction factors | Table 5-3 |
| | Thermal bridging | EN18–EN41 |
| | Building fenestration | EN42 |
| | Recommended fenestration criteria | Table 5-5 |

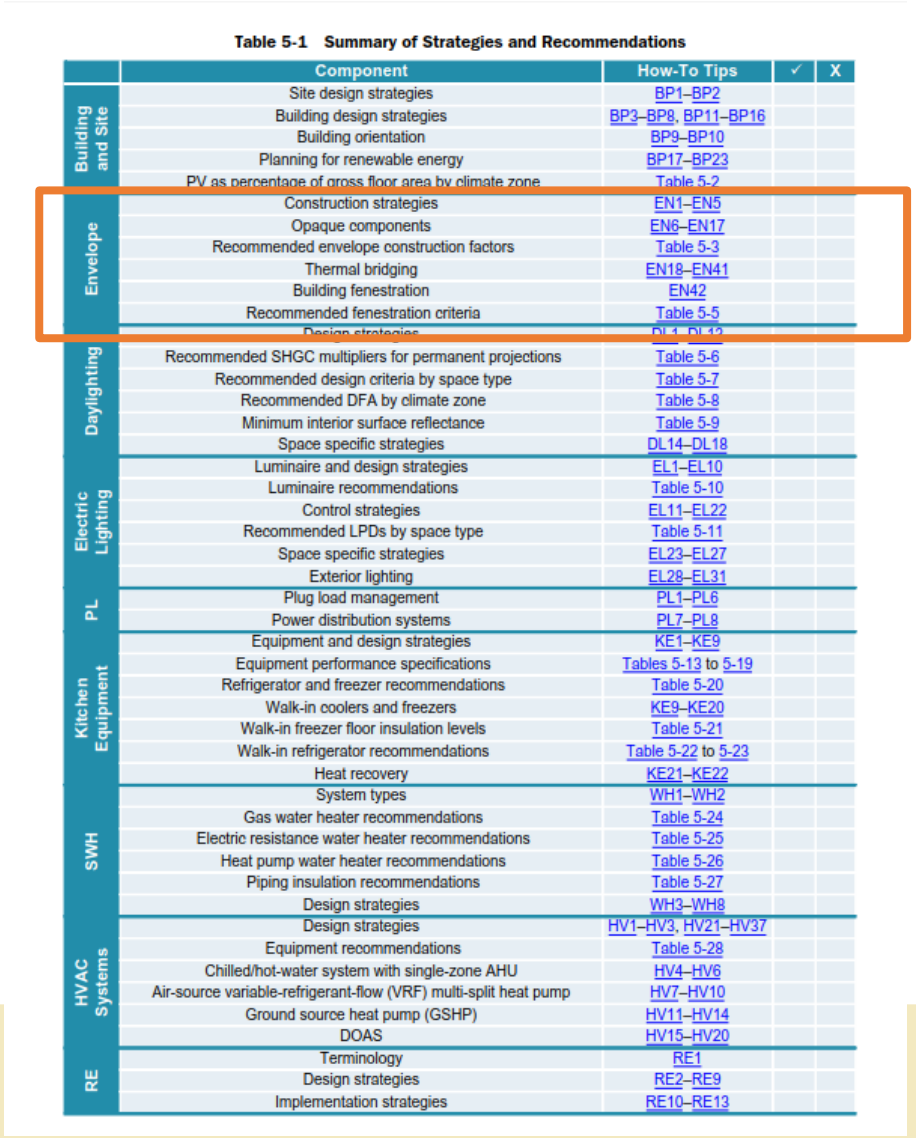


**Table 5-1 Summary of Strategies and Recommendations**

| | Component | How-To Tips | ✓ | X |
|---|---|---|---|---|
| Building and Site | Site design strategies | BP1–BP2 | | |
| | Building design strategies | BP3–BP8, BP11–BP16 | | |
| | Building orientation | BP9–BP10 | | |
| | Planning for renewable energy | BP17–BP23 | | |
| | PV as percentage of gross floor area by climate zone | Table 5-2 | | |
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| | Design strategies | DL1–DL13 | | |
| Daylighting | Recommended SHGC multipliers for permanent projections | Table 5-6 | | |
| | Recommended design criteria by space type | Table 5-7 | | |
| | Recommended DFA by climate zone | Table 5-8 | | |
| | Minimum interior surface reflectance | Table 5-9 | | |
| | Space specific strategies | DL14–DL18 | | |
| Electric Lighting | Luminaire and design strategies | EL1–EL10 | | |
| | Luminaire recommendations | Table 5-10 | | |
| | Control strategies | EL11–EL22 | | |
| | Recommended LPDs by space type | Table 5-11 | | |
| | Space specific strategies | EL23–EL27 | | |
| | Exterior lighting | EL28–EL31 | | |
| PL | Plug load management | PL1–PL6 | | |
| | Power distribution systems | PL7–PL8 | | |
| Kitchen Equipment | Equipment and design strategies | KE1–KE9 | | |
| | Equipment performance specifications | Tables 5-13 to 5-19 | | |
| | Refrigerator and freezer recommendations | Table 5-20 | | |
| | Walk-in coolers and freezers | KE9–KE20 | | |
| | Walk-in freezer floor insulation levels | Table 5-21 | | |
| | Walk-in refrigerator recommendations | Table 5-22 to 5-23 | | |
| | Heat recovery | KE21–KE22 | | |
| SWH | System types | WH1–WH2 | | |
| | Gas water heater recommendations | Table 5-24 | | |
| | Electric resistance water heater recommendations | Table 5-25 | | |
| | Heat pump water heater recommendations | Table 5-26 | | |
| | Piping insulation recommendations | Table 5-27 | | |
| | Design strategies | WH3–WH8 | | |
| HVAC Systems | Design strategies | HV1–HV3, HV21–HV37 | | |
| | Equipment recommendations | Table 5-28 | | |
| | Chilled/hot-water system with single-zone AHU | HV4–HV6 | | |
| | Air-source variable-refrigerant-flow (VRF) multi-split heat pump | HV7–HV10 | | |
| | Ground source heat pump (GSHP) | HV11–HV14 | | |
| | DOAS | HV15–HV20 | | |
| RE | Terminology | RE1 | | |
| | Design strategies | RE2–RE9 | | |
| | Implementation strategies | RE10–RE13 | | |

# Applicable Standards—Commercial Buildings—ASHRAE Advanced Energy Design Guides—Achieving Zero Energy Ready series

- Building and Site (5)
- Envelope (6)
- Daylighting (6)
- Electric Lighting (6)
- Plug Load (2)
- Kitchen Equipment (7)
- Service Hot Water (6)
- HVAC Systems (6)
- Renewable Energy (3)

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| | Piping insulation recommendations | Table 5-27 | | |
| | Design strategies | WH3–WH8 | | |
| HVAC Systems | Design strategies | HV1–HV3, HV21–HV37 | | |
| | Equipment recommendations | Table 5-28 | | |
| | Chilled/hot-water system with single-zone AHU | HV4–HV6 | | |
| | Air-source variable-refrigerant-flow (VRF) multi-split heat pump | HV7–HV10 | | |
| | Ground source heat pump (GSHP) | HV11–HV14 | | |
| | DOAS | HV15–HV20 | | |
| RE | Terminology | RE1 | | |
| | Design strategies | RE2–RE9 | | |
| | Implementation strategies | RE10–RE13 | | |

# Applicable Standards – Residential Buildings

- Residential – Certified through one of the following standards
  - Energy Zero Energy Ready Homes program (DOE ZER)
  - Passive House Institute (PHI)
  - Passive House Institute US (PHIUS)

- As these programs all include an energy model the SB 2030 team will be using that process to determine the anticipated energy use of the buildings and to assist in calculating the needed renewable energy

# Part 2: Section 2 Mandatory Efficiency Requirements

Select equipment and water fixtures meeting the standards listed below:

EnergyStar Applicable Equipment: EnergyStar rated equipment for any application that has EnergyStar rated equipment available. This includes, but is not limited to the following

- Appliances that have Energy Star product categories
- Computers
- Other Office Equipment
- Light Fixtures
- Light Bulbs
- Small HVAC Equipment
- Televisions

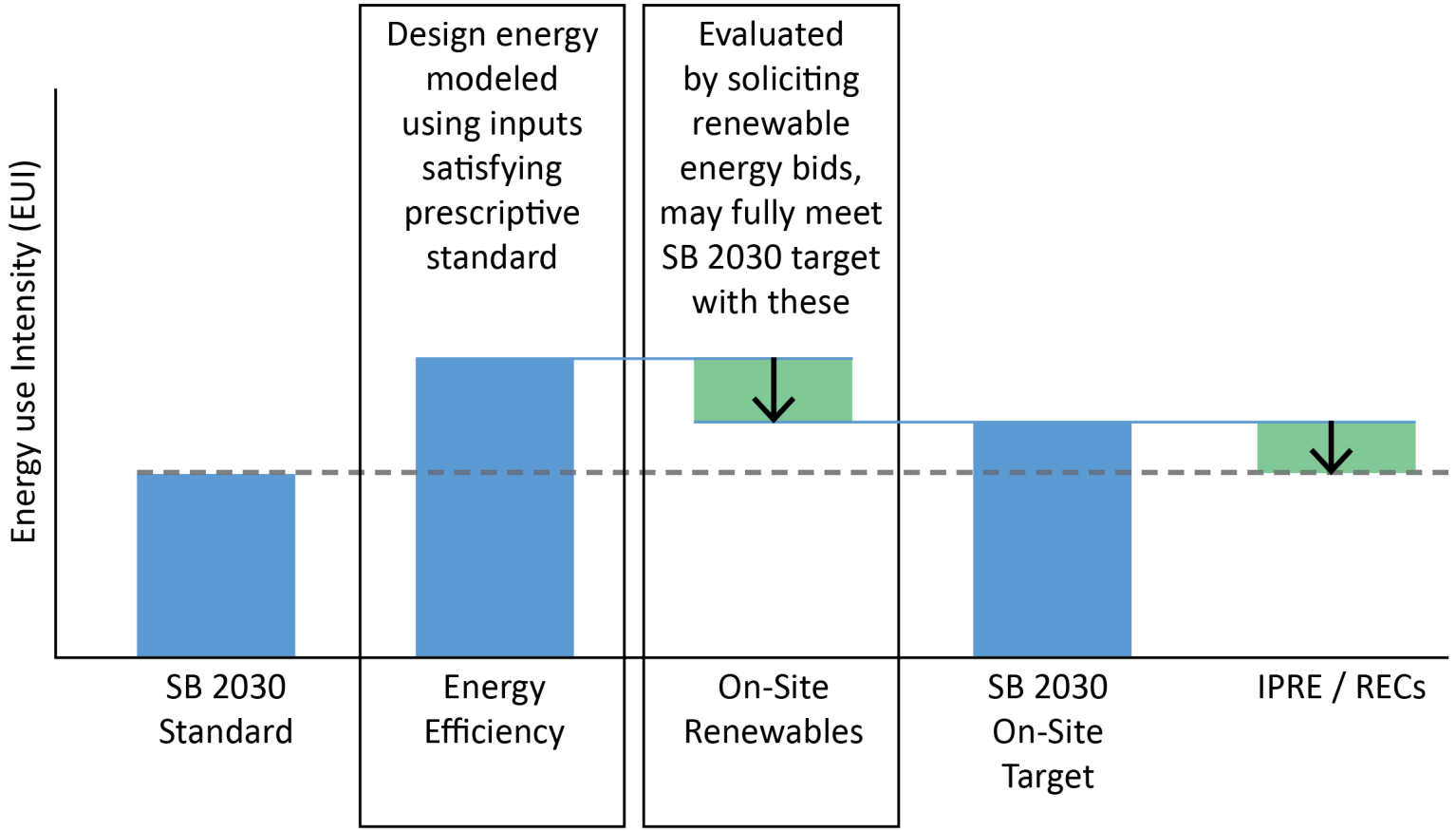
# Part 2: Section 2 Mandatory Efficiency Requirements (continued)

Water Fixtures: The following types of plumbing fixtures must have design flow rates specified and installed at or below the flow rates listed below.

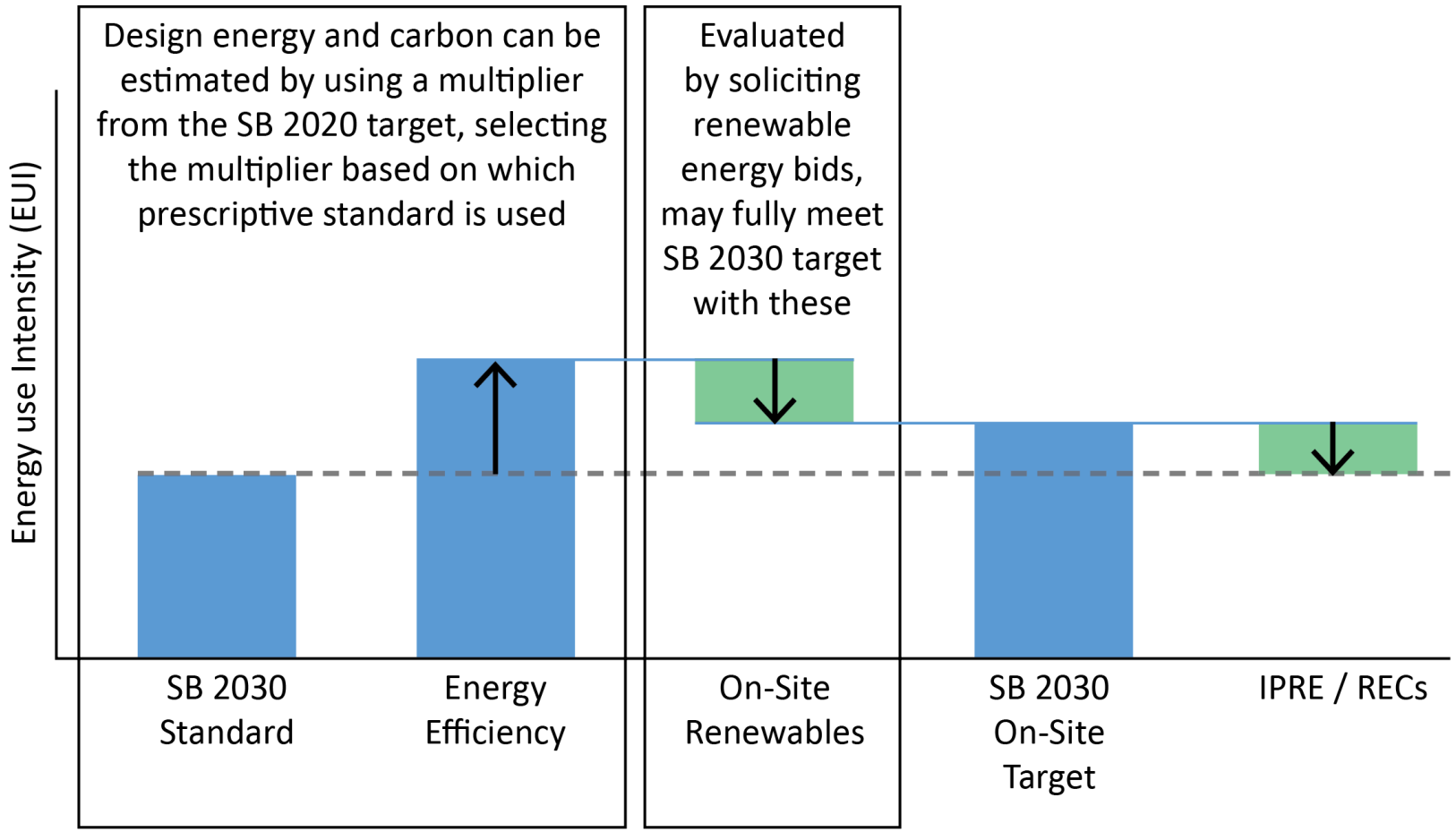
(more stringent standards may be required for projects that are following a green building rating system that is broader than the SB 2030 Energy Standard)

- Lavatory Faucets ≤ 1.5 gallons per minutes
- Kitchen Faucets ≤ 2.0 gallons per minute
- Showerheads ≤ 1.8 gallons per minute

# Part 3: Estimate Energy Use—Option 1: Energy Simulation



# Estimate Energy Use—Option 2: Building Performance Multipliers

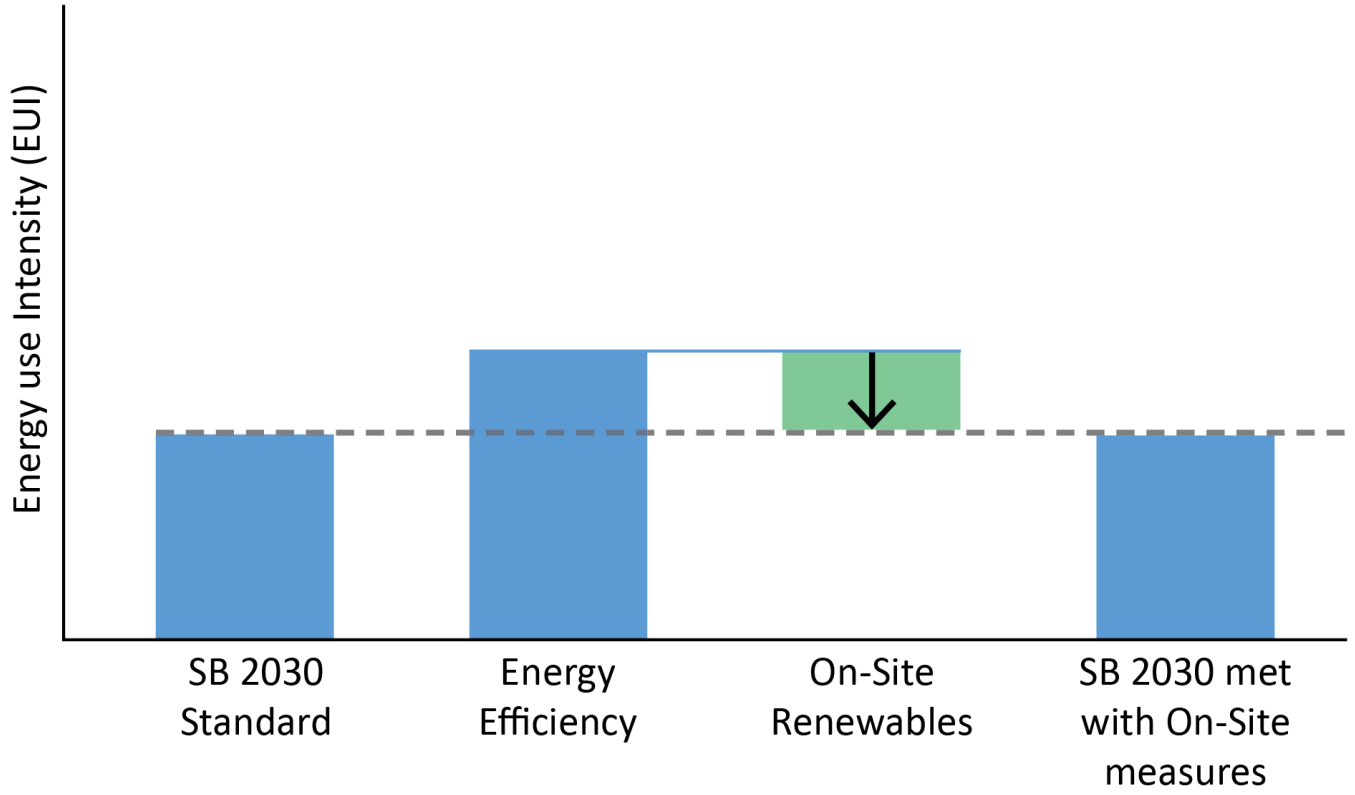


# Part 3: Estimate Energy Use—Option 2: Building Performance Multipliers

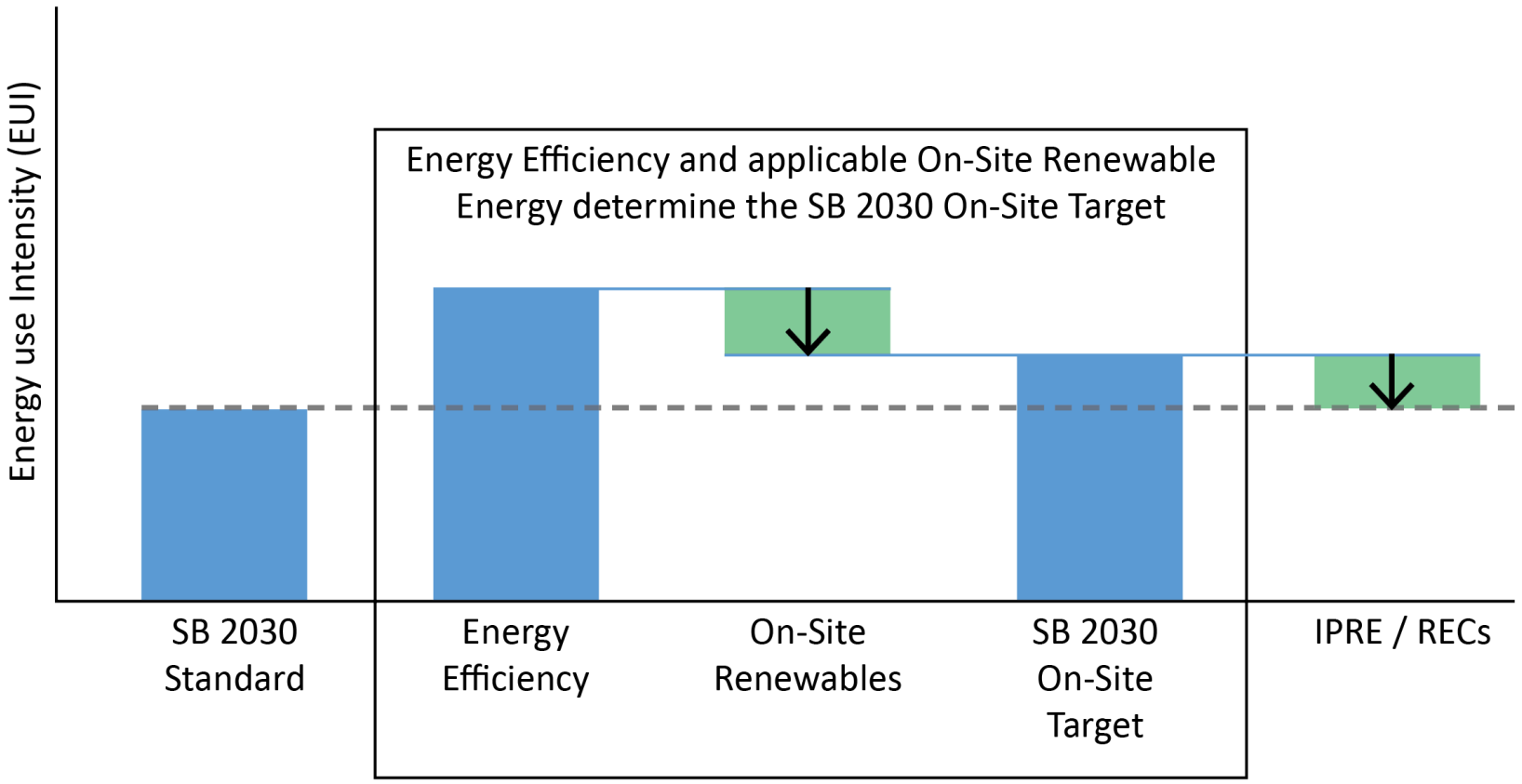
| Building Type | NBI 40% | ASHRAE 90.1 | IgCC | AEDG |
|---|---|---|---|---|
| **Office** | 1.6 | 1.6 | 1.6 | 1.3 |
| **Hotel** | 1.7 | 1.8 | 1.8 | -- |
| **Warehouse** | 2.4 | 3.3 | 3.0 | -- |
| **Secondary School** | 1.1 | 1.1 | 1.0 | 0.6 |
| **Primary School** | 1.2 | 1.3 | 1.2 | 0.6 |

# Part 4: On-Site Renewable Energy

$$Estimated\ Energy\ Use\ - SB\ 2030\ Energy\ Standard = Renewable\ Energy\ Needed$$



# Part 4: On-Site Renewable Energy




If sufficient renewable energy development isn't feasible to fully meet the SB 2030 Target the renewable energy development should be pursued to

- maximize the system size within the cost–effective threshold.

After determining the applicable on-site renewable energy the SB 2030 On-Site target is set.

# Example Buildings Renewable Energy (kBTU/sf)

Note that these are estimates based on typical buildings of these types—your numbers will vary a bit depending on your specific building program.

| Building Types | ASHRAE 90.1-2019 | Preliminary NBI 40% | IGCC | AEDG – ZNE |
|---|---|---|---|---|
| Office | 12 | 11 | 12 | 6 |
| Apartment | 31 | 31 | 30 | - |
| Hotel | 24 | 23 | 25 | - |
| Warehouse | 21 | 13 | 18 | - |
| Secondary School | 4 | 3 | 1 | 0 |
| Primary School | 10 | 8 | 8 | 0 |

# Renewable Energy—a note on RECs

- In order to contribute to meeting the SB 2030 requirements any Renewable Energy developed or procured needs to have an associated Renewable Energy Credit

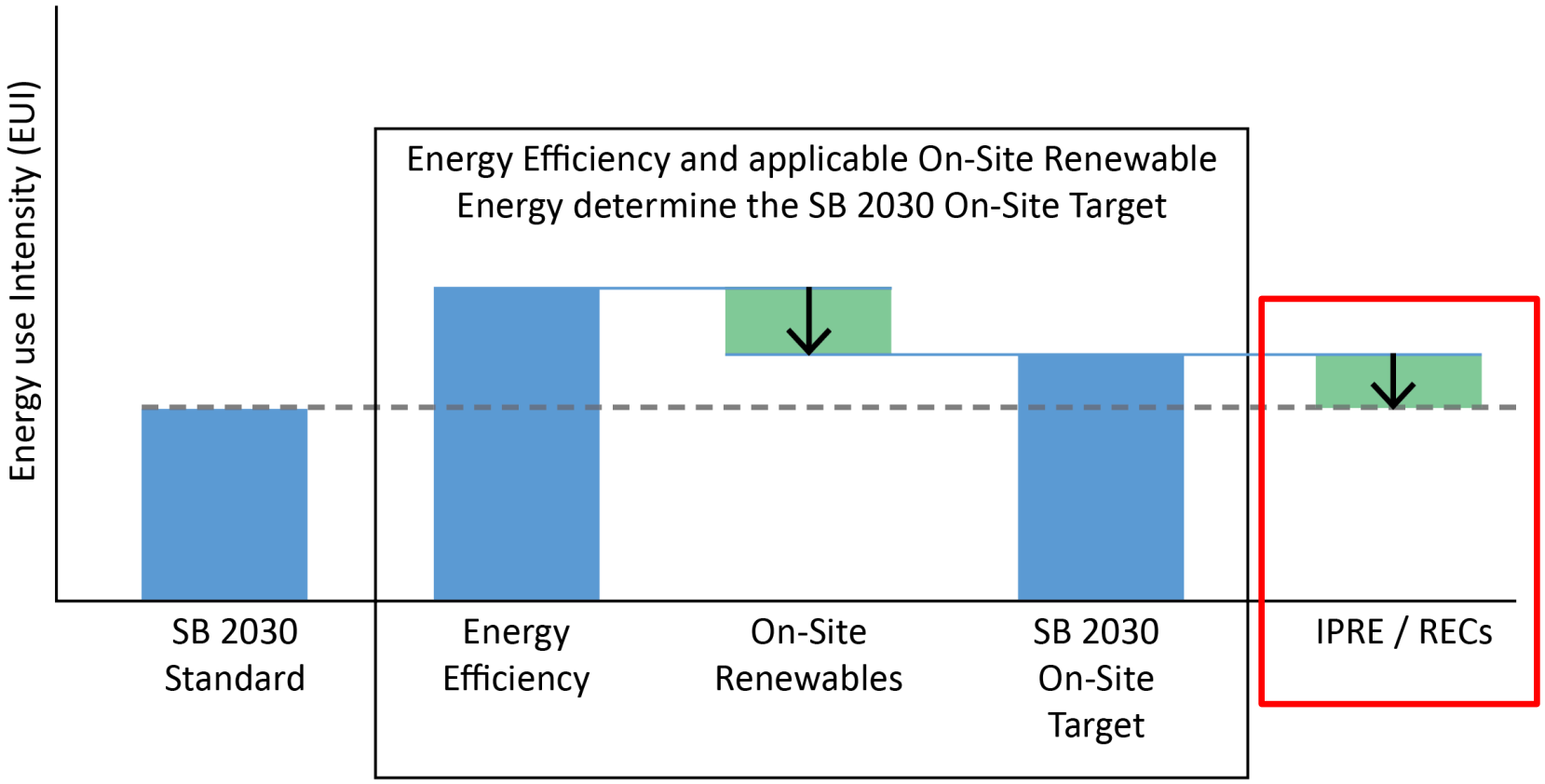
From the EPA*:

*A renewable energy certificate, or REC (pronounced: rĕk), is a market-based instrument that represents the property rights to the environmental, social and other non-power attributes of renewable electricity generation. RECs are issued when one megawatt-hour (MWh) of electricity is generated and delivered to the electricity grid from a renewable energy resource.*

- In order to enable projects to take advantage of utility programs where the RECs are sold to the utility provider the SB 2030 program permits replacement RECs to be used.

* https://www.epa.gov/greenpower/renewable-energy-certificates-recs#certificate

# Renewable Energy Implementation




The remaining energy needed to meet the SB 2030 target should be sourced from in-portfolio renewable energy development (IPRE).

For projects without access to in-portfolio development opportunities renewable energy credits (RECs) may be procured to meet the SB 2030 Standard.

# The review process: what we will be looking for

- Commercial Buildings –
  - Construction documents:
    - Drawings
    - Specifications
    - Additional documents (e.g. submittals, equipment spec sheets)
  - Metering plan
    - List if meters that measure the usage of all and only the SB2030 scope of work
    - Narratives on when and how the metered data will be recorded
    - Maps showing meter locations
    - Equations if post processing on metered data is needed
    - Plug load needs to be sub-metered if building gross floor area is above 10,000sf
  - Renewable energy
    - Narratives, bids, and calculations that explain how the renewable energy requirement will be met, including project bids and—if needed—documentation of in-portfolio development or REC procurement

Information normally missed:
- Exterior wall and roof assembly U factor or insulation R values
- Window assembly U factor and SHGC
- Duct sealing
- Lighting system functional testing

# The review process: what we will be looking for

- Residential Projects
  - Confirmation of certification with the selected program (ZERH or PH/PHIUS)
  - Renewable energy
    - Narratives, bids, and calculations that explain how the renewable energy requirement will be met, including project bids and—if needed—documentation of in-portfolio development or REC procurement

# Questions / Discussion