DPS | Montgomery County Department of Permitting Services

YOUR PROJECT PARTNER

2021 IgCC and Montgomery County Energy Code Training Webinar

Presenters

Anne Hawley	Permitting Services Specialist
Bryan Bomer	Manager of the Sustainability, Energy and Mechanical Division
Ye Jiang	Senior Permitting Services Specialist
Keith Walker	Program Manager
Alyssa Mrvos	Program Manager
Mark Nauman	Senior Permitting Services Specialist

2021 Code Cycle

2024 Code Cycle

2027 Code Cycle

Code amendments

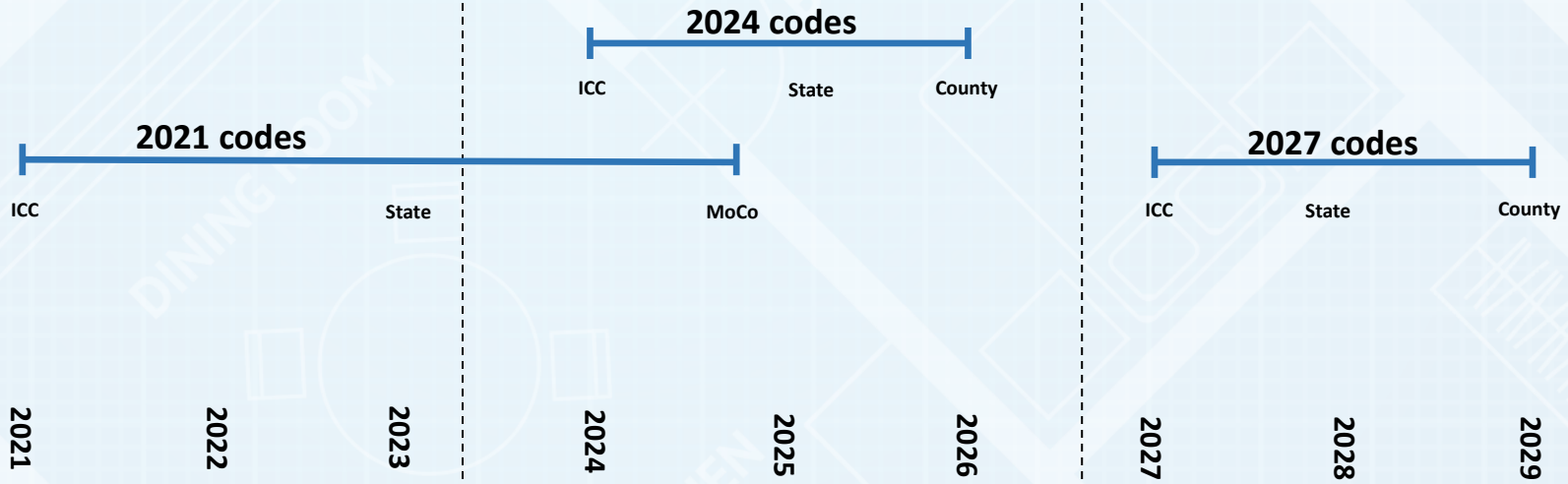
- Step one of NZE – 33% renewables
- Electrification ready new construction
- Advanced Electric Vehicle charging ready
- Additional supporting amendments

- Step two of NZE – 66% renewables

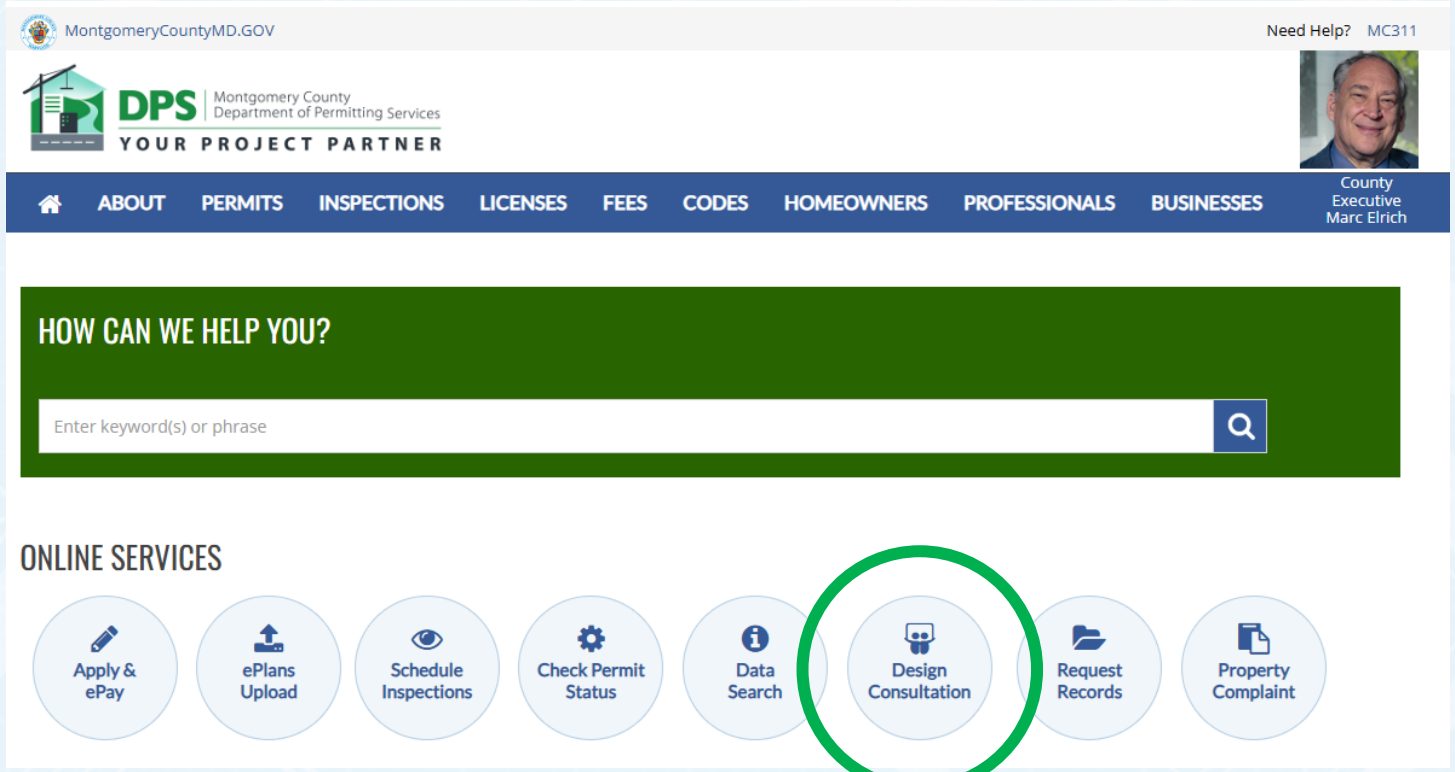
- Step three of NZE – 100% renewables
- Supporting amendments

Refinement cycle

adoption timelines



Montgomery County offers FREE Pre-Design Meeting



For FREE one on one consultations regarding Energy and Green compliance, contact:

Mark Nauman at Mark.Nauman@montgomerycountymd.gov

Or Ye Jiang Ye.Jiang@montgomerycountymd.gov

Bryan Bomer

S.E.M. Manager

DPS website

https://www.montgomerycountymd.gov/dps/

- Commercial Building
  - Energy and Green Building
    - Resources: amendments and commentary
- Policy and Code Interpretations
  - A2L Refrigerants
  - To be posted
    - Townhome energy code compliance policy

Major Amendments for 2021 Code Cycle Montgomery County Executive Regulation (MCER) 13-24

Ye Jiang

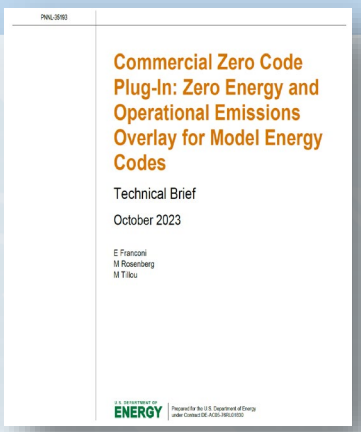
Senior Permitting Services Specialist

MCER 13-24 Amendment: Changes to Section 4.2.1 Compliance Path

a. New building over **20,000** ft² shall comply with **PNNL-35193 Technical Brief, Section 3.1**, **Net Zero Energy** – Performance compliance path

b. New building less than **20,000** ft² shall comply with either:

PNNL-35193 Technical Brief, Section 3.1, Net Zero Energy (**Performance Path**)



OR

ASHRAE 90.1- 2022, Sections 4.2.2 through 4.2.5 and Sections 5 – 11 (**Prescriptive Path**)

OR

ASHRAE 90.1 – 2022, Section 6.6.2 Mechanical System Performance Path (**Alternative Prescriptive Path**)

MCER 13-24: Changes to Section 4.2.1 Compliance Path cont.

MCER 13-24 Amendment: PNNL-35193, Section 3.1 has replaced ASHRAE 90.1-2022, Section 4.2.1.1 and Appendix G1.2.2. Use site energy instead of energy cost, and **Site Performance Energy Index** instead of Performance Cost Index

a. **PNNL-35193:** Changes to Section 4.2.1
   - Use the Site Performance Energy Index, PEI *site* < PEI *site, target*
   - Site Zero Performance Energy Index, PEI *site, zero* =< **0.67** (**MCER 13-24**)
   - Replace Table 4.2.1.1 with Table 4.2.1.1-1 for reduced BPF *site* values

b. **PNNL-35193**: Changes to Normative Appendix G
   - Replace references to "energy cost" with references to "site energy" in G1,2.2, G1.3.2, G2.1, G2.4.2, G2.5.
   - **MCER 13-24 Amendment** to **PNNL- 35193** Table G1.2.2.2

Table 4.2.1.1-1 Building Performance Factor (BPF_{site})

Building Type	Climate Zone											
	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	
Multifamily	0.55	0.54	0.58	0.56	0.59	0.59	0.61	0.59	0.56	0.49	0.56	
Healthcare/ hospital	0.47	0.46	0.47	0.46	0.45	0.43	0.43	0.45	0.44	0.42	0.43	
Hotel/motel	0.57	0.56	0.58	0.56	0.57	0.55	0.57	0.57	0.59	0.54	0.56	
Office	0.40	0.40	0.40	0.39	0.38	0.38	0.37	0.39	0.34	0.34	0.37	
Restaurant	0.57	0.52	0.52	0.51	0.54	0.48	0.55	0.52	0.55	0.55	0.55	
Retail	0.38	0.36	0.35	0.35	0.32	0.30	0.31	0.31	0.31	0.31	0.31	
School	0.40	0.42	0.44	0.42	0.40	0.37	0.40	0.37	0.40	0.31	0.35	
Warehouse	0.20	0.21	0.17	0.19	0.16	0.16	0.18	0.15	0.13	0.25	0.18	
All others	0.50	0.49	0.49	0.48	0.43	0.39	0.42	0.41	0.45	0.41	0.40	

MCER 13-24: Section 4.2.5.2 Building Commissioning Requirements, Exceptions to 4.2.5.2

Changes to the threshold requiring commissioning:

Exception 1:

Replace Exception 1 with the following: 'Mechanical systems and service water heater systems in building where the total mechanical equipment capacity is both less than 480,000 Bru/h cooling capacity and less than 600,000 Btu/h combined service water-heating and space-heating capacity."

Exception 4:

Delete Exception 4.

This keeps Montgomery County's existing code requirements for building commissioning.

MCER 13-24: Add new Section 5.4.3.4.5 Door Switches

Any conditioned space with a door, including doors with more than one-half glass, opening of the outdoors shall be provided with controls that, when any such door is open:

a. Disable mechanical heating or reset the heating set point to 55 F or lower within five minutes of the door opening

AND

b. Disable mechanical cooling or reset the cooling set point to 90 F or grater within five minutes of the door opening. Mechanical cooling may remain enabled if outdoor air temperature is below space temperature.

MCER 13-24: Section 5.5.3.1.4 Roof Solar Reflectance and Thermal Emittance

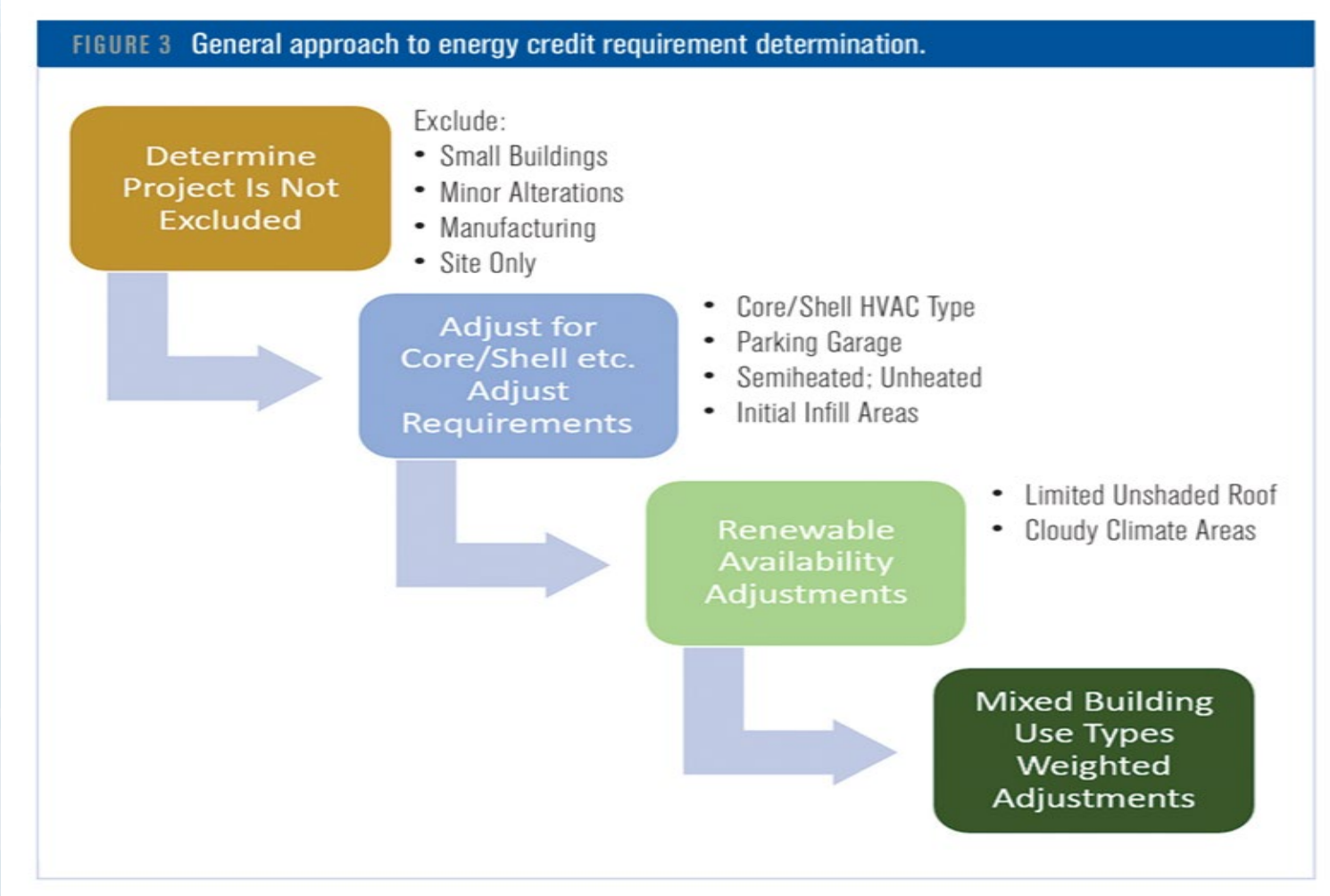
Adjusting the climate zone from 3 to 4 now includes Montgomery County. All new construction will be required to specify a “cool roof” as identified in the Climate Action Plan.

ASHRAE 90.1-2022 Section 11 Additional Efficiency Requirements (THIS IS A NEW SECTION)

1. New energy credits require projects to select additional energy efficiency and load management design features to improve overall building energy efficiency.

1. This requirement only applies to the building envelope, equipment, and systems installed in projects that include (Section 11.1.2 through Section 11.1.4):
   a. New buildings or additions > 2000 ft²
   b. Substantial alterations to existing buildings exceeding 5000 ft² that replace **any 2** of:
      - HVAC equipment accounts for > = 50% of the capacity serving either heating or cooling loads of the alteration area.
      - >= 50% of lighting fixtures
      - >= 25% Envelope cladding, insulation or fenestration
   c. First-time tenant fit-outs (regardless of SQ FT, **MCER 13-24**)

ASHRAE 90.1-2022 Section 11 Additional Efficiency Requirements cont.



Courtesy of ASHRAE

ASHRAE 90.1-2022 Section 11 Additional Efficiency Requirements cont.

3. Energy Credits Required (Section 11.5.1)

a. Weighted-average project energy credits
b. Core & shell buildings shall achieve at least 33% or 50% of the energy credits specified in **Table 11.5.1-1**, depending on the scope of work.
c. First-time tenant shall achieve at least 25% or 50% of the credits required, depending on the scope or work.
d. Substantial alterations shall achieve 50% of the credits required.
e. Unconditioned spaces, semi-heated spaces, and parking garages shall achieve 50% of the credits required.
f. Table 11.5.1-2 Renewable Adjustment Credits

$$EC_{adj} = EC_{req} - PV_{adj} \times \left(1 - \frac{RA_{net}}{G_{floor} \times PV_{incl} \times 0.20}\right) \quad (11.5.1)$$

Table 11.5.1-1 Energy Credit Requirements by Building Use Type EC *req*

Building Use Type [a]	Climate Zone										
	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B
Multifamily [b]	50	50	50	50	50	50	46	50	50	48	50
Health care [c]	50	46	47	46	47	45	49	47	50	46	46
Hotel/motel	50	45	47	46	49	48	46	47	50	48	50
Office [d]	50	50	50	50	50	50	50	50	50	50	50
Restaurant [e]	50	50	50	50	50	50	50	50	50	50	50
Retail	50	50	50	50	50	50	50	50	50	50	50
Education [f]	50	50	50	50	50	50	50	50	50	50	50
Warehouse [g]	50	50	50	50	50	50	50	50	50	50	50
Other [h]	39	36	37	37	35	34	30	32	33	28	32

Table 11.5.1-2 Renewable Adjustment Credits

Building Use Type	PV_{adj} by Climate Zone											
	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C
Multifamily	6	7	8	7	8	18	16	19	20	13	13	14
Health care	3	3	3	3	3	4	3	4	7	5	7	3
Hotel/motel	4	8	9	9	9	12	10	13	8	9	10	8
Office	6	6	7	7	12	8	8	9	10	7	9	7
Restaurant	1	1	1	1	1	2	1	2	2	1	2	1
Retail	5	5	6	6	7	8	14	17	16	7	14	12
Education	5	6	7	6	7	9	16	14	12	11	11	9
Warehouse	20	20	20	20	20	20	20	20	20	19	20	20
Other	6	6	7	7	7	8	7	9	9	7	9	7

MCER 13-24: Section 11.5.2.2. Improved HVAC Performance and Section 11.5.2.3. Reduced Energy Use in Service Water Heating

- All credits only apply when using **non-gas-fueled** equipment except for commercial kitchen applications.
- Amendments to Section 11 focus on non-gas-fueled equipment to align with the County's electrification goal.

MCER 13-24: Informative Appendix H Additional Guidance for Verification, Testing and Commissioning

- Appendix H is incorporated as part of the provisions that establish standards of verification, testing, and commissioning to enhance the base functional performance testing and commissioning processes outlined in Sections 4.2.5, 5.9, 6.9, 7.9, 8.9, 9.9, 10.9, 12.2 (e) and G1.2.1 (e) of Standard 90.1.

MCER 13-24: Normative Appendix L Mechanical System Performance Rating Method, TSP

- Alternative Prescriptive Compliance Path

Compliance Path and Required Documents for Plan Review

Section 4.2.1 Compliance Path

Prescriptive Path

- Compliance requirements of Sections 4.2.2 through 4.2.5, and Sections 5, 6, 7, 8, 9, 10, 11

OR

- Compliance requirements of Section 4.2.2 through 4.2.5, and the Normative Appendix L If a project is qualified for TSPR compliance path (**Alternative prescriptive Compliance path**)

Threshold of Required Compliance Path:

Project Characteristics		Compliance Paths	
Work type	Gross floor area	Energy compliance path	Green building required
New construction, additions	Less than 5,000 ft²	Prescriptive (with or without Appendix L (TSPR)) **OR** Performance-Appendix G with PNNL-35193	No
	5,000 – 20,000 ft²	Prescriptive with Appendix L (TSPR) *If not eligible for Appendix L:* Prescriptive (Sections 4.2.2 through 4.2.5 and Sections 5 – 11) **OR** Performance-Appendix G with PNNL-35193 (Sections 4.2.2 through 4.2.5 and 5.4 through 10.4, G)	Yes
	Greater than 20,000 ft²	Performance-Appendix G with PNNL-35193	Yes
Alterations	n/a	Prescriptive **OR** Performance-Appendix G	No
First time tenant fit-out	n/a	Per base building design criteria and ASHRAE 90.1	Per base building

Documents Required for Plan Review in Compliance With ASHRAE 90.1 – 2022 and 2021 IgCC

Documents Required for Plan Review		
Work Type	**Prescriptive Path**	**Performance Path**
New Construction or Additions	1. Full COMcheck w/MCER 13-24 Amendment (see note #1 -#3) 2. Full set of HVAC load calculations, **or** 3. TSPR (see compliance path chart) if qualified 4. Narrative/schedule outlining the achieved credits per Section 11 5. Walk-in cooler or freezer specs for meeting all applicable requirements of Section 6.5.11 6. 2021 IgCC Checklist (> 5000 ft²) 7. Scorecard (e.g. NGBS) per compliance path for non-IgCC projects. 8. Commissioning plan if required	1. Energy Code Analysis Checklist _Mandatory Reqts. 2. Energy model analysis and reports 3. 2021 IgCC Checklist (> 5000 ft²) 4. Scorecard (NGBS or LEED if ACP) per compliance path for non-IgCC projects. 5. Commissioning plan if required
First-time Tenant Fit Outs	- Above items 1 through 8 if applicable - Tenant-Owner-Lease Agreement (see note #7 & #8)	Above items 1 through 5
Alterations	- Above 1 thru 5 and 8 if required	Above 1 thru 5
Other Projects	1.COMcheck may or may not required 2. Full set of HVAC load calculations	N/A

Notes for The Table (previous slide):

1. COMcheck analysis shall comply with ASHRAE 90.1-2022 and reflect the amendments of **MCER 13-24** Amendment.
2. The COMcheck report must be complete, including the Inspection Checklist with all the supporting documents for energy code compliance. When uploading to the PDox portal, include the "COMCheck" in the file name and submit it as a standalone PDF.
3. All energy compliance data used in COMcheck must be clearly specified in the construction documents.
4. Provide a full set of HVAC load calculations including both input and output data based on ASHRAE 183 for sizing the HVAC equipment.
5. When a performance path is required or selected, provide the Energy Code Analysis Checklist of all mandatory requirements instead of COMcheck, along with the energy simulation model and reports.
6. Please provide the IgCC Code Checklist for any new construction or additions exceeding 5,000 square feet.

DPS Commercial Building website:
https://www.montgomerycountymd.gov/DPS/divisions/commercial/index.html

Notes to the table (previous slide), cont.:

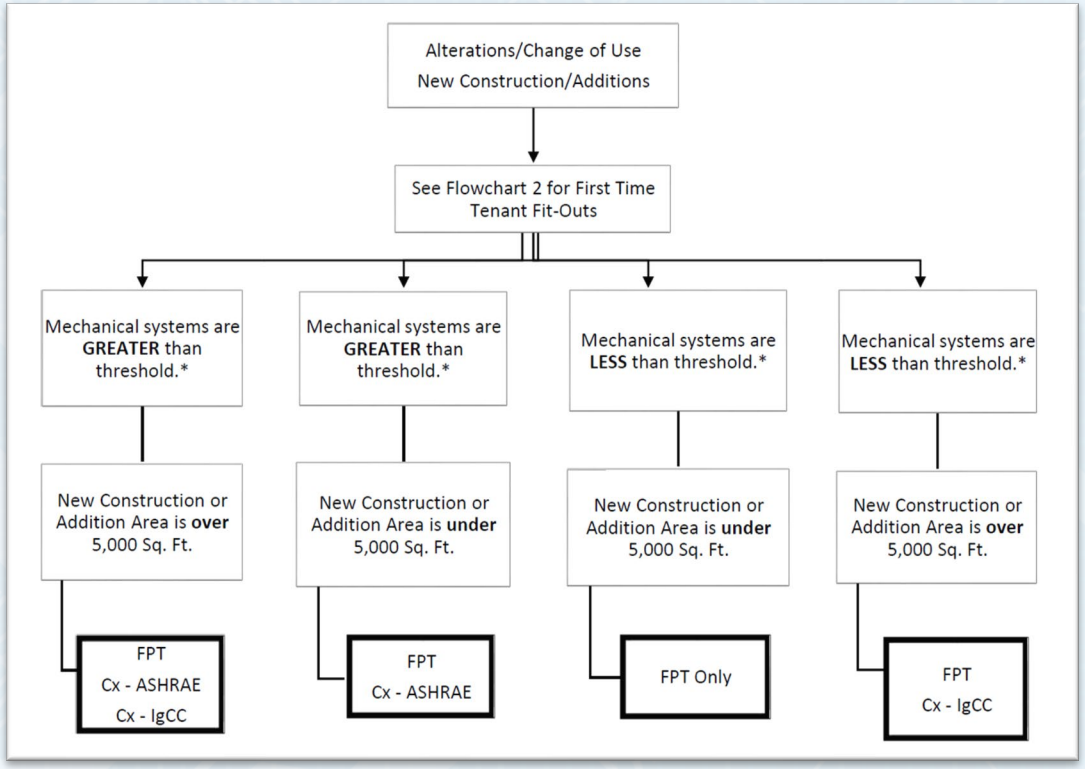
7. If the base building of a first-time tenant fit-out is in core and shell condition, provide a signed Tenant-Owner-Lease Agreement pertaining to the base building permitting package. Include only the sections that contain the green energy design criteria applicable for future tenant fit-outs. This document should clearly outline the energy design criteria following the energy and green building code as established by the base building MEP engineer to achieve the expected building energy performance.

7. Provide a narrative that explains how the energy performance of this tenant fit-out permit aligns with the base building requirements. The narrative should confirm that the base building MEP engineer or energy modeler has evaluated the energy performance and determined it to be within the anticipated energy performance target for the entire building.

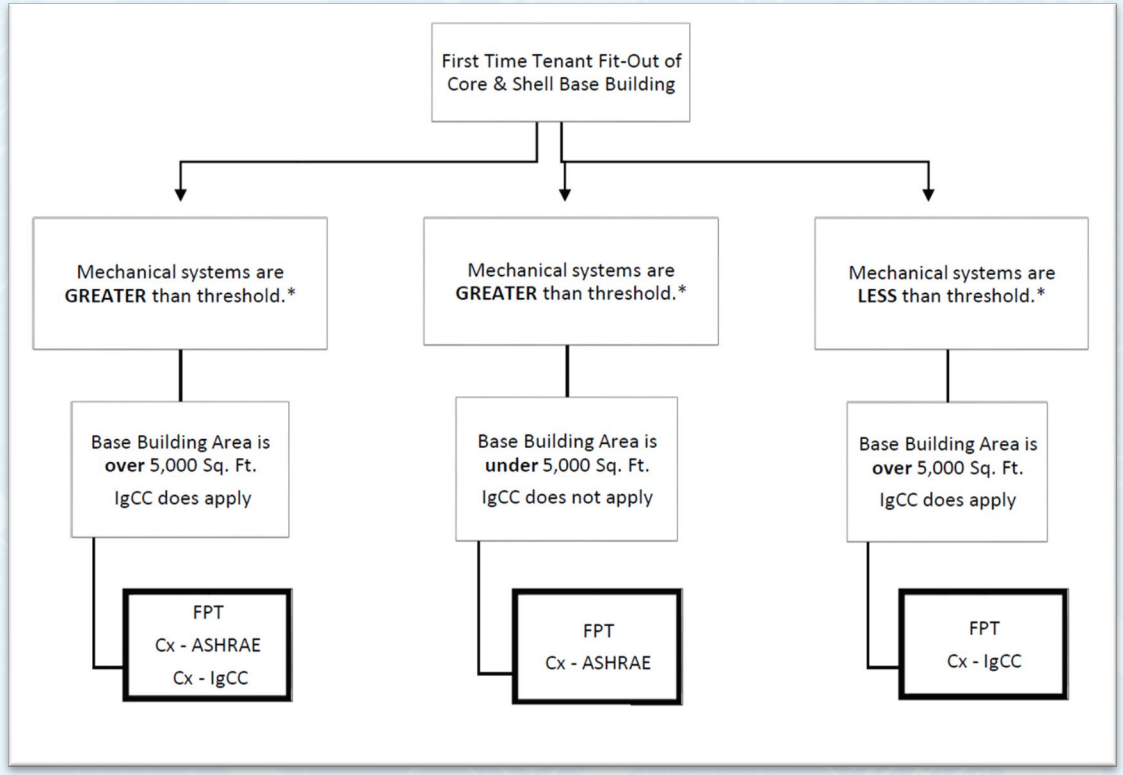
Commissioning and Final Energy Inspection

When is Commissioning Required?

Flowchart for Cx required



First-Time Tenant Fit-Out of Core & Shell Base Building (Flowchart 2)



*** Mechanical Systems Capacity Threshold for Tenant Spaces**

Total mechanical equipment capacity is both > 480,000 Btu/h cooling capacity and > 600,000 Btu/h combined service water-heating and space-heating capacity

When is Commissioning Required?

Flowchart 1 and Flowchart 2 depict the different scenarios when commissioning is required:

- Mechanical system capacity threshold
- Work types
- Gross floor area of the new construction or additions

Commissioning Plan

Compliance requirements: commissioning shall be performed on building envelope system, HVAC systems and controls, and lighting system and controls, etc.

- ASHRAE Standard 90.1 – 2022 with amendments. Sections 4.2.5, 5.9.2, 6.9.2, 7.9.2, 8.9.2, 9.9.2, 10.9.2, and G 1.2.1 (e), Appendix H.
- ASHRAE Standard 202, Commissioning Process for Buildings and Systems and ASHRAE Guidelines 0, The Commissioning Process
- IgCC 2021, Chapter 10 with amendments in addition to the above compliance requirements for new construction with > 5000 ft^2

Permit Submission

The review and approval of the Commissioning (Cx) plan and the qualifications of the Cx provider are essential parts of the plan review process. This must be completed before the permit can be issued. The following documents must be submitted with the permitting package:

a. Cx provider's credentials (certificates, working experiences for similar projects w/Cx)
b. The Cx provider may either be selected from the following list or have the required credentials listed in this document.
c. Cx plan

Pre-design and Design Phases

Obtain the Owner's Project Requirements (OPR) and Basis of Design (BoD). Identify the commissioning (Cx) scope of work, select a Cx provider, and develop an initial Cx plan. Provide a design review report and establish a Cx process team, which will include the owner's representatives, a design team representative, and a contractor representative, all led by the Cx provider. Responsibilities and roles for team members must be clearly defined and contractually assigned.

Permit Submission

The following documents must be submitted with the permitting package. The review and approval of the Cx plan and the qualifications of the Cx provider are part of the plan review process and must be completed before the permit can be issued:

1. Credentials of the Cx provider (certificates and experience with similar projects).
2. The Cx provider must possess the required credentials outlined in this document: https://www.montgomerycountymd.gov/DPS/Resources/Files/Green/Cx%20Approved%20Providers.pdf
3. The Cx plan.

Construction/Final Energy Inspection 550/081

Before the Final Energy Inspection (550/081), the following documents must be submitted to the Department of Public Service (DPS) for review and approval:

1. Testing, Adjusting, and Balancing (TAB) report
2. Preliminary commissioning report
3. Commissioning/Functional Performance (Cx/FP) compliance checklist
4. A letter of transmittal confirming that the building owner's authorized agent has received and accepted all required verification documents, Functional Performance Testing (FPT) documentation, and the preliminary commissioning report
5. Off-site renewable energy documents (PNNL-35193, Appendix G, performance path)
6. Proof of purchase for renewable energy: a) a renewable energy purchase agreement with contract terms, and/or b) for on-site renewable energy, an interconnection application form submitted to the local utility company

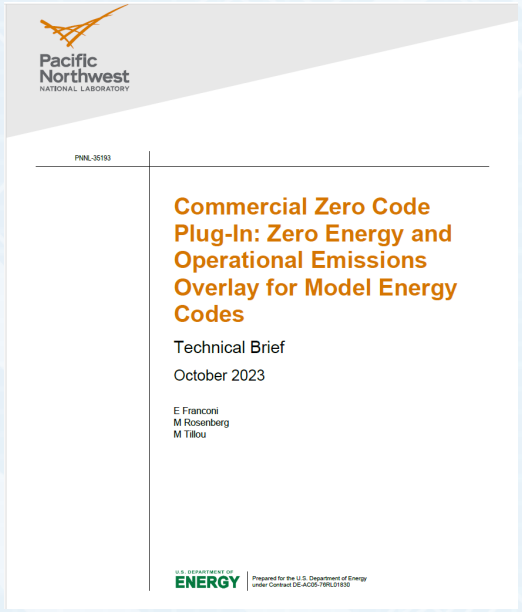
Occupancy and Post Occupancy

1. Final Cx plan and final construction Cx report to DPS prior to the occupancy
2. Deliver Project System Manual to the owner or own authorized agent with 90 days after the systems acceptance

Keith Walker

Energy Code Program Manager

Compliance Path Changes


Pacific Northwest
NATIONAL LABORATORY

PNNL-35193

Commercial Zero Code Plug-In: Zero Energy and Operational Emissions Overlay for Model Energy Codes

Technical Brief

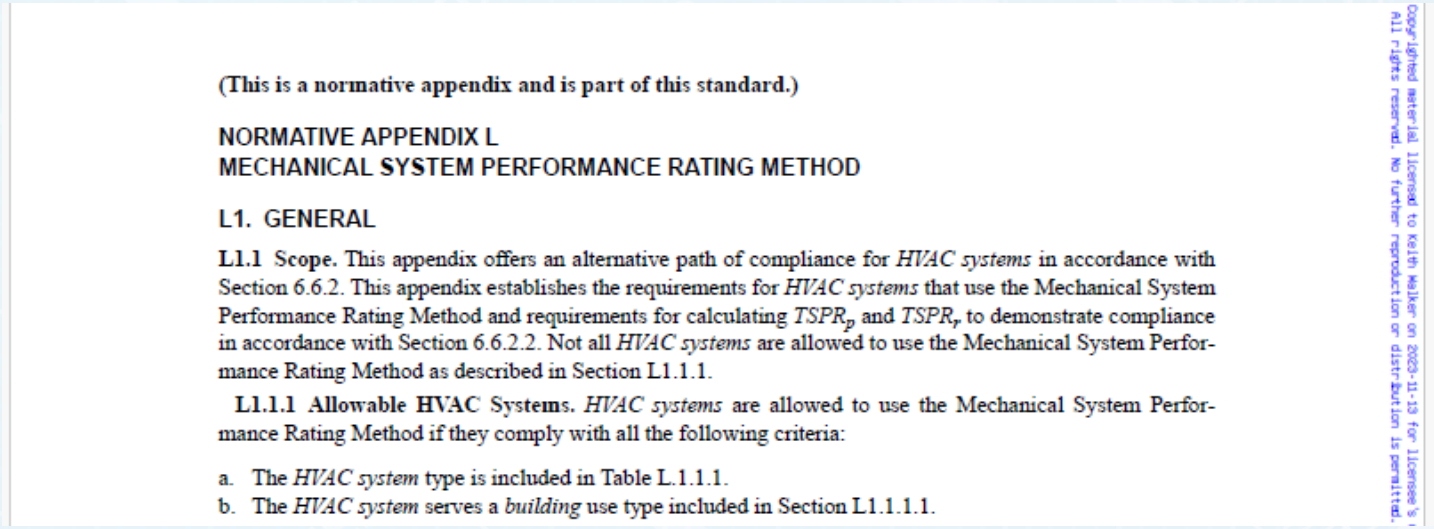
October 2023

E Franconi
M Rosenberg
M Tillou

U.S. DEPARTMENT OF ENERGY | Prepared for the U.S. Department of Energy under Contract DE-AC05-76RL01830

1) Performance Path – 90.1 Appendix G modified by PNNL-35193, Zero Code Plug-In PNNL is Pacific Northwest National Laboratory, Department of Energy.

2) Prescriptive Path - 90.1 Appendix L (TSPR – Total System Performance Ratio) for Section 6 HVAC Systems.


(This is a normative appendix and is part of this standard.)

NORMATIVE APPENDIX L
MECHANICAL SYSTEM PERFORMANCE RATING METHOD

L1. GENERAL

L1.1 Scope. This appendix offers an alternative path of compliance for *HVAC systems* in accordance with Section 6.6.2. This appendix establishes the requirements for *HVAC systems* that use the Mechanical System Performance Rating Method and requirements for calculating $TSPR_p$ and $TSPR_r$ to demonstrate compliance in accordance with Section 6.6.2.2. Not all *HVAC systems* are allowed to use the Mechanical System Performance Rating Method as described in Section L1.1.1.

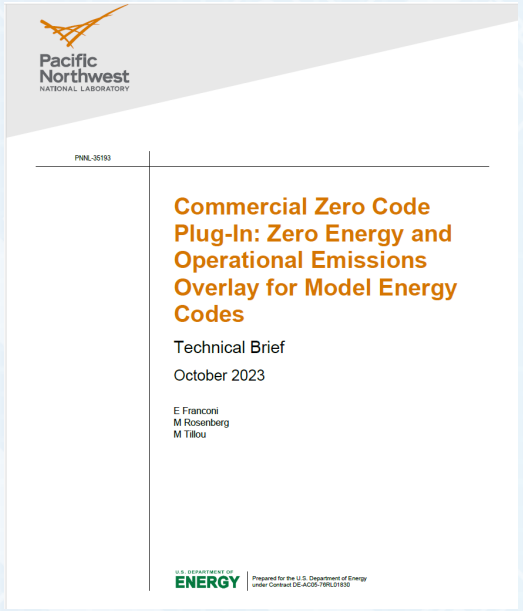
L1.1.1 Allowable HVAC Systems. *HVAC systems* are allowed to use the Mechanical System Performance Rating Method if they comply with all the following criteria:

a. The *HVAC system* type is included in Table L.1.1.1.
b. The *HVAC system* serves a *building* use type included in Section L1.1.1.1.

Performance-Appendix G with PNNL-35193

Project Characteristics		Compliance Paths	
Work type	Gross floor area	Energy compliance path	Green building required
New construction, additions	Less than 5,000 sf	Prescriptive (Sections 4.2.2 through 4.2.5 and Sections 5 - 11) (with or without Appendix L (TSPR)) **OR** Performance-Appendix G with PNNL-35193 (Sections 4.2.2 through 4.2.5 and 5.4 - 10.4)	No
	5,000 – 20,000 sf	Prescriptive with Appendix L (TSPR) If not eligible for Appendix L: Prescriptive **OR** Performance-Appendix G with PNNL-35193	Yes
	Greater than 20,000 sf	Performance-Appendix G with PNNL-35193	Yes
Alterations	n/a	Prescriptive **OR** Performance-Appendix G	No
First time tenant fit-out	n/a	Per base building design criteria and ASHRAE 90.1	Per base building

Performance-Appendix G with PNNL-35193 – Energy Efficiency Measure


Pacific Northwest
NATIONAL LABORATORY

PNNL-35193

Commercial Zero Code Plug-In: Zero Energy and Operational Emissions Overlay for Model Energy Codes

Technical Brief

October 2023

E Franconi
M Rosenberg
M Tillou

U.S. DEPARTMENT OF ENERGY | Prepared for the U.S. Department of Energy under Contract DE-AC05-76RL01830

PNNL-35193 ***Section 3.1*** (MCER 13-24 Amendment 08.00.02.118, pg. 28.)

- Replaces Section 4.2.1.1 and G1.2.2
- Separates energy backstop from renewable energy
- Site Performance Energy Index (PEI_{site}) (change from energy cost PCI)
- Updated BPF table (11% energy savings over 90.1-2022)
- PEI_{site} <= $PEI_{site,t}$

G1.2.2.1 Site Performance Energy Index Calculation

$$PEI_{site} = \frac{PBGEU_{site}}{BBEU_{site}}$$

Where:

PEI_{site} = Site Performance Energy Index.

$PBGEU_{site}$ = Proposed building gross site energy use, the regulated and unregulated site energy use of the *proposed design*, calculated in accordance with Appendix G, excluding the contribution of *on-site renewable energy* production and off-site renewable energy procurement.

$BBEU_{site}$ = baseline building design site energy use is the regulated and unregulated energy use of the baseline building design calculated in accordance with Section G1.2

$$PEI_{site,t} = \frac{BBUEU_{site} + BPF_{site} * BBREU_{site}}{BBEU_{site}}$$

Where:

$PEI_{site,t}$ = Site Performance Energy Index Target.

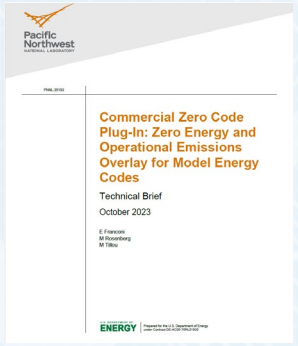
$BBUEU_{site}$ = *baseline building design* unregulated site energy use, the portion of the annual site energy use of a *baseline building design* that is due to *unregulated energy use.*

BPF_{site} = *building performance factor* site from Table 4.2.1.1-1. For *building* area types not listed in Table 4.2.1.1-1, use "All others." Where a *building* has multiple *building* area types, the required BPF shall be equal to the area-weighted average of the *building* area types based on their *gross floor area*.

$BBREU_{site}$ = *baseline building design* regulated site energy use, the portion of the annual site energy use of a *baseline building* design that is due to *regulated energy use*.

BBEUsite = *baseline* building *design* site energy use of a *baseline building design* that is due to both *regulated energy use* and *unregulated energy use*.

Performance-Appendix G with PNNL-35193 – Energy Efficiency Measure



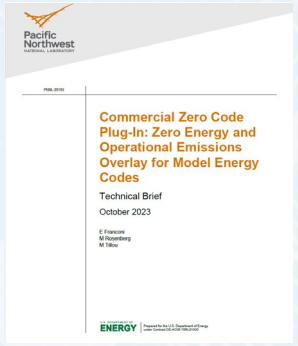
PNNL-35193 **Section 3.1**

- Replace Table 4.2.1.1 with the following table:

Table 4.2.1.1-1 Building Performance Factor (BPF_{site})

Building Type	Climate Zone																		
	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
Multifamily	0.55	0.54	0.58	0.56	0.59	0.59	0.61	0.59	0.56	0.49	0.56	0.53	0.46	0.51	0.53	0.44	0.47	0.45	0.47
Healthcare/ hospital	0.47	0.46	0.47	0.46	0.45	0.43	0.43	0.45	0.44	0.42	0.43	0.42	0.43	0.43	0.46	0.42	0.45	0.44	0.45
Hotel/motel	0.57	0.56	0.58	0.56	0.57	0.55	0.57	0.57	0.59	0.54	0.56	0.57	0.53	0.55	0.57	0.51	0.53	0.50	0.49
Office	0.40	0.40	0.40	0.39	0.38	0.38	0.37	0.39	0.34	0.34	0.37	0.35	0.35	0.37	0.35	0.34	0.35	0.31	0.33
Restaurant	0.57	0.52	0.52	0.51	0.54	0.48	0.55	0.52	0.55	0.55	0.55	0.56	0.57	0.58	0.57	0.59	0.61	0.60	0.61
Retail	0.38	0.36	0.35	0.35	0.32	0.30	0.31	0.31	0.31	0.31	0.31	0.33	0.34	0.31	0.34	0.34	0.33	0.33	0.34
School	0.40	0.42	0.44	0.42	0.40	0.37	0.40	0.37	0.40	0.31	0.35	0.39	0.32	0.36	0.38	0.32	0.31	0.30	0.32
Warehouse	0.20	0.21	0.17	0.19	0.16	0.16	0.18	0.15	0.13	0.25	0.18	0.20	0.31	0.25	0.20	0.36	0.30	0.32	0.35
All others	0.50	0.49	0.49	0.48	0.43	0.39	0.42	0.41	0.45	0.41	0.40	0.44	0.41	0.42	0.44	0.42	0.42	0.41	0.42

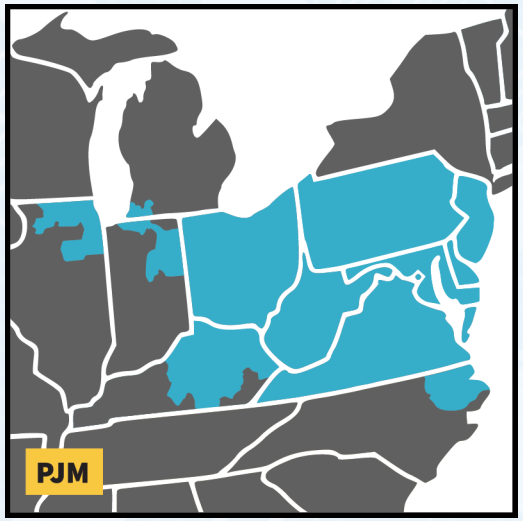
Performance-Appendix G with PNNL-35193 – Renewable Measure



- Site Zero Performance Energy Index ($PEI_{site,\,zero}$)
- $PEI_{site,\,zero} = \frac{PBNEU_{site}}{PBGEU_{site}}$ <= 0.67 (MCER 13-24 Amendment)

  $PBNEU_{site}$ = proposed net site energy (gross energy minus on- and off-site renewables)

  $PBGEU_{site}$ = proposed gross site energy use
- 33% of gross site energy use from renewable sources



Off-site

- Procurement factor = 1.0
- Must be within PJM territory

(MCER 13-24 Amendment)

G1.2.2.3.2 Off site contract terms. The total off-site renewable energy shall be delivered or credited to the *building site* under an energy contract with a duration of not less than 15 years. The contract shall be structured to survive a partial or full transfer of ownership of the building property.

G1.2.2.3.3 Renewable energy certificate documentation. The property owner or owner's authorized agent shall demonstrate that for an on-site or off-site renewable energy system required to comply this appendix, no RECs or EACS are associated with the renewable energy system or the following provisions for RECS and EACS shall be met:

1. The RECS and EACS are retained and retired by or on behalf of the property owner or tenant for a period of not less than 15 years;
2. The RECS and EACS are created within a 12-month period of the use of the REC; and
3. The RECS and EACS are from an asset placed in service no more than 5 years before the issuance of the certificate of occupancy.

Performance-Appendix G – Required Sections / Software

1. Required sections
   - Sections 4.2.2 through 4.2.5, and Mandatory Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4.

2. Simulation Program (Appendix G2)
   - Department of Energy:
     - Whole building energy simulation EnergyPlus https://www.energy.gov/eere/buildings/building-energy-modeling
   - Commercial software
     - TRACE 3D Plus 6.0 and later versions
     - Carrier Hourly Analysis Program (HAP)
   - Software qualified for calculating building tax deduction: https://www.energy.gov/eere/buildings/qualified-software-calculating-commercial-building-tax-deductions

Performance-Appendix G – Permit Submission

3. Required submittal to DPS for plan review (not an exhaustive list)
   a) Approved energy simulation tool
   b) Specified systems and components reported in the compliance form reflect design documents. All the pertinent data and features of the building, equipment, and systems used in the energy simulation analysis shall be identified with consistency and in sufficient detail in the construction documents.
   c) Specified systems and components meet the mandatory requirements in 90.1 Section 5-10.
   d) Required Reports
      - Building summary
      - Simulation inputs and outputs
        - Baseline model input and output
        - Proposed model input
      - Energy Results
      - Summary compliance report

Compliance Paths – Appendix L (TSPR)

Project Characteristics		Compliance Paths	
Work type	Gross floor area	Energy compliance path	Green building required
New construction, additions	Less than 5,000 sf	Prescriptive (Sections 4.2.2 through 4.2.5 and Sections 5 - 11) (with or without Appendix L (TSPR)) **OR** Performance-Appendix G with PNNL-35193 (Sections 4.2.2 through 4.2.5 and 5.4 - 10.4)	No
	5,000 – 20,000 sf	Prescriptive with Appendix L (TSPR) If not eligible for Appendix L: Prescriptive **OR** Performance-Appendix G with PNNL-35193	Yes
	Greater than 20,000 sf	Performance-Appendix G with PNNL-35193	Yes
Alterations	n/a	Prescriptive **OR** Performance-Appendix G	No
First time tenant fit-out	n/a	Per base building design criteria and ASHRAE 90.1	Per base building

Appendix L (TSPR)

Appendix L: Mechanical System Performance Rating Method, also known as Total System Performance Ratio (TSPR) (MCER 13-24 Amendment 08.00.02.160, pg. 51 and 08.00.02.118, pg. 30.)

- Prescriptive path 4.2.1.1(a), ACP for HVAC Section 6 (6.6.2), 6.4 mandatory.

Uncertain if TSPR tool for Montgomery Co. code will be ready by 3/31. If not, DPS will delay this requirement.

Projects Required to use TSPR: see L1.1.1 Allowable HVAC Systems, Building Use Types and Excluded HVAC Systems.

L1.1.1.1 Allowable Building Use Types. *HVAC systems* that serve the following *building* use types are allowed to use the Mechanical System Performance Rating Method:

a. Large office (*gross conditioned floor area* >150,000 ft^2 or >5 *stories*)
b. Medium office (*gross conditioned floor area* 5000 to 150,000 ft^2 and ≤5 *stories*)
c. Small office (*gross conditioned floor area* ≤5000 ft^2 and ≤5 *stories*)
d. Retail
e. Multifamily (including dormitory)
f. Hotel (including motel)
g. School (including education and university)
h. Other *building* use types that are <1000 ft^2 and <10% of the *building* conditioned floor area unless specifically excluded by Section L1.1.1.2(a)

Informative Note: Item (h) allows for a small sandwich or coffee counter service area but not a restaurant in an office *building* lobby or bookstore, for example.

L1.1.1.2 Excluded HVAC Systems. The following *HVAC systems* are excluded from using the Mechanical System Performance Rating Method:

a. *HVAC systems* serving one of the following excluded *building* areas:
   1. Data centers and *computer rooms* with *equipment* power density exceeding 20 W/ft^2 of conditioned floor area and exceeding 10 *kW* of *equipment* load
   2. Laboratories with fume hoods
   3. Locker rooms with more than four showers
   4. Cafeterias and dining rooms
   5. Restaurants and commercial kitchens with total cooking capacity greater than 100,000 Btu/h (does not include break rooms)
   6. Natatoriums or rooms with saunas
   7. Areas of *buildings* with commercial refrigeration *equipment* exceeding 100 *kW* of power input
b. *HVAC systems* that are not replaced in their entirety as part of an *alteration* and are not serving initial build-out *construction*

Appendix L (TSPR)

Simplified whole-building simulation, for HVAC system efficiency.

Use **site energy** (MCER 13-24 Amendment)

$$TSPR_p > \frac{TSPR_r}{MPF}$$

MPF's set above minimum prescriptive design but below highly efficient.

L5 Note 2 – MPF table reference is unclear; TSPR tool will provide calculation.

L2.1.5 Calculating TSPR. $TSPR_p$ shall be calculated according to Equation L-1:

$$TSPR_p = \frac{\text{Loads}_r}{\text{HVACinput}_p} \quad \text{(L-1)}$$

where

Loads_r = sum of the annual heating and cooling loads for the *TSPR reference building design* met by the *building HVAC system*, thousand Btu.

HVACinput_p = sum of the annual HVAC *energy* input for heating, cooling, fans, *energy* recovery, *pumps*, and heat rejection for the *proposed design*. The HVAC *energy* input units shall be in accordance with Section L5.

$TSPR_r$ shall be calculated according to Equation L-2:

$$TSPR_r = \frac{\text{Loads}_r}{\text{HVACinput}_r} \quad \text{(L-2)}$$

where

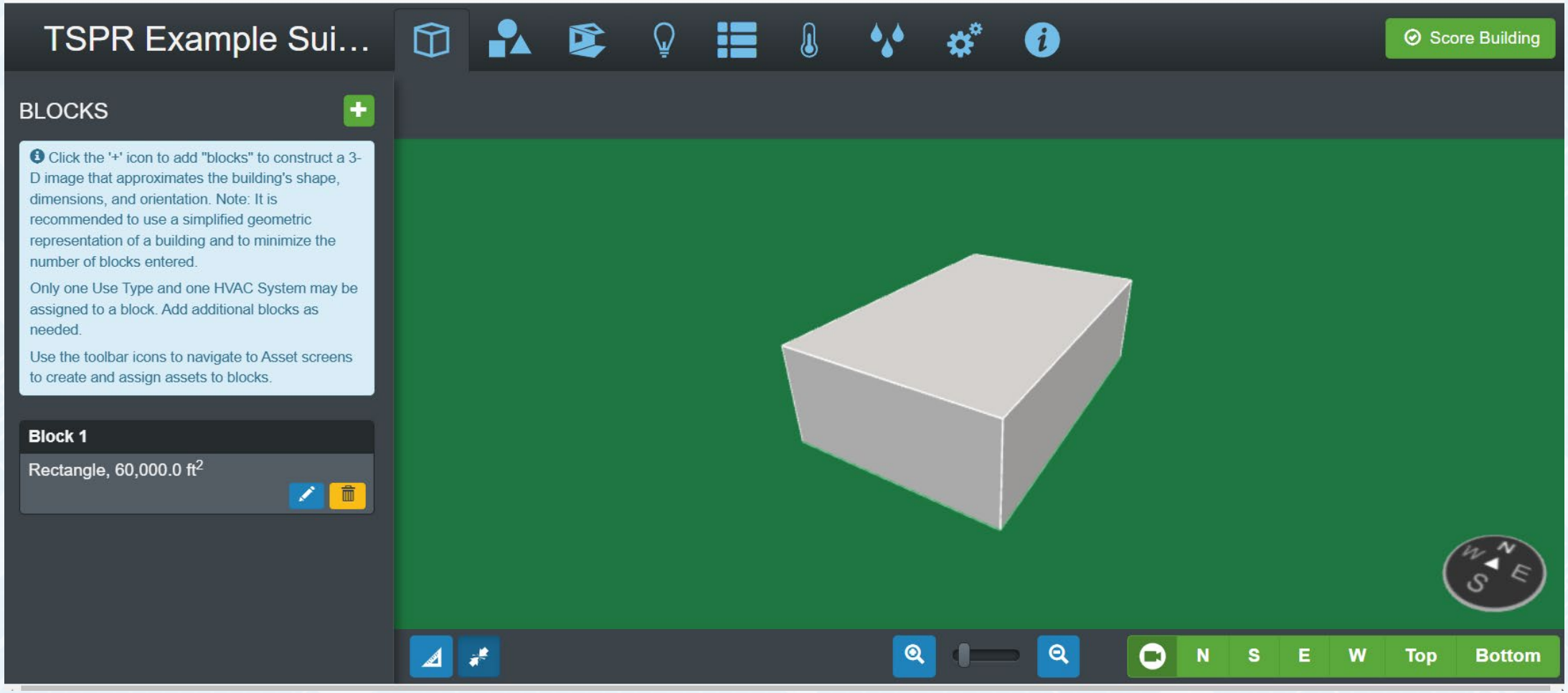
Loads_r = sum of the annual heating and cooling loads for the *TSPR reference building design* met by the *building HVAC system*, thousand Btu.

HVACinput_r = sum of the annual HVAC *energy* input for heating, cooling, fans, *energy* recovery, *pumps*, and heat rejection for the *TSPR reference building design*. The HVAC *energy* input units shall be in accordance with Section L5.

Compliance shall be documented by the design team according to L2.1.6 TSPR Submittals.

TSPR Tool – building geometry

- TSPR tool (Asset Score) : https://energycode.pnl.gov/HVACSystemPerformance/



TSPR tool – HVAC info

VRF Condenser Units | **Plant Loops** | Air Handlers | VAV Terminal Units | Zone Equipment

1. Create mechanical equipment schedules to enter all of the HVAC equipment present in the building.
2. Create HVAC Systems (Air Handlers or Zone Equipment, including VRF, Plant Loops and/or Terminal Units as needed)
3. Assign schedules to Systems (the tool will calculate weighted average equipment efficiency and subtract supply fan power for packaged equipment)
4. Assign Systems to Blocks on the Heating & Cooling screen (one System per block)

Plant Schedule Entries

Equipment ID	Quantity	Plant Type	Fuel Type	Condenser Type	Compressor Type	Design Approach (ΔT)	Design Range (ΔT)	Design Water Flow Rate (gpm)	Rated Capacity	Efficiency Units	Rated Full Load Efficiency	Calculated Full Load Efficiency	Part Load Efficiency	Calculated Part Load Efficiency
Chiller 1	1	Chiller	N/A	Water	Scroll/Sc	N/A	N/A	N/A	100.0 tons	COP	6.1	6.1 COP	6.7	6.7 COP
Boiler 1	1	Boiler	Natural (	Air / Water	N/A	N/A	N/A	N/A	960.0 MBH	Et	80.0	80.0% Et	N/A	N/A
Cooling Tower 1	1	Cooling Tower	N/A	N/A	N/A	7.0	10.0	280.0	N/A	gpm/hp	40.2	NA	N/A	N/A

Add Schedule Entry | Save Plant Schedule Entries

Plant Pump Schedule Entries

Equipment ID	Pump Type	Pump Control	Pump Power (W/gpm)	Pump Design Water Flow Rate (gpm)	Plant Loop System Assignment
Chiller pump 1	Primary	Constant Speed	4.0	230.0	Plant Loop 4
Chiller pump 2	Secondary	Variable Speed	12.0	230.0	Plant Loop 4
Boiler pump 1	Primary	Constant Speed	16.0	144.0	Plant Loop 2
Cooling Tower pump 1	Primary	Variable Speed	16.0	280.0	Plant Loop 3

References

- PNNL-35193 Commercial Zero Code Plug-In
  https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-35193.pdf
- ASHRAE/IES Standard 90.1-2022 Performance Path Changes
  https://www.ashrae.org/file%20library/technical%20resources/bookstore/part7_90.1-2022performancepathchanges.pdf
- Mechanical System Performance Rating Method
  https://www.ashrae.org/file%20library/technical%20resources/bookstore/part6_90.1-2022mechanicalsystemperformance.pdf
- ASHRAE 90.1 Energy Cost Budget and Performance Rating Method Submittal Review Manual
  https://www.energycodes.gov/sites/default/files/2024-08/90.1_Secton_11_and%29_Appendix_G_Review_Manual_V04.pdf
- PNNL-34451 Building Performance Standards and Energy Code Alignment
  https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-34451.pdf
- PNNL-32001 Expanded Energy and Load Management Credits in Energy Codes
  https://www.energycodes.gov/sites/default/files/2021-11/TechBrief_Energy-Load-Credits_2021Oct20.pdf
- PNNL-34990 Service Water Heating System Performance Approach for Energy Codes
  https://www.energycodes.gov/sites/default/files/2025-01/SWH_Performance_Tech_Brief_January_2025.pdf
- PNNL-34217 Energy Credits Application Guide https://www.energycodes.gov/sites/default/files/2023-07/901_Energy_Credits_Application_Guide_Final_07162023.pdf
- PNNL-31571 HVAC System Performance for Energy Codes
  https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-31571.pdf

Alyssa Mrvos

Green Building Program Manager

2021 IgCC Updates From 2018

- MoCo has moved from 2018 IgCC to **2021 IgCC**.
- MoCo has made a few significant Amendments to the 2021 IgCC to support the Climate Action Plan.
- Each new code cycle creates a **higher minimum standard** for buildings.
- IgCC comprises a wide range of sustainability topics.
- Not a rating system; sets specific minimum requirements.

Montgomery County's Holistic Approach to Achieve Net Zero Energy Buildings

Montgomery County has targets to reduce greenhouse gas emissions 80% by 2027 and 100% by 2035. The building sector comprises 50% of the County's community-wide greenhouse gas emissions. The building sector calls for focused attention to reach net zero energy.

- The 2021 IgCC is an important tool in the multi-faceted approach that Montgomery County is pursuing to achieve net zero energy buildings.

- The 2021 IgCC, as submitted in the **December 2024** Register, includes:
  - EV Requirements
  - Energy modeling options
  - Increased stringency
  - Building design improvements

Montgomery County IgCC Update

Sections (Chapters) Addressed:

- Chapter 1: Scope and Administration
- Chapter 3: Definitions, Abbreviations, and acronyms
- Chapter 5: Site sustainability
- Chapter 6: Water Use Efficiency
- Chapter 7: Energy efficiency
- Chapter 8: Indoor environmental quality
- Chapter 9: Materials and resources
- Chapter 10: Construction and plans for operation
- Appendices
- Alternative Compliance Path (ACP)

Chapter 1: Who IgCC Applies too

1. New buildings greater than 5,000 square feet in gross aggregate area and their systems.
2. New portions of buildings exceeding 5,000 square feet in gross aggregate square area and their systems.

Chapter 3: Definitions, Abbreviations, Acronyms

- Certain terms, abbreviations, and acronyms defined in this section
- Definitions are applicable to all sections of 2021 IgCC code

- **Electric Vehicle Supply Equipment (EVSE) Installed**: Fully Installed EVSE with connector (plug) with a minimum 208/240 volt, 40-amp circuits, including sufficient panel capacity, conduit, and wiring. Dedicated parking spaces shall be identified at original building permit submittal.

<u>Delete EV Ready Space and replace with:</u>

- **Electric Vehicle (EV) Ready**: has installed panel capacity and conduit, to accommodate future build-out of EV charging with minimum 208/240 volt, 40-amp circuits. Dedicated parking spaces shall be identified at original building permit submittal.
- **EV Capable**: has sufficient conduit (capable of facilitating 208/240 volt 40-amp) installed to accommodate future build-out of EV charging but lacks panel capacity, or dedicated parking spaces but shall have physical electrical equipment space available via additional sub-panel/additional dedicated panel(s).

Chapter 5: Site Sustainability

- Light pollution is typically caused by the way a light is emitted from lighting equipment.
  - 501.3.6 **Reduction of Light Pollution**
    - Backlight, uplight and glare.
- Creating pedestrian and **bicycle friendly** buildings/areas.
  - 501.3.7 Mitigation of Transportation Impacts
    - Pedestrian and Bicycle connectivity.
      - Pedestrian walkways
      - Bicycle paths
      - Bicycle parking, location, ability to lock, security & visibility & electric vehicle charging facilities.
- A plan for removal of debris from a construction site.
  - 501.3.8 **Building Site Waste Management**
    - Building site waste management plan requirements.

Chapter 6: Water Use Efficiency

Under the enforcement of WSSC

Chapter 7: Energy Efficiency

- **IECC/ASHRAE 90.1-2022 still apply**. However, this chapter has been replaced with the following:
- "This section specifies requirements for **EV Capable/Ready, Additional Electrical Infrastructure, and Mechanical System Performance Rating Method**."
- The mandatory provisions below are designed to prepare projects for future electrification in alignment with the Climate Action Plan and Bill 13-22.

- 701.3.1 EV Capable/Ready Parking.
- 701.3.2 Additional electric infrastructure.
- 701.3.2.1 Combustion space heating.
- 701.3.2.1.1 Low-capacity heating.
- 701.3.2.1.2 High-capacity heating.
- 701.3.2.2 Combustion water heating.
- 701.3.2.2.1 Low-capacity water heating.
- 701.3.2.2.2 High-capacity water heating.
- 701.3.3 Record Documents.
- 701.3.4 Electric infrastructure for energy storage.
- 701.3.4.1 Electrical service reserved space.

Chapter 7: Energy Efficiency Continued

- Table 701.3.1 in MoCo Amendments, shows the number of EVSE Ready and EVSE Capable parking spaces that are required for different types of buildings.
- ZTA 59-e-2.23 & 24 and federal requirements also apply.

TABLE 701.3.1				
	EVSE Installed	EVSE Ready	EVSE Capable	Total
Commercial Construction Residential use:				
Multi-family apartments, hotels, dormitories.	0%	25%	65%	90%
R-1, R-2	0%	25%	65%	90%
Longer dwell time visitor destinations:				
Business (B), Educational (E), Assembly (A), Factory (F) Institutional (I), *Residential (R-3, R-4)*, Large Mercantile > 50 spaces (M), S-2 parking garages, High Hazard (H)	0%	5% (10% employee parking)	20% (25% employee parking)	25 (35) %
Brief destinations:				
Small Mercantile (M) < 50 spaces, Storage (S except parking garages), Utility and Misc. (U)	0%	5%	5%	10%

Chapter 7: Energy Efficiency Continued

Section 701.4. Prescriptive option. Replace this Section with the following:

- Section 701.4.1 ASHRAE 90.1 2022 Normative Appendix L: Mechanical System Performance Rating Method mandatory for all prescriptive projects that are allowed to use this method according to L1. General.

  Building codes have historically used "prescriptive requirements" for energy efficiency, however these are not sufficient to ensure that buildings are consistently performing at an expected level of energy efficiency. Even if a building meets individual component requirements such as insulation values and HVAC equipment efficiency, the overall design may still not result in an expected level of energy efficiency. A better approach is to use computer software to model a building's energy use. The Mechanical System Performance Rating uses a simplified computer model of a building. It is included in this code cycle to introduce the building industry to this method for the subset of buildings that must comply with the Green Code and that are either office, retail, multifamily, or schools.

701.5 (7.5) Performance option. Delete.

The introduction of ASHRAE 90.1 2022 raises the performance bar to a level where the IgCC energy performance option is no longer needed.

Chapter 8: Indoor Environmental Quality (IEQ)

- This chapter has remained the same as the 2018 code, with one small addition:
  - 801.3.1.3 Filtration and air cleaner requirements letter d. Ozone emissions.
    - Air cleaning devices need to be labeled properly and shall not emit over 185 nanometers (nm) wavelengths.

Chapter 9: Materials and Resources

This chapter has remained the same as the 2018 code.

Chapter 10: Construction and Plans for Operation

- This chapter is set up in a different way than in IgCC 2018 ie. The section numbers are numbered differently.
- We added back one Section:
  - 1001.4.5 Construction and demolition waste management.
- For this chapter we have deleted one big section and two small sections (reported on next two slides). All other deletions remain the same from 2018.

Chapter 10: Construction and Plans for Operation Continued

MoCo has deleted 1001.3 since Commissioning (Cx) is required under ASHRAE 2022-90.1. However, there are portions of chapter 10 that are required to be included in the Cx Report:

- The following are requirements under Chapter 10 Construction and Plans for Operation 1001.2 and Montgomery County Amendments:
    1. Indoor Air Quality (IAQ) Construction Management (1001.4.2).
    2. Construction and Demolition Waste Management (1001.4.5).
    3. Acoustical Field Measurement (1001.5).
    4. Postconstruction Building Flush-out and air monitoring (1001.7).
    5. Plan for High-Performance Building Operation (1001.9, if applicable).

Chapter 10: Construction and Plans for Operation Continued

- For this chapter we have deleted two sections:
  - 1001.6 Building envelope airtightness – ASHRAE 2022-90.1 is more strict.
  - 1001.10 Service life plans.

Appendices

These appendices help DPS determine alternative compliance pathways (ACP) for IgCC.

- Appendix L: Informative Appendix L has been adopted in its entirety.
- Appendix M: Informative Appendix M Sections 101.1.3, 101.1.4, and 101.1.5 are adopted.

Alternative Compliance Path (ACP)

- Projects that wish to **utilize an ACP** to the IgCC must follow certain steps.
- We will have an updated 2021 IgCC Reference Sections sheet on our website explaining the steps to follow.
- The **biggest change** from 2018 to 2021 ACP is (building size requirements apply):
  - Mandatory provisions have been replaced to add EV capable requirements and subsections.
  - Amended Chapter 7 Prescriptive path which has been replaced with Normative Appendix L –TSPR and,
  - PNNL-35193 Technical Brief: Section 3.1 Net Zero Energy.

Questions and Answers

Contact Information:

- Bryan Bomer: bryan.bomer@montgomerycountymd.gov
- Mark Nauman: mark.nauman@montgomerycountymd.gov
- Ye Jiang: ye.jiang@montgomerycountymd.gov
- Anne Hawley: anne.hawley@montgomerycountymd.gov
- Alyssa Mrvos: alyssa.mrvos@montgomerycountymd.gov
- Keith Walker: keith.walker@montgomerycountymd.gov

DEPARTMENT OF PERMITTING SERVICES

PODCAST

MONTGOMERY COUNTY GOVERNMENT

eSolar

DEPARTMENT OF PERMITTING SERVICES

Montgomery County
Department of Permitting Services

DPS | YOUR PROJECT PARTNER