

# 2021 WSEC COMMERCIAL – ADDITIONAL ENERGY EFFICIENCY AND LOAD MANAGEMENT MEASURES



**WSEC Commercial Technical Support Team:**

Lisa Rosenow – Evergreen Technology Consulting (ETC)

Duane Lewellen – Lewellen Associates, LLC

(360) 539-5300 | [com.techsupport@waenergycodes.com](mailto:com.techsupport@waenergycodes.com)

# WSEC Commercial Technical Support

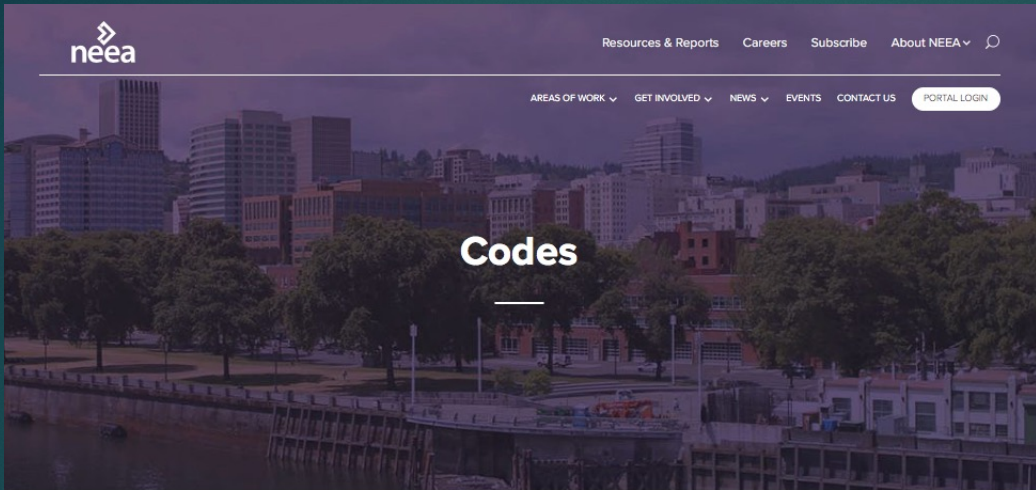
- ▶ On-call technical support thru 3 avenues
  - Telephone hot line – **360-539-5300**
  - Online form – **<https://www.waenergycodes.com>**
  - Email inquiries – **[com.techsupport@waenergycodes.com](mailto:com.techsupport@waenergycodes.com)**
- ▶ Classroom and webinar training
- ▶ We administer the technical support and compliance documentation webtool



Duane Lewellen



Lisa Rosenow



## Increasing progressive effectiveness of energy codes

The NEEA Codes and Standards program supports regional stakeholders in the development and adoption, training and implementation of energy codes. States engage in the code development process along different cycles and code versions, but all states now use the International Energy Conservation Code (IECC) as a baseline for their commercial energy codes. All states except Oregon now use the IECC as the basis of their residential code. The adoption of codes is the responsibility of state code boards or agencies. Official state-by-state energy code information can be found on state building code websites:

Idaho - <http://dbs.idaho.gov/boards/index.html>

Oregon - <http://www.cbs.state.or.us/external/bcd/>

Washington - <https://sbcc.wa.gov/>

Montana - <http://svc.mt.gov/gov/boards/>



### Idaho

David Freelove, Idaho Circuit Rider  
[davidfreelove@yahoo.com](mailto:davidfreelove@yahoo.com)



### Montana

Carl Little [carl@ncat.org](mailto:carl@ncat.org) or Paul  
Tschida [ptschida@mt.gov](mailto:ptschida@mt.gov)



### Oregon

Residential: Roger Kainu  
[roger.kainu@state.or.us](mailto:roger.kainu@state.or.us)  
Commercial: Blake Shelide  
[blake.shelide@state.or.us](mailto:blake.shelide@state.or.us)



### Washington

Residential:  
[energycode@energy.wsu.edu](mailto:energycode@energy.wsu.edu)  
Commercial:  
[com.techsupport@waenergycodes.com](mailto:com.techsupport@waenergycodes.com)

WSEC technical support services are made possible thanks to the generous support of the Northwest Energy Efficiency Alliance

[www.neea.org](http://www.neea.org)

# Today's Presentation

- ▶ This presentation represents ETC's **unofficial** interpretation of code intent.
- ▶ Our technical support team is not an affiliate, nor do we speak for the Washington State Building Code Council (SBCC).
- ▶ The technical support we provide is advisory only and non-binding.



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# Topics we'll discuss today ~

1. Efficiency measure and load management measure credits required by occupancy & project type
2. Credit requirements for existing building alterations
3. Additional efficiency credits required for the fossil fuel compliance path
4. Summary of additional energy efficiency measures (AEM)
5. Summary of load management measures (LMM)
6. Credit requirements for tenant spaces (initial TI)
7. Discrete area weighting of credits by occupancy group
8. Correlation between renewable energy prescriptive requirements and energy efficiency measure requirements
9. Q&A



# Additional Energy Efficiency and Load Management Measures

Additional Energy  
Efficiency Credits

# Multidiscipline Effort

- ▶ List of measures include strategies for all primary disciplines (envelope, lighting/electrical, mechanical, service water heating)
- ▶ Multidiscipline collaboration to select which combination of measures are most suitable for the project
- ▶ Document selected measures and credit value in permit submittals



# Two Types of Required Measures

## **C406.2 Additional Energy Efficiency Measures (AEM)**

- ▶ **Purpose** – Focus of these measures is to enhance overall building energy performance by incorporating various better than code strategies
- ▶ In addition to complying with all applicable mandatory and prescriptive provisions for each discipline, a project is required to achieve a minimum number of AEM credits
- ▶ **NEW in the 2021 WSEC-C**
  - Number of required AEM credits varies by occupancy group
  - There are now **32** different measures to choose from
  - Credit value of each AEM is based on modeled energy efficiency potential by occupancy group



Which project types are required to comply with additional energy efficiency measures?

- ▶ New buildings, including shell & core
- ▶ First occupancy build-out of a tenant space (initial TI)
- ▶ Building additions
- ▶ Change in space conditioning or occupancy alterations (as defined in Section C505) shall comply in the same manner as a building addition
- ▶ All other alterations are **NOT** required to comply with C406 per Section C503.1

C406.1  
C406.1.1  
C503.1  
C505.1.1

## Do the AEM provisions only apply to conditioned spaces?

- ▶ **NO** – AEMs apply to all levels of space conditioning including unconditioned, low energy, semi-heated and fully conditioned
- ▶ Applies to all enclosed spaces and unenclosed parking garages (categorized as low energy)
- ▶ Does not apply to **exterior building areas** such as covered canopies, courtyards under building overhangs, roof decks, unenclosed upper deck of parking structure
- ▶ Does not apply to **exterior site areas** such as surface parking, outdoor plazas, landscape areas, covered transit station platforms

Refrigerated warehouses are also within the scope of this provision.  
Requesting clarification on this detail...stay tuned!

**C406.1**  
**C406.1.1**

# Two Types of Required Measures

## **NEW – C406.3 Load management measures (LMM)**

- ▶ **Purpose** - Focus of these measures is to reduce peak energy demand by incorporating automatic control of building systems based on demand and energy storage
- ▶ In addition to complying with AEM credits, a project is required to achieve a minimum number of LMM credits
- ▶ Number of required LMM credits varies by occupancy group
- ▶ Credit value of each LMM is based on modeled potential reduction of peak energy demand by occupancy group

Which project types are required to comply with load management credit measures?

- ▶ **New buildings greater than 5,000 SF**
- ▶ Does **NOT** apply to:
  - First occupancy build-out of a tenant space (initial TI)
  - Building additions
  - All alterations, including spaces undergoing a change in space conditioning or occupancy
  - Unconditioned and low energy spaces
  - Equipment buildings
  - Open and enclosed parking garages
  - Warehouses

# How many credits are required for additional energy efficiency?

**TABLE C406.1  
ENERGY MEASURE CREDIT REQUIREMENTS**

Required Credits for Projects	Section	Occupancy Group					
		Group R-1	Group R-2	Group B	Group E	Group M	All Other
New building energy efficiency credit requirement	C406.2	54	41	42	48	74	49
Building additions energy efficiency credit requirement	C406.2	27	20	21	23	36	21
New building load management credit requirement	C406.3	12	15	27	15	13	26



Number of required credits is based upon the project scope and the occupancy group

# How many credits are required for additional energy efficiency?

- ▶ **Exceptions** reduce the minimum required number of **AEM credits by 50%** for the following spaces:
  - Unconditioned and low energy spaces
  - Equipment buildings
  - Open and enclosed parking garages
  - Building additions with less than 1,000 SF of conditioned floor area
- ▶ Credit weighting for unconditioned building areas is based on the "All Other" occupancy category, regardless of actual occupancy

# How many credits are required for load management?

**TABLE C406.1  
ENERGY MEASURE CREDIT REQUIREMENTS**

Required Credits for Projects	Section	Occupancy Group					
		Group R-1	Group R-2	Group B	Group E	Group M	All Other
New building energy efficiency credit requirement	C406.2	54	41	42	48	74	49
Building additions energy efficiency credit requirement	C406.2	27	20	21	23	36	21
New building load management credit requirement	C406.3	12	15	27	15	13	26



Number of required credits is based upon the project scope and the occupancy group

# Total Building Performance

## Exemption for the C406 requirements

- ▶ Projects complying under the C407 Total Building Performance path are not required to comply with C406
- ▶ Energy savings potential of C406 measures are captured in the Building Performance Factors defined in Table C407.3(2) for each occupancy type, which are used in the whole building energy model
- ▶ **C406.1.1 Tenant Spaces Exception 1** – If a shell and core project complied via C407 Total Building Performance, subsequent tenant space projects are exempt from the C406 requirements



# Total Building Performance

## **Additional advantages of the C407 Compliance Path**

- ▶ Modeled energy performance accounts for integrated effects of multiple strategies
- ▶ Can claim energy savings potential for strategies that are not included in the AEM list
- ▶ Utilizes the comprehensive energy model methodology per ANSI/ASHRAE/IESNA 90.1 Appendix G

# Additional Energy Efficiency Measure Categories



Envelope – Thermal & air leakage



Lighting – Controls & lighting power



HVAC – Equipment efficiency, controls, ER, DOAS, TSPR



SWH – Equipment type, sizing, ER, temp maintenance



Low carbon district energy systems



Kitchen & laundry equipment



On-site & off-site renewable energy



Elevators

ER = Energy Recovery

DOAS = Dedicated OSA system

TSPR = Total system performance ratio

**TABLE C406.2(1)  
EFFICIENCY MEASURE CREDITS**

Measure Title	Applicable Section	Prorating Flag	Occupancy Group					
			Group R-1	Group R-2	Group B	Group E	Group M	All Other
25. Enhanced envelope performance <sup>9</sup>	C406.2.12	Heat	24	20	13	5	19	14
26. Base reduced air leakage <sup>9</sup>	C406.2.13.2		29	24	6	3	9	11
27. Enhanced reduced air leakage <sup>9</sup>	C406.2.13.3	Heat	53	44	11	5	16	20
28. Enhanced commercial kitchen equipment	C406.2.14	Heat	30 <sup>h</sup>	18 <sup>h</sup>	18 <sup>h</sup>	30 <sup>h</sup>	30 <sup>h</sup>	31 <sup>h</sup>
29. Enhanced residential kitchen equipment	C406.2.15	Heat	12	19	NA	NA	NA	NA
30. Enhanced residential laundry equipment	C406.2.16	Heat	NA	6	NA	NA	NA	NA
31. Heat pump clothes dryers	C406.2.17	Heat	6	6	NA	NA	NA	NA
32. Efficient elevator equipment	C406.2.18	Heat	3	5	5	5	4	4

Envelope,  
elevator,  
kitchen &  
laundry  
equipment

Number of available AEMs has substantially expanded

**TABLE C406.2(1)  
EFFICIENCY MEASURE CREDITS**

Measure Title	Applicable Section	Prorating Flag	Occupancy Group					
			Group R-1	Group R-2	Group B	Group E	Group M	All Other
9. 10% reduced lighting power	C406.2.3.1	Heat	7	4	18	16	20	15
10. 20% reduced lighting power <sup>d</sup>	C406.2.3.2	Heat	13	8	36	32	40	29
11. Lamp efficacy improvement	C406.2.3.3	Heat	5	6	NA	NA	NA	NA
12. Residential lighting control	C406.2.4.1	Heat	NA	8	NA	NA	NA	NA
13. Enhanced lighting control	C406.2.4.2	Heat	1	1	6	6	11	6
14. Renewable energy	C406.2.5		7	12	13	13	10	11

Lighting power & controls, renewable energy

Value of each AEM is based on modeled energy efficiency potential, or renewable energy benefit, by occupancy group

**TABLE C406.2(1)  
EFFICIENCY MEASURE CREDITS**

Measure Title	Applicable Section	Prorating Flag	Occupancy Group					
			Group R-1	Group R-2	Group B	Group E	Group M	All Other
1. Dwelling unit HVAC control	C406.2.2	Heat	NA	7	NA	NA	NA	NA
2. Improved HVAC TSPR <sup>a</sup>	C406.2.2.1	Heat	NA	8	11	17	22	NA
3. Improve cooling and fan efficiency	C406.2.2.2	Heat	2	2	3	4	3	2
4. Improve heating efficiency	C406.2.2.3	Heat	2	3	3	10	16	7
5. Improved low-carbon district energy system (10% better)	C406.2.2.4		3	3	4	11	17	8
6. Improved low-carbon district energy system (20% better) <sup>b</sup>	C406.2.2.5		9	10	12	33	52	24
7. High performance DOAS	C406.2.2.6	Heat	31	31	21	39	40	21/ (A) 40 <sup>c</sup>
8. Fault detection & diagnostics (FDD)	C406.2.2.7	Heat	2	2	2	6	9	4

HVAC systems,  
low-carbon district energy systems

**TABLE C406.2(1)  
EFFICIENCY MEASURE CREDITS**

Measure Title	Applicable Section	Prorating Flag	Occupancy Group					
			Group R-1	Group R-2	Group B	Group E	Group M	All Other
15. Shower drain heat recovery	C406.2.6.1	SWH	9	30	NA	3	NA	NA
16. Service water heat recovery	C406.2.6.2	SWH	35	111	13	14	(Grocery) 41 <sup>e</sup>	NA
17. Heat pump water heating	C406.2.6.3	SWH	72	54	1	13	(Grocery) 5 <sup>e</sup>	29 <sup>f</sup>
18. High efficiency service water heating, gas-fired	C406.2.6.4	SWH	NA	NA	NA	NA	NA	NA
19. Heat trace system	C406.2.7.1	SWH	6	13	4	1	NA	6
20. Point of use water heater	C406.2.7.2	SWH	NA	NA	19	5	NA	NA
21. Service hot water distribution right sizing	C406.2.8		13	42	NA	NA	NA	NA
22. High performance service hot water temperature maintenance system	C406.2.9		6	13	4	1	NA	6
23. High efficiency service hot water circulation system	C406.2.10		3	6	2	1	NA	4
24. Low flow residential showerheads	C406.2.11	SWH	3	3	NA	NA	NA	NA

Service water heating equipment & systems

# Load Management Measure Categories



Envelope Optimization



Lighting Load Management



HVAC Load Management



Energy Storage – Electric, Chilled Water,  
Service Hot Water

# Load Management

**TABLE C406.3  
LOAD MANAGEMENT MEASURE CREDITS**

Measure Title	Applicable Section	Occupancy Group					
		Group R-1	Group R-2	Group B	Group E	Group M	All Other
1. Lighting load management	C406.3.1	12	15	27	15	NA	NA
2. HVAC load management	C406.3.2	29	24	42	23	13	26
3. Automated shading	C406.3.3	NA	7	12	16	NA	NA
4. Electric energy storage	C406.3.4	41	50	126	72	37	65
5. Cooling energy storage	C406.3.5	13	10	14	19	NA	14
6. Service hot water energy storage	C406.3.6	31	248	59	8	5	70
7. Building thermal mass	C406.3.7	NA	NA	50	95	96	80

Value of each LMM is based on modeled potential reduction of peak energy demand by occupancy group

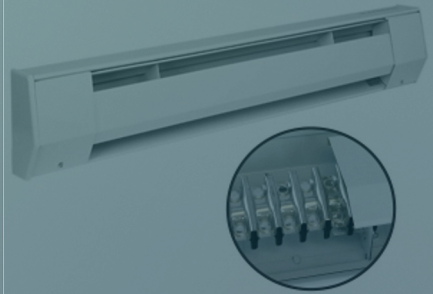


# Load Management

## **Load management measure general requirements**

- ▶ Each measure shall have automatic controls activated by either:
  - Utility demand response
  - Utility price response signal
  - Peak price period time control
  - Local building demand monitoring
- ▶ Load management measures include required sequences of operation
  - Controls configured to provide the required load management sequences
  - All equipment associated with required load management sequences shall have controls connected to a central DDC system

# Space Heating & SWH Compliance Paths



# NEW Heat Pump Prescriptive Compliance Path

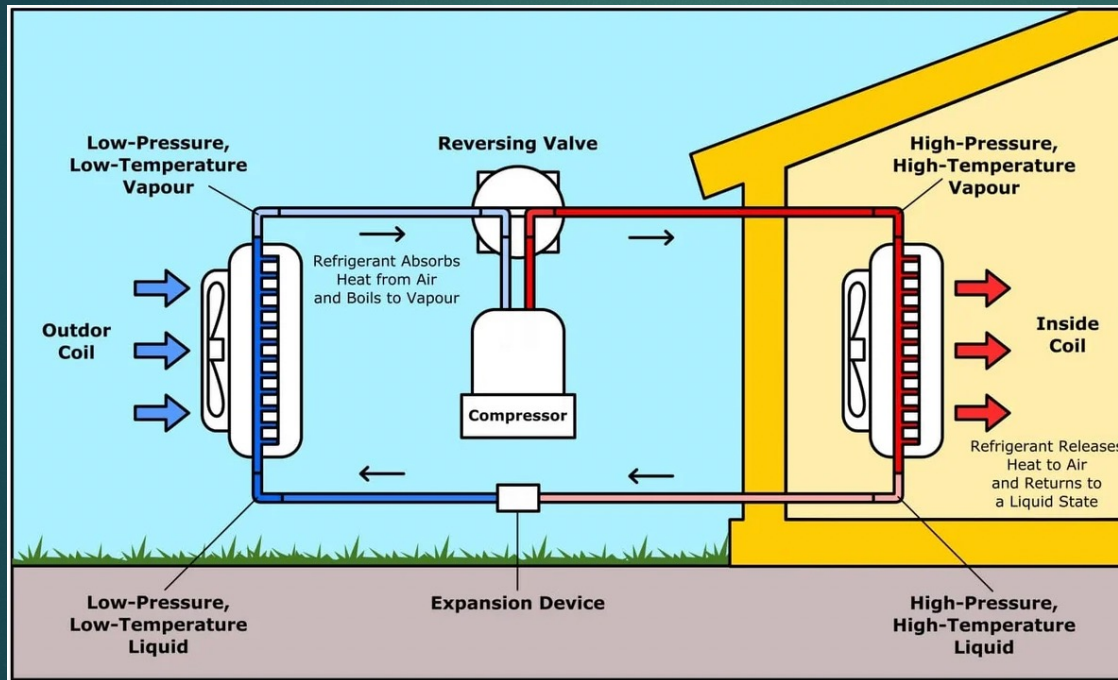
## Equipment type criteria for space heating and service water heating (SWH)

### ▶ NEW Prescriptive Path

- Section C403.1.4 requires **heat pumps** as the primary source of space heating energy capacity
- Section C404.2.1 requires **heat pump water heaters (HPWH)** as the primary source of SWH energy capacity for at least 50% of the calculated peak demand
- ▶ Electric resistance and fossil fuel equipment are only allowed via an exception to these provisions, or by complying with the **Fossil Fuel Compliance Path**

C401.3  
C403.1.4  
C404.2.1

# Why Heat Pumps?



Heat pumps use phase change to move heat from one place to another by taking advantage of the energy released when refrigerant changes state from a low temp liquid to a high temp vapor

# Equipment Efficiency Comparison

	COP
<b>FOSSIL FUEL SPACE HEATING</b>	<b>0.80 - 0.90</b>
<b>ELECTRIC RESISTANCE SPACE HEATING</b>	<b>1.0</b>
<b>ELECTRIC HEAT PUMP SPACE HEATING</b>	<b>2.0 - 5.0</b>

**COP = Energy Output/Energy Input**

# Fossil Fuel Compliance Path

## Additional energy credits

- ▶ Alternative compliance path for project areas that are served by fossil fuel or electric resistance space heating and/or service water heating (SWH) appliances
- ▶ **Additional AEM credits are required per Table C401.3.3, which is in addition to the number of AEM credits required in C406.2**
- ▶ Discrete area weighting of additional AEM credits for the fossil fuel compliance path is applied in the same manner as C406.2 AEM credits
- ▶ **Use adjusted AEM credit values in Table C406.2(2)** for the fossil fuel compliance path, DO NOT use Table C406.2(1) credit values

C401.3

C401.3.3.1

C401.3.3.2

Table C406.2(2)

# Fossil Fuel Compliance Path

**TABLE C401.3.3  
ADDITIONAL CREDITS REQUIRED**

Measure Title	Applicable Section	Occupancy Group					
		Group R-1	Group R-2	Group B	Group E	Group M	All Other
New building - Additional efficiency credits required for space heating systems using the fossil fuel pathway	C401.3.3.1	7	24	101	38	111	56
New building - Additional efficiency credits required for service water heating systems using the fossil fuel pathway	C401.3.3.2	198	212	27	17	79	107
Building additions - Additional efficiency credits required for space heating systems using the fossil fuel pathway	C401.3.3.1	4	12	51	19	56	28
Building additions - Additional efficiency credits required for service water heating systems using the fossil fuel pathway	C402.3.3.2	99	106	14	9	40	54

Number of additional required credits is based on the project type, occupancy group **and** heating system type

# Fossil Fuel Compliance Path – Required Credits Example

## New Retail Center (Group M) complying via SWH Fossil Fuel Path

- ▶ Required **AEM credits** per Table C406.1 = **74 credits**
- ▶ Required **additional energy credits** per Table C401.3.3 = **79 credits**

**Total required = 153 credits**

**TABLE C406.1  
ENERGY MEASURE CREDIT REQUIREMENTS**

Required Credits for Projects	Section	Occupancy Group					
		Group R-1	Group R-2	Group B	Group E	Group M	All Other
New building energy efficiency credit requirement	C406.2	54	41	42	48	74	49

**TABLE C401.3.3  
ADDITIONAL CREDITS REQUIRED**

Measure Title	Applicable Section	Occupancy Group					
		Group R-1	Group R-2	Group B	Group E	Group M	All Other
New building - Additional efficiency credits required for service water heating systems using the fossil fuel pathway	C401.3.3.2	198	212	27	17	79	107





# Area-Weighting Of Measures



# Area-Weighting

## Multiple ways to apply area-weighting to AEMs and LMMs

1. Whole building measures area-weighted by occupancy group in a mixed occupancy building
2. Different measures applied to each occupancy group area in a mixed occupancy building
3. Different measures applied to each tenant space area within a multi-tenant building (with same or different occupancies)
4. Measures area-weighted by discrete area within a building occupancy or tenant space

# Mixed Occupancy Buildings

## Area-weighting whole building measures by occupancy group

- ▶ **Total required credits** for the building are determined by area-weighting the required number of credits for each occupancy
- ▶ **Achieved whole building AEM & LMM credits** are calculated in a similar manner, where the occupancy-based credit values are area-weighted for each occupancy
- ▶ Each occupancy is also permitted to comply with a different combination of measures (i.e. mix & match)



C401.3.5  
C406.1.2

# Tenant Spaces

## **AEM requirements for tenant spaces**

- ▶ *Each tenant space shall achieve the required number of AEM credits based on the tenant space occupancy*
- ▶ Each tenant space is permitted to comply with a different combination of measures (i.e. mix & match)
- ▶ Credit value of each measure is based on the occupancy group of the tenant space
- ▶ LMM credits are not required for tenant spaces

### TERMINOLOGY:

Tenant space = Initial tenant improvement

# Shell & core + tenant space

## Projects that straddle code editions

- ▶ Credits achieved under the shell & core project may be carried over to the tenant spaces
- ▶ If whole building envelope, renewable energy or elevator AEMs were achieved in the shell & core project under the 2018 WSEC-C, each achieved credit shall be **multiplied by six** to determine the credit value of the measure under the 2021 WSEC-C
- ▶ HVAC and SWH measures may also carryover from a 2018 WSEC-C shell & core project to the tenant space, various limitations apply
- ▶ When the overall building is completed (shell & core + tenant space), all areas shall comply with the required number of credits per the 2021 WSEC-C

C406.1.1

C406.1.1.1

C406.1.1.2

# Discrete areas

## Area-weighting measures applied to specific areas

- ▶ Measures may be applied and area-weighted to discrete building areas, provided the total credit value of all achieved measures complies with the minimum required for the overall occupancy
- ▶ ***Put another way – Measures may be applied to specific portions of a building.***
- ▶ Discrete area-weighting can be applied to energy efficiency and load management measures

Can a separate  
occupancy  
area be  
allocated for a  
Group A-2  
commercial  
kitchen area?

- ▶ **Yes.** Commercial kitchen areas may be designated as a separate “All other” occupancy.
- ▶ The achieved occupancy-based credit value shall be area-weighted relative to the overall building area.

Can residential corridors or other accessory spaces within a Group R-2 building be accounted for separately?

- ▶ **Yes.** Corridors and accessory spaces may be included with the Group R-2 occupancy areas or accounted for separately under the “All Other” occupancy category.
- ▶ If these areas are accounted for under a separate occupancy, this approach to compliance with the AEM and LMM provisions shall be applied consistently throughout the building.



**C406 Additional Energy Efficiency & Load Management Credit Calculation**

**C406-CALC**

2021 Washington State Energy Code Compliance Forms for Commercial Buildings as defined in Chapter 2

Revised Sept 2024

Project Title: **Apartment Building**

Date: **10/2/24**

**Additional Energy Efficiency & Load Management Measures - Required Credits**

Occupancy/Discrete Area List							Additional Energy Efficiency Measure Credits					Load Management Measure Credits		
Area ID	Occupancy Group	Special Occ Case (Only for Occ. Group M and All Other) <small>NOTE 1</small>	Special Conditioning Case <small>NOTE 2</small>	Description	Floor Area	Capacity Fraction Requiring C401.3.3 Compliance <small>NOTE 3</small>		Base Credits Req'd	Fossil Fuel Path Credits Req'd	C411 Exception Credits Req'd	Total Req'd	Proposed	Total Req'd	Proposed
						Space Heating	Water heating							
Apts	Group R-2	None	None	Dwelling Units	75,000			41	0	0	41.0	43.0	15.0	24.0
Common	Group R-2	None	None	Common Areas	25,000			41	0	0	41.0	39.0	15.0	20.0
Credits Entered by Whole Project Measures <small>NOTE 4</small>											0.00	7.00		
Project Total					100000	0.00	0.00	41.00	42.00	15.00	30.00			

# Credit Accounting



# Credit Accounting Example #1

## New Office Building (Group B) – Simple credit accounting

- ▶ Required **AEM credits** per Table C406.1 = **42 credits**
- ▶ Applied AEM Credits
  - C406.2.2.1 Improved HVAC TSPR score – Group B = 11 credits
  - C406.2.3.1 10% reduced lighting power – Group B = 18 credits
  - C406.2.12 Enhanced envelope performance – Group B = 13 credits

**Total AEM Credits – 11+18+13 = 42 credits**

- ▶ Required **LMM credits** per Table C406.1 = **27 credits**
- ▶ Applied Credit: C406.3.2 HVAC load management – Group B = **42 credits**

# Credit Accounting Example #2

## New Boutique Hotel (Group R-1) – Area-weighted

- ▶ Required **AEM credits** per Table C406.1 = **54 credits**
- ▶ **Building Areas** – 4 floors, 60,000 SF total; 15,000 SF per floor w/20% corridor/lobby; 3,000 SF commercial kitchen
- ▶ Applied AEM Credits
  - C406.2.2.6 High performance DOAS, 1<sup>st</sup> floor & Corridors (40%) – Group R-1 = 31 credits
  - C406.2.12 Enhanced commercial kitchen equipment (5%) – Group R-1 = 30 credits
  - C406.2.6.2 Service water heat recovery, Whole Bldg (100%) – Group R-1 = 35 credits
  - C406.2.6.1 Shower drain heat recovery, 2<sup>nd</sup> thru 4<sup>th</sup> floors (75%) – Group R-1 = 9 credits

$$\begin{aligned} & (\text{DOAS: } 0.4 * 31 \text{ credits} = 12.4) + (\text{Kitchen: } 0.05 * 30 \text{ credits} = 1.5) + \\ & (\text{Shower: } 0.75 * 9 \text{ credits} = 6.75) + (\text{SWH: } 35 \text{ credits}) = \mathbf{55.65 \text{ credits}} \end{aligned}$$



# Renewable Energy Generation Systems

# When do the renewable energy & solar readiness provisions apply?

## THRESHOLDS WHEN PROVISIONS APPLY

	<b>C411 Renewable Energy &amp; Solar Readiness</b>	Project conditioned floor area ≤ 10,000 sf *	Project conditioned floor area > 10,000 sf	Building height ≤ 20 stories	Building height > 20 stories
New Building	Renewable Energy	NA	✓	✓	✓
	Solar Readiness	✓	✓	✓	NA
Building Additions	Renewable Energy	NA	✓	✓	✓
	Solar Readiness	✓	✓	✓	NA
Change in Space Conditioning or Occupancy	Renewable Energy	NA	✓	✓	✓
	Solar Readiness	✓	✓	✓	NA
Existing Building Alterations	Renewable Energy	NA	NA	NA	NA
	Solar Readiness	NA	NA	NA	NA

EPCA Edition Update – C505.1.2

\* Solar readiness does not apply to projects < 500 sf

# Renewable Energy Systems

## What is required?

- ▶ Minimum renewable energy generation capacity not less than **0.5 watt/SF** or **1.7 Btu/SF** multiplied by the sum of all **gross conditioned floor areas** of the building or building addition
- ▶ Includes fully conditioned and semi-heated spaces
- ▶ Buildings under-going a change in space conditioning or occupancy (per C505) shall comply with the renewable energy system requirements in the same manner as a building addition
- ▶ There are exceptions allowing reduced or no renewable energy capacity for buildings with limited available roof area or where a substantial portion of the roof area is shaded

# Renewable Energy Systems

## Eligible sources/locations of renewable energy capacity

- ▶ System located on or within the building
- ▶ System located on or within another structure elsewhere on the project site
- ▶ Off-site system owned by the building project owner
- ▶ Community renewable energy facility system
- ▶ Purchase power agreement (PPA) with contract minimum duration of at least 15-years



C411.2.1  
C411.2.2  
C411.2.3

# Renewable Energy AEM

## On-site & Off-site Renewable Energy Efficiency Measure

- ▶ **Minimum required additional capacity = 0.1 watts/sf**
- ▶ Based on total building sf area (not just conditioned area)
- ▶ Required capacity is in addition to the renewable energy capacity required per C411.1 (0.5 watts/sf), plus other provisions where renewable energy is used for code compliance
- ▶ May be applied to the whole building, building addition, or tenant space

C406.2.5  
C411.1



# Renewable Energy AEM

## On-site & Off-site Renewable Energy Efficiency Measure

- ▶ Renewable energy credits claimed for C406 compliance **cannot exceed 50%** of total credits required for the project.
- ▶ If complying via the fossil fuel path, renewable energy credits claimed for C401.3.3 compliance **cannot exceed 80%** of the total additional energy credits required for the project.
- ▶ Projects qualifying for a C411.1 exception to omit installation of renewable energy capacity must achieve **an additional 18 credits** above what's required for C406 compliance.
- ▶ 18 additional credits may be reduced if partial renewable energy capacity is installed (based on prorated fraction of required capacity).

C406.2.5

C401.3.4

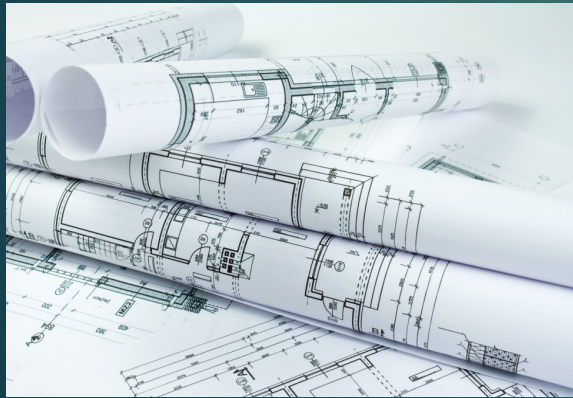
C411.1

C411.1.1



# Documentation

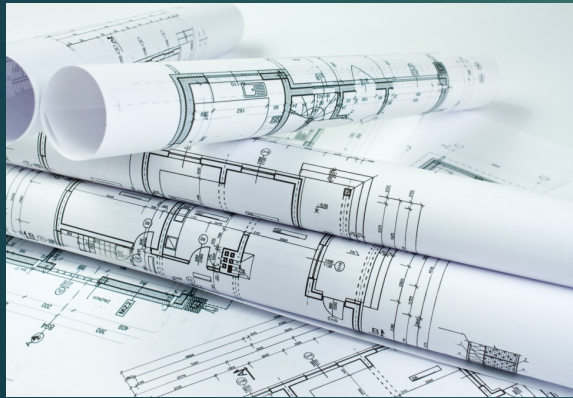
What will  
building  
departments  
be looking  
for?



### **Permit Submittal Documentation**

- ▶ Identify which AEMs and LMMs are applied to the project and credit values based on occupancy
- ▶ Demonstrate that the minimum required number of AEM and LMM credits for the project are achieved
- ▶ If efficiency measures are applied by building area for single occupancy or multiple occupancy buildings:
  - Identify the area each measure is applied to on the project plans
  - Include AEM and LMM area-weighting calculations in the project documentation

What will  
building  
departments  
be looking  
for?



### Permit Submittal Documentation

- ▶ If project includes fossil fuel or electric resistance space heating and/or SWH equipment, demonstrate that the minimum required **additional energy credits** for the project are achieved
- ▶ For tenant space projects where AEM and LMM credits are being carried over from the shell & core permit, verify that tenant space scope does not cause the tenant space to no longer comply with the carried over measures and credit value

# NEW Credit Accounting Tool

## Excel Calculator for C406, C411 and C401.3 Credit Requirements

C406 Additional Energy Efficiency & Load Management Credit Calculation												C406-CALC		
2021 Washington State Energy Code Compliance Forms for Commercial Buildings as defined in Chapter 2												Revised Sept 2024		
Project Title: Apartment Building											Date: 10/2/24			
Additional Energy Efficiency & Load Management Measures - Required Credits														
Occupancy/Discrete Area List						Additional Energy Efficiency Measure Credits					Load Management Measure Credits			
Area ID	Occupancy Group	Special Occ Case (Only for Occ. Group M and All Other) <sup>NOTE 1</sup>	Special Conditioning Case <sup>NOTE 2</sup>	Description	Floor Area	Capacity Fraction Requiring C401.3.3 Compliance <sup>NOTE 3</sup>		Base Credits Req'd	Fossil Fuel Path Credits Req'd	C411 Exception Credits Req'd	Total Req'd	Proposed	Total Req'd	Proposed
						Space Heating	Water heating							
Apts	Group R-2	None	None	Dwelling Units	75,000			41	0	0	41.0	43.0	15.0	24.0
Common	Group R-2	None	None	Common Areas	25,000			41	0	0	41.0	39.0	15.0	20.0
Credits Entered by Whole Project Measures <sup>NOTE 4</sup>											0.00		7.00	
Project Total					100000	0.00	0.00				41.00	42.00	15.00	30.00

WASHINGTON STATE ENERGY CODE

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Questions & Feedback

## Education and Resources

### Technical Resources

**NEW TOOL!! 2021 WSEC-C Additional Energy Efficiency & Load Management Credits Compliance Forms**

This Excel workbook is a set of electronic forms developed to help designers calculate Required and Achieved Energy Efficiency and Load Management Credits to demonstrate compliance with the 2021 WSEC-C. Reviewing the "ReadMe" and "Using This Form" tabs in the workbook before completing the forms is recommended. Note that some inputs in the forms require supporting calculations that must be completed separately. These Excel forms and calculations are included as supporting documentation with a building permit submittal.

Applicable provisions supported by these compliance forms include:

- Section C406.1 Additional energy efficiency and load management measures credit requirements
- Section C401.3.3 Fossil fuel compliance path - Additional efficiency credits
- Section C403.1.4 Use of electric resistance and fossil fuel-fired HVAC heating equipment
- Section C404.2.1 Service water heating system type
- Section C411 Renewable energy

NEW technical resource developed to assist with documentation for AEM & LMM credits, fossil fuel compliance path additional energy credits, and renewable energy

# Thank you!

## 2021 WSEC COMMERCIAL – ADDITIONAL ENERGY EFFICIENCY AND LOAD MANAGEMENT MEASURES



**WSEC Commercial Technical Support Team:**

Lisa Rosenow – Evergreen Technology Consulting (ETC)

Duane Lewellen – Lewellen Associates, LLC

(360) 539-5300 | [com.techsupport@waenergycodes.com](mailto:com.techsupport@waenergycodes.com)