

# CBES Compliance Paths and COMcheck

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# Target Effective Date

- The 2024 CBES will be effective on July 1, 2024
- Permit application date determines what version of CBES applies
  - A permit, in this context, is limited to a building permit or an Act 250 permit
- Caveat: For buildings permitted under 2020 CBES: construction must start prior to December 31, 2024



# Scope and General Requirements

CBES provides minimum energy efficiency requirements for design and construction for the following:

- New buildings
- New portions of buildings and their systems
- New systems and equipment in existing buildings
- New stand-alone equipment or building systems that are part of manufacturing or industrial processes and are specifically identified in the code

It also requires *a plan for operation and maintenance* of the above!

# New for 2024

## *Required Information on Construction Documents*

Air barrier and air sealing details, including the location of the air barrier, a diagram showing the building's pressure boundary in plan(s) and section(s), and calculation of the area of the pressure boundary as specified in Section C402.4.1.3.

Identify areas and future equipment for Renewable Energy and Energy Storage

# Exceptions

Farm Structures as defined in 24 Vermont Statutes Annotated (V.S.A. 4413)

Manufacturing or industrial processes equipment that are not identified in this standard or are integral to equipment that is not identified in the standard



# Exempt Buildings\*

- Low Energy Buildings (3.4 Btu/h per square foot)
- Unconditioned Buildings
- Greenhouses
- Inflatable Buildings
- Yurts
- Equipment Buildings: very specific set of requirements to meet this exemption

\* Exempt from Thermal Shell requirements of CBES



# Exempt Buildings

What about historic buildings?

Maybe

Need to file [Historic Building Exemption Application Form](#) with State Historic Preservation Office for endorsement





# Compliance Materials

The code official or authority having jurisdiction shall be permitted to approve:

- Specific computer software
- Worksheets
- Compliance manuals
- Other similar materials

FYI: Stamped drawings submitted at time of construction permit application are required to state that they meet the CBES requirements

# Compliance Materials

Who is the code official or authority having jurisdiction?

## *Authority Having Jurisdiction*

- For purposes of this code, neither the Vermont Public Service Department nor the Division of Fire Safety should be considered the authority having jurisdiction

## *Code Official*

- See above definition

# Compliance Materials

Vermont employs a self-certification process

PSD is authorized to create and update CBES but not enforce the code

No current Code Official designated in Code language



# Alternative Materials, Design and Methods of Construction

Are allowed provided that the code official or authority having jurisdiction finds

- Proposed design complies with intent of CBES
- Proposed materials and methods are not less in quality, strength, effectiveness, fire resistance, durability or safety

# Compliance Options

Use one of the following methods:

- 1a: Chapter 4 plus credits (prescriptive approach)
- 1b: ASHRAE 90.1-2019 plus credits
- 2a: ASHRAE/ESNA Standard 90.1-2019 Energy Cost Budget
  - Include CBES amendments in C401.2.1
- 2b: ASHRAE/ESNA Standard 90.1-2019 Appendix G- Performance Rating
  - Include CBES amendments in C401.2.1
- 3: Above Code Program

# Compliance Options

What is the ASHRAE/ESNA Standard 90.1-2019 Energy Cost Budget Method?

Modeling software is used to show that the proposed design would not cost more to operate than a similar building designed strictly per the prescriptive requirements of ASHRAE 90.1



# Compliance Options

What is the ASHRAE/ESNA Standard 90.1-2019 Appendix G – Performance Rating Method?

Energy modeling can be used to demonstrate compliance for designs that exceed the requirements of Standard 90.1

- Gives credit for integrated design that results in energy savings. Examples:
  - efficient use of building mass
  - optimized building orientation
  - efficient HVAC&R system selection
  - right sizing of HVAC&R equipment
- The proposed building design needs to have a Performance Cost Index (PCI) less than a reference building based on building type and climate zone

# Compliance Options

Compliance Path	Required Documentation
2024 CBES (Chapter 4)  OR  ASHRAE 90.1-2019 (with CBES amendments as noted in Section 401.2.1)	2024 VT CBES Version of COMcheck™ Software or COMcheck-Web™ Results Report, including, where applicable: <ul style="list-style-type: none"><li>• Envelope Compliance Certificate</li><li>• Interior Lighting Compliance Certificate</li><li>• Exterior Lighting Certificate</li><li>• Mechanical Compliance Certificate</li><li>• Mechanical Requirements Description</li></ul>

Note: Addition/alteration/renovation/repair projects: only need to include COMcheck compliance sections for systems altered in the project

# Important note on COMcheck

Certain minimum cavity insulation R-values, published in 2024 CBES, when entered into COMCheck, may not register as a passing system

How should I handle this?

If this occurs, describe the assembly component and the 2024 CBES published minimum R-value in the COMcheck project notes



# Compliance Options

Compliance Path	Required Documentation
ASHRAE/IESNA Standard 90.1–2019 Energy Cost Budget Method	All documentation as noted in Section 11.7 Documentation Requirements of ASHRAE 90.1-2019
ASHRAE/IESNA Standard 90.1–2019 Appendix G - Performance Rating Method	Compliance documentation requirements as noted in Appendix G
Above-Code Program	Contact Vermont DPS for approval of above-code program and required documentation

# Compliance Options

CBES Chapter 4 – “Prescriptive” plus Points: Meet the following system and equipment minimum requirements:

- Building Envelop
- Air Leakage
- Mechanical Equipment
- Electrical Power and Lighting Systems: Daylighting, Lighting Power Density, EVSE
- Additional Energy Efficiency Credit and Load Management Requirements
- Commissioning: mechanical systems, required lighting controls

# Compliance Options

## Notes on Commissioning:

Commissioning shall be completed by the project commissioning authority. The commissioning authority shall:

1. Have experience as a commissioning authority on at least three previous projects, each at least 20,000 s.f. or greater
2. Be an independent third-party entity. The commissioning authority shall not be an employee of the design team, construction team, owner or developer



# Additional Efficiency, Renewable, and Load Management Requirements Compliance

Buildings shall comply as follows:

1. Buildings >1,000 s.f.:

comply with Additional Energy Credits Requirement:

2. Buildings >2,500 s.f.:

comply with Additional Energy Credits Requirement AND

comply with Additional Renewable & Load Management Credits

# Additional Energy Efficiency Credit Requirements

How many points does my building need?

**TABLE C406.1.1  
ENERGY CREDIT REQUIREMENTS BY BUILDING OCCUPANCY GROUP**

	Building Occupancy Group								
	R-2, R-4, and I-1	I-2	R-1	B	A-2	M	E	S-1 and S-2	All Other
Energy Credit Requirements	79	46	83	30	60	75	90	65	36

What about mixed occupancy?

Calculate weighted average of credit requirements based on square footage of floor area

# Energy Efficiency Measures and Credits by Occupancy Group

TABLE C406.2.1

ENERGY EFFICIENCY MEASURES AND CREDITS BY OCCUPANCY GROUP

ID	Energy Credit Measure	R-2, R-4, and I-1
E01	Envelope Performance	
E02	UA Reduction	19
E03	Envelope Leak Reduction	13
E04	Add Roof Insulation	7
E05	Add Wall Insulation	13
E06	Improve Fenestration	42
H01	HVAC Performance	6
H02	Heating Efficiency	14
H03	Cooling Efficiency	3
H04	Residential HVAC Control	21
H05	Energy Recovery	46
W01	SHW Preheat Recovery	93
W02	Heat Pump Water Heater	81
W04	SHW Pipe Insulation	6
W05	Point of Use Water Heaters	
W06	Thermostatic Balance Valves	3

TABLE C406.2.1

ENERGY EFFICIENCY MEASURES AND CREDITS BY OCCUPANCY GROUP

ID	Energy Credit Measure	Building Occupancy Group									
		R-2, R-4, and I-1	I-2	R-1	B	A-2	M	E	S-1 and S-2	All Other	
W07	SHW Heat Trace System	11	1	7	5	3	5	5	2	5	
W08	SHW Submeters	17								17	
W09	SHW Distribution Sizing	68		26						47	
W10	Shower Heat Recovery	25	1	9						10	
P01	Energy Monitoring	3	3	2	3	2	5	3	5	3	
L01	Lighting Performance										
L02	Enhanced Digital Lighting Controls	1	4	1	4	1	5	4	3	3	
L03	Increase Occupancy Sensors	1	4	2	4	1	6	3	4	3	
L04	Increase Daylight Area	2	5	3	6	1	8	5	4	4	
L05	Residential Light Control	3									
L06	Reduced Lighting Power	1	5	1	5	1	6	5	4	4	
Q01	Efficient Elevator Equipment	4	2	2	4	0	3	4	5	3	
Q02	Commercial Kitchen Equipment					21					
Q03	Residential Kitchen Equipment	13		10							
Q04	Fault Detection	3	3	2	3	3	3	4	6	4	

# C406.1.2 Renewable & Load Management Credit Requirements

How many points does my building need?

**TABLE C406.1.2  
RENEWABLE AND LOAD MANAGEMENT CREDIT REQUIREMENTS BY BUILDING  
OCCUPANCY GROUP**

	Building Occupancy Group								
	R-2, R-4, and I-1	I-2	R-1	B	A-2	M	E	S-1 and S-2	All Other
Renewable and Load Management Credit Requirements	16	11	14	24	4	25	22	20	17



# C406.3 Renewable and Load Management Credit Requirements

**TABLE C406.3.1  
Renewable and Load Management Credit Requirements by Building Occupancy Group**

ID	Renewable and Load Management Credit	Building Occupancy Group								
		R-2, R-4, and I-1	I-2	R-1	B	A-2	M	E	S-1 and S-2	All Other
R01	On-Site Renewable Energy	9	6	8	14	2	9	13	24	11
G01	Lighting Load Management	5	14	9	10	4	18	16	36	14
G02	HVAC Load Management	10	12		8	16	14	18	14	13
G03	Automated Shading	1		1	5		8	14		5
G04	Electric Energy Storage	14	13	13	16	4	11	20	24	14
G05	Cooling Energy Storage	7	11	12	12	2	9	16	1	9
G06	SHW Energy Storage	18	4	26	6	15	4	7	2	10
G07	Building Thermal Mass	27	26	26	8	6	13	31	20	20
C01	Insulation Embodied Carbon	5	3	4	8	1	8	7	6	5
E01	Additional Electric Infrastructure	16								

## C406.1.2 Renewable & Load Management Credit Requirements

### R&LM Exceptions:

1. Building achieves additional 70% of Energy Efficiency Credits from Table C406.1.1:  
only 50% of R&LM credits required
2. Building achieves additional 120% of Energy Efficiency Credits from Table C406.1.1:  
Zero R&LM credits required
3. Buildings 1,000-2,500 s.f. do not need to achieve R&LM Credits (only have to comply with Energy Credits Requirement)

# CBES Certificate and Affidavits

**2020 Vermont Commercial Building Energy Standards (CBES) Certificate**

This certificate is for projects whose state or local permit application was submitted on or after September 1, 2020.  
*Before completing this form, refer to the instructions*

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Site Address (Street, City, ZIP Code) \_\_\_\_\_

Construction START Date \_\_\_\_\_ Construction FINISH Date \_\_\_\_\_ Act 250 (Y/N): \_\_\_\_\_ Act 250 Permit # \_\_\_\_\_

Project Description: \_\_\_\_\_

# Stories Above Grade \_\_\_\_\_ # Stories \_\_\_\_\_

# Building Sq. Ft. \_\_\_\_\_ # Conditioned Sq. Ft. \_\_\_\_\_

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**Compliance Methods**     **Option 1a: Chapter 5-Plus-Credits**    *(see CBES for full requirements each point option)*

(Must select option 1a, 1b, 2a, 2b or 3)     **Option 1b: ASHRAE 90.1-2016 (with CBES amendments C401.2.1) Plus-Credits**

Credits achieved: \_\_\_\_\_ Occupancy Group \_\_\_\_\_ (See Table C406.1 for credits and groups)

<input type="checkbox"/> 1 More efficient HVAC performance	<input type="checkbox"/> 2.1 Reduced lighting power: Option 1	<input type="checkbox"/> 2.2 Reduced lighting power: Option 2
<input type="checkbox"/> 3 Enhanced lighting controls	<input type="checkbox"/> 4 On-site supply of renewable energy	<input type="checkbox"/> 5 Dedicated outdoor air system
<input type="checkbox"/> 6.1 High-efficiency service water heating	<input type="checkbox"/> 6.2 High-efficiency service water heating	<input type="checkbox"/> 6.3 Heat pump water heating equipment
<input type="checkbox"/> 7 Enhanced envelope	<input type="checkbox"/> 8 Reduced air infiltration	<input type="checkbox"/> 9 Efficient kitchen appliances
<input type="checkbox"/> 10 Controlled Receptacles		

Compliance Documentation required: COMcheck™ Software Vermont 2020 CBES Version

**Option 2a: ASHRAE/IESNA Standard 90.1-2016 Energy Cost Budget Method**  
Compliance documentation requirements as noted in Section 11.7

**Option 2b: ASHRAE/IESNA Standard 90.1-2016 Appendix G -Performance Rating Method** (Review CBES amendments C401.2.1)  
Compliance documentation requirements as noted in Appendix G

**Option 3: Above Code Program**  
Contact Vermont PSD for approval of Above Code Program and documentation requirements

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**Air Sealing / Blower Door Test** (if required) \_\_\_\_\_ CFM75/sq ft of building shell (6 sides)    Date of Test \_\_\_\_\_

Air Leakage Tester Firm and Testers Name: \_\_\_\_\_

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**Other Requirements**    Where applicable:

EV charging requirement: \_\_\_\_\_ # Total Parking Spaces: \_\_\_\_\_ # Total EVSE Equipped Parking Spaces: \_\_\_\_\_ # Total EVSE Ready Parking Spaces \_\_\_\_\_

# CBES Certificate and Affidavits

NEW! The 2024 certificate will require the following information:

- Thermal envelope details including R-values of assembly insulation and U-factors & SHGC of fenestrations
- Results from any building envelope air leakage testing
- An indication of the solar-ready zone and other requirements of C402.5

# CBES Certificate and Affidavits

Who can sign off on the certificate and affidavits?

- Designer Affidavit: Primary Designer
  - Professional Engineer
  - Licensed Architect
  - “Other licensed professional”
  - If none of the above are involved, then the builder



# CBES Certificate and Affidavits

Who can sign off on the certificate and affidavits?

- Builder Affidavit:
  - Builder who directed construction, or
  - “Other another party authorized to certify code compliance”

# CBES Certificate and Affidavits

The CBES certificate needs to be signed off on:

I certify that the above information is correct and that the premises listed HAVE been **DESIGNED** in accordance with the Vermont Commercial Building Standards (CBES) created under 30 V.S.A. § 53.

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Signature	Print Name	

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Company	Phone #	Date

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I certify that the above information is correct and that the premises listed HAVE been **CONSTRUCTED** in accordance with the ordinary standard of care applicable to the participating construction trades, and that the subject commercial building was constructed substantially in accordance with the construction documents including the plans and specifications certified herein, and in accordance to 30 V.S.A. §53

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Signature	Print Name	

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Company	Phone #	Date

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# CBES Certificate and Affidavits

## Affidavits

**2020 VT COMMERCIAL BUILDING ENERGY STANDARDS (CBES) CONSTRUCTION AFFIDAVIT**

Site Address (street, town, ZIP Code) \_\_\_\_\_  
Construction Start Date \_\_\_\_\_  
Building Sq. Ft. \_\_\_\_\_  
Construction Finish Date \_\_\_\_\_  
# of Stories Above Grade \_\_\_\_\_  
County \_\_\_\_\_  
Project Description \_\_\_\_\_  N/A  
Act 250 Permit # \_\_\_\_\_

I certify the premise listed above has been constructed in accordance with the ordinary standard of care applicable to the participating construction trades, and that the subject commercial building was constructed substantially in accordance with the construction documents including the plans and specifications certified herein, and in accordance to 30 V.S.A. § 53.

Signature \_\_\_\_\_  
Print Name \_\_\_\_\_  
Company \_\_\_\_\_  
Phone # \_\_\_\_\_

Subscribed and sworn to before me: \_\_\_\_\_  
Signature of Notary \_\_\_\_\_  
Date \_\_\_\_\_

30 V.S.A. § 53 requires this affidavit certifying that the commercial construction meets the CBES requirements. Copies of the affidavit and supporting documentation demonstrating code compliance shall be provided to the Public Service Department, Division of Efficiency and Energy Resources, 112 State St., Montpelier, VT 05602-2901

**2020 VT COMMERCIAL BUILDING ENERGY STANDARDS (CBES) DESIGN AFFIDAVIT**

Site Address (street, town, ZIP Code) \_\_\_\_\_  
Construction Start Date \_\_\_\_\_  
Building Sq. Ft. \_\_\_\_\_  
Construction Finish Date \_\_\_\_\_  
# of Stories Above Grade \_\_\_\_\_  
County \_\_\_\_\_  
Project Description \_\_\_\_\_  N/A  
Act 250 Permit # \_\_\_\_\_

I certify the premise listed above has been designed in accordance with the designer's professional duty of care, and that the building was designed in substantial compliance with the requirements of the Vermont Commercial Building Energy Standards (CBES) created under 30 V.S.A. § 53.

Signature \_\_\_\_\_  
Print Name \_\_\_\_\_  
Company \_\_\_\_\_  
Phone # \_\_\_\_\_  
Date \_\_\_\_\_

Subscribed and sworn to before me: \_\_\_\_\_  
Signature of Notary \_\_\_\_\_  
Date \_\_\_\_\_  
Expiration Date \_\_\_\_\_

30 V.S.A. § 53 requires this affidavit certifying that the commercial construction design meets the CBES requirements. Copies of the affidavit and supporting documentation demonstrating code compliance shall be provided to the Public Service Department, Division of Efficiency and Energy Resources, 112 State St., Montpelier, VT 05602-2901

# CBES Certificate and Affidavits

What do I do with my compliance documents?

- Certificate label permanently affixed to one of the following:
  - Inside electrical service panel
  - Heating or cooling equipment
  - Nearby in a visible location
- Affidavits SHALL accompany the certificate

# CBES Certificate and Affidavits

What do I do with my compliance documents?

Copies of the certificate, affidavits, and compliance documents shall be provided to the Public Service Department

Division of Efficiency and Energy Resources

112 State Street

Montpelier, VT 05620-2601



# COMcheck software

## What is it?

U.S. Department of Energy commercial energy compliance software tool

## Where do I find it?

<https://www.energycodes.gov/comcheck>

- downloadable software in Windows format
- otherwise use web version

# COMcheck software

Any training resources out there?

2hr video training: [Building Energy Codes Program resource page](#)

Any other support ?

Web-based help desk: [COMCheck Help Desk](#)

PDF: [Technical Support Document: COMcheck Version 3.9.1](#)



Questions?

Efficiency  
Vermont

## Energy Code Assistance Center

1-855-887-0673

[ecacemail@veic.org](mailto:ecacemail@veic.org)

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