

Appendix N: C-PACE NEW CONSTRUCTION, REPOSITIONING AND GUT REHABILITATION TECHNICAL STANDARDS AND APPROVAL PROCESS

1. Defined Terms
2. Overview
3. Supporting Documentation
4. Total Eligible Construction Cost (TECC) Determination
5. Energy Performance Determination
 - a. Whole Building Energy Model Path
 - b. Home Energy Rating System (HERS) Index Multifamily Path
6. Bonus Technologies & Net Zero Design Determination
 - a. Bonus Technologies
 - b. Net Zero Design
7. Total Eligible C-PACE Financed Amount Determination
8. Clean Energy Generation for New Construction
9. Project Examples

1. Defined Terms

This document is an appendix to the C-PACE program guidelines (the “Program Guidelines”) published by the Connecticut Green Bank (the “Green Bank”). Pursuant to the Program Guidelines, this appendix may be modified or amended by Green Bank, in its sole discretion, from time to time. Capitalized terms used but not defined herein have the meaning ascribed to them in the Program Guidelines.

2. Overview

Given the lack of a pre-improvement energy baseline against which to measure energy savings and the difficulty of isolating and assigning portions of new construction, repositioning and gut rehabilitation project (each being a “New Construction Project”) costs to particular Energy Improvements, the Standard SIR Technical Review process (described in Article IV, Section 2 of the Program Guidelines) is not applicable. C-PACE eligibility for New Construction Projects will instead be determined by the overall energy performance of the property above the applicable building energy code. New Construction Projects must demonstrate a minimum level of energy performance, above the applicable building energy code, using one of the two paths outlined below. Based on that determination, a percentage of the project’s TECC will be eligible for C-PACE financing (“C-PACE Eligible Finance Amount”). Fees and interest associated with the C-PACE financing can be added to the C-PACE Eligible Finance Amount to determine the total C-PACE benefit assessment amount.

3. Supporting Documentation

The applicant must submit the following documents to the Green Bank and the Technical Administrator, in a form acceptable to both in their discretion:

- Narrative describing the New Construction Project and scope (typically prepared by the modeler)
- Energy modeling input and output files
- Supporting spreadsheet calculations, if any
- Design drawings
- Equipment cutsheets and AHRI certificates
- Detailed construction budget
- Letter of agreement from utility programs, if applicable
- For projects opting to use the HERS Index Multifamily path (as described in Section 4(b) below):
 - HERS Index Rating analyses
 - Data collection sheets for non-residential spaces

4. Total Eligible Construction Cost (TECC) Determination

For a New Construction Project, the sum of construction hard and soft costs directly related to a building's design and construction (the "Total Eligible Construction Cost" or "TECC"), shall be determined by the Green Bank and Technical Administrator pursuant to this Section. The applicant must submit a detailed construction budget that includes the itemized hard costs and soft costs in an .xls or .csv format. The Technical Administrator will review the budget and send comments and questions to the applicant regarding specific line items to determine eligibility. Based on the applicant's submitted materials and responses, the Technical Administrator will provide a final TECC determination.

The following list contains examples of eligible costs that may be included in the TECC calculation. The Green Bank and Technical Administrator will ultimately determine the maximum TECC for each New Construction Project:

- Architectural, engineering, and design services
- Energy modeling services
- Construction hard costs
- Environmental studies
- Plumbing
- Landscaping
- Energy consuming equipment and energy saving measures
- Permits
- Administrative fees and project management
- Developer fees
- Appraisal costs
- Lender inspection costs
- General liability Insurance
- Builder's risk insurance
- Building safety systems such as sprinklers and fire alarms
- Utility connection and impact fees
- Legal and accounting fees
- Construction period interest
- Financing fees
- Operating losses during construction
- Interest reserves
- Contingencies

The following costs are NOT eligible to be included in the TECC calculation. The Green Bank and Technical Administrator will ultimately determine the maximum TECC for each New Construction Project:

- Costs related to land acquisition
- Marketing expenses
- Plug-in equipment (appliances, bulbs, etc.)
- Furniture, fixtures, and equipment
- Interior decorations such as artwork
- Any items not affixed to the property

5. Energy Performance Determination

There are two paths that a New Construction Project can use to demonstrate it meets a required levels of energy performance:

- (a) Whole Building Energy Model Path, and
- (b) HERS Index Multifamily Path

Applicants are strongly encouraged to discuss and review their projects with the Green Bank and Technical Administrator before applying for project approval. This step will help the applicant determine which path may be best for a New Construction Project and answer any questions related to the requirements set forth below.

Technical review of a New Construction Project must be completed by the Technical Administrator.

a. Whole Building Energy Model Path

A New Construction Project using this path must use a whole building energy model to demonstrate that the proposed building's energy performance will exceed, to a minimum level, a baseline building energy performance. The baseline building energy performance is based on a building that is designed and built to meet Connecticut building and energy code requirements applicable at the time building permits are obtained (<https://portal.ct.gov/DAS/Office-of-State-Building-Inspector/Connecticut-State-Building-Code>). All C-PACE New Construction projects can use this path, including projects for commercial, industrial, multifamily, and other C-PACE eligible properties, as well as gut rehabilitation or repositioning to change the use of an existing facility at C-PACE eligible properties.

For projects using IECC 2021 as the baseline code, a minimum improvement in energy performance of 5% over the baseline building is required to be eligible for C-PACE financing. The C-PACE Eligible Finance Amount for such a building that demonstrates a 5% improvement over the baseline will be 20% of the TECC. Buildings that demonstrate an energy performance of 10% over the baseline will be eligible for 25% of the TECC (as summarized in Table 1 below).

For projects using a baseline of IECC 2018 or prior, a minimum improvement in energy performance of 10% over the baseline building is required to be eligible for C-PACE financing. The C-PACE Eligible Finance Amount for such a building that demonstrates a 10% improvement over the baseline will be 20% of the TECC. Buildings that demonstrate an energy performance of 20% over the baseline will be 25% of the TECC (as summarized in Table 1 below).

The following energy modeling software can be used to model the baseline and proposed buildings' energy performance. Software other than those outlined below can be utilized upon review and approval by the Technical Administrator:

- eQuest
- Energy Plus (Open Studio)
- Trane Trace or Trace 3D
- Design Builder

Submittals made to the Connecticut public utilities Energy Conscious Blueprint Program in support of energy efficiency program incentives would be acceptable documentation to provide in support of the C-PACE technical requirements. The Connecticut public utilities energy modeling guidelines can be found here (<https://energizect.com/your-business/solutions-list/Energy-Conscious-Blueprint>). These submittals will be subject to the review of the technical administrator to ensure conformity with the C-PACE program guidelines.

An example of a project using the Whole Building Energy Model Path can be found in Section 8 (Project Examples).

b. HERS Index Multifamily Path

C-PACE New Construction projects for multifamily properties, or eligible mixed-use properties which include multifamily, can use this path to demonstrate that the proposed building's energy performance will exceed, to a minimum level, a baseline building energy performance through the Home Energy Rating System ("HERS") Index.

The HERS index is a nationally recognized system for inspecting, calculating, and estimating residential and multifamily energy performance (<https://www.hersindex.com/>). The HERS index rating is determined by a certified Home Energy Rater, who assesses the energy efficiency of a residence or multifamily dwelling unit and assigns it a relative performance rating. Every point below 100 on the HERS index translates to roughly 1% energy savings compared to a IECC 2006 code-built residence or multifamily dwelling unit. The lower the rating, the more efficient the dwelling unit. For multifamily buildings, each unique dwelling unit type receives a HERS index rating. After a rating is determined for each dwelling unit type, a weighted average of the total units is calculated based on the quantity of each dwelling unit type. This weighted average is used as the overall HERS index rating. For example, if there 3 unit types (A with a HERS index rating of 40, B with a HERS index rating of 45, and C with a HERS index rating of 60) and there are 10 each of A and B, and 20 of C (for a total of 40 units), then the weighted average HERS index rating would be 51.25.

For the purposes of the HERS Index Multifamily Path, only corridors, stairwells, exterior lighting, and lobbies are considered to be common areas in multifamily buildings (collectively being "Common Areas"). All other spaces, including but not limited to, clubhouses, gymnasiums, enclosed parking areas, swimming pools, etc. will be considered commercial spaces (collectively being "Commercial Spaces").

For Common Areas and Commercial Spaces for mixed-use facilities, the Technical Administrator will provide data collection sheets for commonly applicable energy technologies/measures. These completed data collection sheets need to be provided by the applicant along with the other relevant

project documentation, including the HERS index rating analyses. The data collection sheets will be used to compare the specifications of proposed equipment in non-residential spaces to code-compliant or industry standard practice baseline equipment.

For projects using IECC 2021 as the baseline code, a maximum weighted HERS index rating of 40 is required to be eligible for C-PACE financing. For projects where the weighted HERS index rating is 35 and under, the equipment serving the Common Areas and Commercial Spaces would need to meet IECC 2021 code requirements, at minimum. For projects where the weighted HERS index rating is between 36 and 40, the efficiencies of the equipment serving the Common Areas and Commercial Spaces would need to exceed IECC 2021 code requirements by at least 5%. For such projects, the C-PACE Eligible Finance amount is of 20% of the TECC. For projects where the weighted HERS index rating is 30 and under, the equipment serving the Common Areas and Commercial Spaces would need to meet IECC 2021 code requirements, at minimum. For projects where the weighted HERS index rating is between 31 and 35, the efficiencies of the equipment serving the Common Areas and Commercial Spaces would need to exceed IECC 2021 code requirements by at least 10%. For such projects, the C-PACE Eligible Finance amount is of 25% of the TECC.

For projects using a baseline of IECC 2018 or prior, please refer to Table 2 below for the weighted HERS index rating required to be eligible for C-PACE financing.

The following tools, accredited by the Residential Energy Services Network (RESNET), can be used to determine the HERS index rating including:

- REM/Rate
- EnergyGauge® USA
- Ekotrope

Energy efficiency incentive submittals made to the Connecticut utilities Residential New Construction Program would be acceptable documentation to provide in support of the C-PACE technical requirements (<https://energizect.com/your-home/solutions-list/residential-new-construction-program>). These submittals will be subject to the review of the technical administrator to ensure conformity with the C-PACE program guidelines.

The following multifamily properties are NOT eligible to use the HERS Index Multifamily Path. These properties would need to use the “Whole Building Energy Model Path” as outlined above in Section 4a. Please contact the Technical Administrator in situations that need further clarification:

- Multifamily facilities with dwelling units served by central plants (including geothermal)
- Mixed-use facilities with significant process loads such as refrigeration, compressed air, manufacturing processes, etc.
- Mixed-use facilities where the commercial space, as referenced earlier in this section, is greater than 20% of total occupied space
- Historic buildings as designated by the state of CT (https://portal.ct.gov/DECD/Content/Historic-Preservation/01_Programs_Services/Historic-Designations/State-Registry-of-Historic-Places)

An example of a project using the HERS Index Multifamily Path can be found in Section 8 (Path Examples).

6. Bonus Technologies & Net Zero Design Determination

a. Bonus Technologies

In order to promote emerging clean energy technologies, resiliency, state policy goals, and energy transition goals, if a New Construction Project design contains at least two of the technologies listed below (each being a “Bonus Technology” and collectively being “Bonus Technologies”), an additional 5% of C-PACE financing is made available. If a New Construction Project design contains at least four of the technologies listed below, an additional 10% of C-PACE financing is made available (as summarized in Table 1 & Table 2).

- Electric vehicle charging stations (Level 2 or better)
- Battery storage systems sized appropriately for the project (behind the meter)
- High-efficiency heat pumps (air, ground, or water source, better than code & facility-wide)
- Networked lighting controls (facility-wide)
- Hard wired smart plug load controls (facility-wide)
- Heat pump water heaters (facility-wide)
- Passive window shading system, sized appropriately for the project
- Fuel cell, sized appropriately for the project, in combined heat and power mode (please note that these systems can either be included as a Bonus Technology under the Whole Building Energy Model path OR as a clean energy electric generation measure as defined in Section 7)
- Solar PV, sized appropriately for the project (please note that these systems can either be included as a Bonus Technology under the Whole Building Energy Model path OR as a clean energy electric generation measure as defined in Section 7)

b. Net Zero Design

If a New Construction project is designed to be all-electric and to achieve net zero, as defined by the New Buildings Institute (NBI), the C-PACE Eligible Finance amount is 35% of the TECC (as summarized in Table 1 & Table 2). Table 3 in the NBI document titled “Zero Energy Commercial Building Targets” (<https://newbuildings.org/wp-content/uploads/2019/09/ZeroEnergyCommercialBuildingTargets.pdf>) specifies the energy use intensity (EUI) that needs to be achieved for various building types prior to the implementation of on-site renewables. Connecticut falls under climate zone 5A and should be referenced when determining the desired EUI. If a building type is not specified or clearly identified in the referenced NBI document, please reach out to the Green Bank and Technical Administrator for guidance on how to determine the appropriate target EUI. A detailed review of project documentation and proposed designs would be conducted by the Technical Administrator in order to approve a net zero design and eligibility to receive 35% of the TECC.

7. Total Eligible C-PACE Financed Amount Determination

Based on determinations made by the Green Bank and Technical Administrator pursuant to the requirements above, the total eligible C-PACE financed amounts for New Construction Projects are set forth in tables 1 and 2.

Table 1- Whole Building Energy Model Path Eligible Financed Amount

IECC Code Year	Min. Energy Performance Above Code to be eligible for C-PACE Financing	C-PACE Financed Amt. of TECC	C-PACE Financed Amt. after Addition of Min. 2 Bonus Technologies	C-PACE Financed Amt. after Addition of Min. 4 Bonus Technologies	C-PACE Financed Amt. Designed for Net Zero
2021	5%	20%	25%	30%	35%
2021	10%	25%	30%	35%	
2018 or prior	10%	20%	25%	30%	
2018 or prior	20%	25%	30%	35%	

Table 2- HERS Index Multifamily Path Eligible C-PACE Financed Amount

IECC Code Year	Weighted HERS Index Rating*	Min. Common Area and Commercial Space equip. efficiency requirement	C-PACE Financed Amt. of TECC	C-PACE Financed Amt. after Addition of Min. 2 Bonus Technologies	C-PACE Financed Amt. after Addition of Min. 4 Bonus Technologies	C-PACE Financed Amt. Designed for Net Zero
2021	35 and under	Meets code	20%	25%	30%	35%
	36-40	5% > code	20%	25%	30%	
2021	30 and under	Meets code	25%	30%	35%	
	31-35	10% > code	25%	30%	35%	
2018 & 2015	46 and under	Meets code	20%	25%	30%	
	47-51	10% > code	20%	25%	30%	
2018 & 2015	36 and under	Meets code	25%	30%	35%	
	37-41	20% > code	25%	30%	35%	
2012	55 and under	Meets code	20%	25%	30%	
	56-60	10% > code	20%	25%	30%	
2012	45 and under	Meets code	25%	30%	35%	
	46-50	20% > code	25%	30%	35%	
2009	70 and under	Meets code	20%	25%	30%	
	71-75	10% > code	20%	25%	30%	
2009	60 and under	Meets code	25%	30%	35%	
	61-65	20% > code	25%	30%	35%	
2006	85 and under	Meets code	20%	25%	30%	
	86-90	10% > code	20%	25%	30%	
2006	75 and under	Meets code	25%	30%	35%	
	76-80	20% > code	25%	30%	35%	

*Please note: At this time, the values listed as the "Weighted HERS Index Rating" for 2021 in Table 2 above are an **estimate**. Once IECC 2021 code has been finalized, we will finalize those values, if needed.

8. Clean Energy Electric Generation for New Construction

C-PACE financing for Class I Renewable Energy Sources (as defined in Conn. Gen. Stat. Sec. 16-1(a)) as part of a new construction project, can either be included as a Bonus Technology when using the Whole Building Energy Model Path OR as an Energy Improvement using standard SIR methodology. If included using the standard SIR methodology, these costs cannot be included in the TECC or in the energy model as an efficiency measure. The impact of the generation on the associated building's energy performance will not be included in the assessment of energy savings against the Baseline Building Energy Performance. If approved, the total eligible C-PACE-financed cost associated with the clean energy electric generation measure will be added to the C-PACE Eligible Finance Amount allowable under New Construction.

Geothermal systems must be included in a whole building energy model as part of the new construction analysis since they are not electric generation systems and not subject to treatment as clean energy electric generation as outlined in this section.

C-PACE New Construction clean energy electric generation measures shall be reviewed by the Technical Administrator.

9. Project Examples

Whole Building Energy Model Path Example

If a project has a TECC of \$10 million and is modeled to have an improvement in energy performance over the IECC 2021 energy code of 7%, it will be eligible for 20% of the TECC in C-PACE financing (\$2 million in this case). If that same project also includes four Bonus Technologies, it will be eligible for 30% of the TECC in C-PACE financing (\$3 million in this case). If the same project was permitted prior to the Connecticut adoption of IECC 2021, it would need to exceed the applicable IECC code by at least 10%. The percentage of TECC eligibility for C-PACE financing remains the same.

HERS Index Rating Path Example

A 200,000 square foot C-PACE eligible new construction multifamily building consisting of 175,000 square feet of residential space and 25,000 square feet of Common Areas and Commercial Space has a TECC of \$20 million. The applicable energy code for the project is IECC 2015. The facility is modeled by a HERS rater to have a weighted HERS index rating of 50. If the Common Area and Commercial Space equipment is at least 10% more efficient than the IECC 2015 code requirements, the project would be eligible for 20% of the TECC in C-PACE financing (\$4 million in this case). If the facility had a weighted HERS index rating of 46 or under, then the Common Area and Commercial Space equipment would only need to meet the IECC 2015 code to be eligible for 20% of the TECC in C-PACE financing. If that same project also includes two Bonus Technologies, it will be eligible for 25% of the TECC in C-PACE financing (\$5 million in this case).