Cornell University
Ithaca Energy Code Supplement
Applicability and Project Compliance Guidance Document
Version 1.1

Rev. Aug 03, 2021

Purpose

This document provides information and guidance for design professionals executing non-State projects on the Cornell University campus within the City or Town of Ithaca, New York which may require compliance with the Ithaca Energy Code Supplement (IECS)[1]. Projects must comply with the IECS if applying for a building permit after August 4, 2021 in the City of Ithaca or September 13, 2021 in the Town of Ithaca. This Guidance Document is intended to serve as a living document and as a source for information sharing and discussion regarding IECS. Individual projects/teams are ultimately responsible for compliance with the IECS.

Subject matter experts within Facilities Engineering and Department of Energy and Sustainability are available to consult with project teams to discuss compliance approaches, past experiences, and campus specific guidance. Please reach out early in your project development so we can assist you.[2] Also, to prevent unnecessary scope expense, please determine early on if a project is likely to require compliance with the IECS prior to requiring within the A/E RFP and Contract Agreement.

1.0 Applicability[3]

The IECS applies to projects within City or Town of Ithaca that meet any one of the following conditions (except that the IECS does not apply to construction that does not include directly heated space):

A. All new construction, excluding additions and renovations that are not specified below.
B. All additions 500 square feet or larger to single or two-family dwellings
C. All additions 1,000 square feet or larger to buildings other than single or two family dwellings
D. All MAJOR RENOVATIONS, defined as the following:

   MAJOR RENOVATION[4] – Any construction or renovation to an existing structure other than a repair or addition, where (1) the WORK AREA exceeds 75 percent of the Total Building FLOOR AREA and (2) two or more of the following occur:

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[1] http://www.ithacagreenbuilding.com/
[2] For assistance or to set up a meeting with CU stakeholders please contact Matt Kozlowski (mdk39@cornell.edu), Liz Kolacki (eak43@cornell.edu), or Cole Tucker (cmt233@cornell.edu)
[3] IECS section 202.1
[4] IECS section 302

- Replacement or new installation of a heating plant or system (e.g. boiler, furnace, or other major system. Changes to ventilation and air conditioning systems are not considered renovations of the heating system.
- Construction that involves disassembly of greater than 50% of the area of the above-grade portion(s) of the BUILDING THERMAL ENVELOPE in the building.
- Changes to lighting, including but not limited to new installation, replacement, relocation, or removal, of lamps, lighting, or other illumination fixtures in greater than 50% of the total building FLOOR AREA. Space within a building interior that is not currently lit, and is not proposed to be lit, shall not count toward the 50% calculation.

Note that the IECS only applies to projects that must obtain building permits from the City or Town of Ithaca. New York State facilities/projects that do not require a local municipal building permit are not required to comply with the IECS.

Future Requirements

The IECS has been structured to have increasing stringency as time passes and has the following targeted goals[5]:

- Step 1 - Aug 4, 2021 through Jan 1, 2023 – Targeted 40% reduction in energy/Greenhouse Gas (GHG) Emissions
- Step 2 - Jan 1, 2023 through Jan 1, 2026 - Targeted 80% reduction in energy/GHG Emissions
- Step 3 - Beyond Jan 1, 2026 – Targeted Net Zero energy/GHG emissions

This Guidance Document will focus primarily on the current compliance requirements (Step 1), but a reasonable estimate should be made at the beginning of project planning as to when a building permit application is expected to be filed in order to determine whether higher targets should be incorporated into design.

2.0 Compliance Pathways

Projects will be required to submit an IECS compliance documentation plan when applying for a building permit and will be required to show final compliance with these plans prior to the issuance of a Certificate of Occupancy.

There are two pathways identified for commercial structures in the IECS during the Step 1 and Step 2 compliance intervals:

- Prescriptive Compliance Path/Easy Path (Easy Path)
- Performance-based Compliance Path/Whole Building Path (Whole Building Path)

We suggest that projects first evaluate compliance using the Easy Path.

[5] IECS section 404

During the third Step 3 compliance interval, these pathways are eliminated and projects must comply with the Zero Code[6]. Compliance with Step 3 requirements is not included in the scope of this document.

2.1 Easy Path – Compliance Discussion

The Easy Path is a point-based compliance system, with different design decisions or actions weighted with higher point values based on a roughly equivalent energy/emissions reduction. Projects must achieve a minimum of 6 points during the Step 1 compliance period, and a minimum of 12 points during Step 2.

The following is a summary and discussion of the available Easy Path Credits, suggested credits to target, and resources to document credit achievement.

Table 1. IECS Easy Path Summary

PRESCRIPTIVE PATH (EASY PATH)		Step 1	Step 2	
		Max Pts.	Max Pts.	Targeted Credits
Efficient Electrification				
EE1	Heat Pumps for Space heating	3	6	
EE2	Heat Pumps for Domestic Water Heating	1	2	
EE3	Commercial Cooking Electrification	3	6	
Affordability Improvements				
AI1	Smaller Building/Room Size	2	2	
AI2	Heating Systems in Heated Space	1	1	Possible
AI3	Efficient Building Shape	1	1	Possible
AI4	Right-lighting	1	1	Probable
AI5	Modest window-to-wall ratio	1	1	Probable
Renewable Energy				
RE1	Renewable Energy Systems	3	6	Probable
RE2	Biomass Space Heating	3	3	
Other Points				
OP1	Development Density	1	1	Probable
OP2**	Walkability	1	1	Probable
OP3**	Electric Vehicle Parking Spaces	1	1	
OP4	Adaptive Reuse	1	1	
OP5	Meet NY Stretch Code	1	1	Probable
OP6	Custom Energy Improvement	2	2	Probable

** Only 2 points can be achieved for OP1, OP2, OP3 combined

2.1.1. Credit Discussion

We have focused our interpretation and resources on credits that appear to be the best fit for campus achievement, particularly at locations served by the district energy system. While project teams are encouraged to examine and pursue any of the available IECS credits deemed achievable for a specific project, project teams are required to identify

[6] The ZERO Code, an Architecture 2026 initiative, is available at https://zero-code.org

and target first those credits that are achievable within the scope of the project itself. In particular, adopting design philosophies that make efficient building space, right-lighting, modest window-to-wall ratio, onsite renewables, and adoption of the stretch energy code are preferred vs. reliance on offsite renewable energy assets.

AI2 Heating Systems in Heated Space[7]

Per the AI2 credit, one point may be earned by meeting the following criteria:

All components of heating systems shall be installed inside space that meets all the following criteria:

- Inside the BUILDING THERMAL ENVELOPE
- DIRECTLY HEATED SPACE
- LIVABLE SPACE, OCCUPIABLE SPACE or contiguous to LIVABLE SPACE or OCCUPIABLE SPACE
- On a building level where at least 50% of the FLOOR AREA is DIRECTLY HEATED FLOOR AREA

Facilities connected to the university district energy systems should comply if all components of the building heating system meet the specified criteria.

AI3 Efficient Building Shape[8]

The IECS provides 1 point if the exterior surface area divided by the directly heated floor area is less than the maximum value provided by table C402.3.3.1 in the IECS. Project teams are encouraged to determine this value and pursue this credit if project programming allows.

AI4 Right Lighting[9]

Projects are encouraged to utilize the reference tables within the IECS and determine if pursuing the Right Lighting credit is appropriate and achievable.

AI5 Modest Window-to-Wall Ratio[10]

One point may be earned according to the requirements below.

The vertical fenestration area, not including opaque doors and opaque spandrel panels, shall be not greater than 20 percent of the gross above-grade wall area.

[7] IECS 402.3.2
[8] IECS 402.3.3
[9] IECS 402.3.4
[10] IECS 402.3.5

For additions, the area of above-grade walls that were part of the building thermal envelope of the original building but are not part of the building thermal envelope of the new building shall be counted towards the above-grade wall area of the addition.

RE1 Renewable Energy Systems[11]

Projects may earn up to three points in Step 1 and six points in Step 2 for allocating the production of renewable energy to the project based on the project square footage for no less than 15 years. Projects may use a mixture of both onsite renewable energy assets and offsite renewable energy assets that meet the criteria identified in the IECS. The University has over the past several years participated in the development of multiple offsite solar facilities which meet the criteria for the offsite renewable energy generation.

Projects can determine the amount of renewable energy required to achieve each point using the calculation below:

Minimum Renewable Energy Production needed to earn each point =
(1.2 kWh/ft2 x RA) + (2.4 kWh/ft2 x CA)
CA = Directly heated floor area of Commercial space (ft2)
RA = Directly heated floor area of Residential space (ft2)
Note: For buildings that have no residential space, set RA equal to zero. For buildings that have no commercial space, set CA equal to zero.

Projects may utilize the PVWatts online calculator[12] to determine the annual generation of any proposed onsite renewable energy systems. Projects may also use the tool to determine the sizing of the system required in order to generate the required amount of renewable energy in order to achieve the credits.

Projects seeking to utilize existing offsite renewable energy assets must coordinate this process and request allocations from the Energy and Sustainability department. To be eligible for allocations from Cornell's renewable energy assets projects must conform to Energy and Sustainability (018000) sections and Mechanical (230000) sections of the Cornell Design Standards, maximize onsite renewables, and implement all cost-effective energy efficiency measures.

It is likely that some projects will need to incorporate some renewable energy in order to comply with the IECS in both the Easy Path/Prescriptive and Whole Building Path options. Cornell has a limited stock of qualifying renewable energy credits (RECs) available for allocation to projects. HOWEVER, the primary goal of each project is to target GHG reductions in accordance with the Cornell Climate Action Plan as follows: AVOID carbon-intensive activities; REDUCE demand through aggressive energy conservation; REPLACE fossil fuels with low-carbon renewable energy; and AS A LAST RESORT - OFFSET what remains. Cornell will not consider allocating any RECs

[11] IECS 402.4.1
[12] https://pvwatts.nrel.gov/index.php

to the project required to OFFSET until the opportunities under AVOID, REDUCE, and REPLACE have been exhausted.

Annual reporting will be overseen by the Energy and Sustainability department.

OP1 Development Density[13]

Projects may earn one point for meeting the prescribed density calculated as follows:

> One point shall be earned if (DU + CA) > (7 x Acreage), where:
>
> DU = the number of all Residential dwelling units on the entire parcel occupied by the building
> CA = the floor area of all Commercial space, measured in units of 1,000 square feet, on the entire parcel occupied by the building
> Acreage = the land area, measured in acres, of the entire parcel occupied by the building.

Parcel boundaries on the Cornell Campus vary widely and range in size from small parcels containing a single building, agricultural and open space parcels with dispersed structures, to parcels containing hundreds of acres and dozens of high-density structures and dormitories. Projects can identify their parcel using online tax parcel data available from the Tompkins County GIS division[14].

Project teams should gather information on parcel size and all structures contained within the parcel boundary. Information on building size and number of dormitory units can be obtained from the Cornell Facilities Information website[15].

OP2 Walkability[16]

One point is available for siting a project within ¼ mile of at least 5 "Neighborhood Amenities". The radius may be set within ¼ mile of any point of the building. Amenity types may be counted twice and at least two amenity categories must be represented. Campus service amenities such as gymnasiums, eateries, and entertainment spaces are eligible. The University itself serves as a civic/community facility and also surrounded by and includes museums, performance spaces, worship spaces, and parks.

[13] IECS 402.5.1
[14] https://geo.tompkins-co.org/sites/mappingtompkins/
[15] https://www.fs.cornell.edu/fs_facilFind.cfm
[16] IECS 402.5.2

Neighborhood Amenity Types and Categories

Amenity Category	Amenity Type
Food retail	Supermarket
	Grocery with produce section
Community-serving retail	Convenience store
	Farmers market
	Hardware store
	Pharmacy
	Other retail
Services	Bank
	Family entertainment venue (e.g., theater, sports)
	Gym, health club, exercise studio
	Hair care
	Laundry, dry cleaner
	Restaurant, café, diner (excluding those with only drive-thru service)
Civic and community facilities	Adult or senior care (licensed)
	Child care (licensed)
	Community or recreation center
	Cultural arts facility (museum, performing arts)
	Education facility (e.g., K–12 school, university, adult education center, vocational school, community college)
	Government office that serves public on-site
	Medical facility that treats patients
	Place of worship
	Post office
	Public library
	Public park
	Social services center

OP5 Meet NY Stretch Code[17]

Cornell University Design and Construction standards require that projects be designed and constructed to meet the NY Stretch Code[18]. One point is available to projects which are designed to this energy standard.

Projects do not need to generate an energy model to show compliance with NY Stretch Code if the prescriptive requirements of the Code are met. When the prescriptive requirements of the Code cannot be met, an energy model must be performed. The Consultant has a choice between using ASHRAE 90.1-2016 Section 11 or Appendix G as baselines to demonstrate compliance under this credit. Cornell strongly encourages the use of ASHRAE 90.1-2016 Appendix G as the compliance option.

OP6 Custom Energy Improvement[19]

[17] IECS 402.5.5
[18] https://www.nyserda.ny.gov/All-Programs/Programs/Energy-Code-Training/NYStretch-Energy-Code-2020
[19] IECS 402.5.6

The Cornell University Design and Construction standards require that projects are designed to use less energy and emit less carbon over time, with the ultimate goal of carbon neutrality. Energy modeling is a key component of making good design decisions that show significant energy savings over energy code.

All project teams are strongly encouraged to achieve the two points under this Section.

The OP6 credit allows us to recognize site-based improvements to metered energy use and aligns with the University Design and Construction standards requirement that buildings have a minimum efficiency beyond those obtained by documenting district energy system savings.

2.2 Whole Building Path – Compliance Discussion

Projects are encouraged to pursue the easy path if feasible. However, several whole building compliance pathways are available which may be appropriate for larger capital projects to pursue. These compliance paths require energy/greenhouse gas modeling exercises as well as registration/pursuit of green building certification systems.

A matrix outlining modeling requirements is located in Appendix A of this document.

2.2.1 Whole Building Path – LEED/Energy Calculation Based Compliance

Projects required to meet LEED goals (v4.0) are encouraged to evaluate this option by revising the model as follows:

- Determine if this is sufficient to achieve 17 Optimize Energy Performance/Renewable Energy credits. Credit achievement may include district energy savings.
- If under, determine renewable energy required for the project achieve the 17 points
- Compare to the amount of renewable energy generation points needed for the project per C402.4 RE1 to comply with the Easy/Prescriptive Path of the IECS.
- Facilities Engineering/Energy and Sustainability will evaluate any required shortfall in performance and determine if RECs are are available to show compliance using this path.

2.2.2 Whole Building Path – Passive House Based Compliance

The Ithaca campus has not pursued Passive House certification to date. While the design principles and testing/verification required for certification are good practice and are to be encouraged, the aggressive energy use intensity requirements in passive house construction would be very difficult for non-residential structures to achieve. Compliance with the IECS using this method requires either certification or precertification using a third-party Passive House professional.

Projects interested in pursuing this pathway should discuss this possibility with Facilities Engineering and the Office of the University Architect at the earliest design stage possible.

2.2.3 Whole Building Path – Greenhouse Gas Emissions Calculation Based Compliance
It is unlikely that many projects will successfully apply the GHG calculation based compliance path.

3.0 Documentation/Submission Package

The project team shall meet with Cornell subject matter experts and provide an IECS compliance plan throughout the design process. It is important that IECS compliance documentation provided to the City and Town are clear, concise, and persuasive. We suggest that teams utilize the checklist provided as Appendix B to this document to provide a consistent application look and style to municipal officials reviewing the package.

A deliverable schedule may be included in the Architect contract/agreement. This document provides supplemental guidance, but does not supersede terms contained within the Architect agreement.

Projects teams must deliver a complete IECS compliance plan document and associated drawings and calculations for submission to Town/City code officials. This package must reflect value engineering exercises which take place after the issuance of the 100% CD submission package. It will be the responsibility of the design professional to work with the entity applying for the project building permit (entities could include the University or contractor) to successfully submit the IECS compliance plan package to code officials at the time of the building permit application.

The design professional will also ultimately be responsible for ensuring that during construction, submitted and approve products comply with the submitted IECS compliance plan. At the completion of construction, in order to obtain a Certificate of Occupancy, the design professional must provide documentation demonstrating to code officials that the plan has been executed as outlined in the plan.

Appendix A – Energy Modeling Matrix

ENERGY MODELING MATRIX - IECS										
COMPLIANCE PATH	P1	P2	B1	B2	B3	B4	B5	B6	B7	Notes
Cornell Standards	X		X							3, 5, 12
General Energy Code Compliance	X		X							3, 5, 13
IECS C402.5.5 OP5 NYStretch Code	X	X		X		X				3, 4, 6, 8, 14
IECS C402.5.6 OP6 Custom Energy Improvement	X						X			3, 9, 15
IECS C403.2.1 LEED v4-based Compliance		X							X	4, 11, 16
IECS C403.4 Greenhouse Gas Emissions Based Compliance		X						X		4, 10, 17
LEED v4.1		X			X					4, 7, 18

Notes	
1	Stand-Alone Models: Energy Units reflect metered energy use (chilled water ton-hours, steam Mmbtu, electricity kWh)
2	Aggregate/DES Models: Energy Units reflect virtual LSC/CHP Plants (electricity kWh, natural gas therms)
3	Proposed Model 1 (P1): Building Stand Alone
4	Proposed Model 2 (P2): Aggregate Building / DES Model
5	Baseline Model 1 (B1): ASHRAE 90.1-2016 Appendix G - Building Stand Alone
6	Baseline Model 2 (B2): ASHRAE 90.1-2016 Appendix G - Building Stand Alone with NYStretch overlay
7	Baseline Model 3 (B3): ASHRAE 90.1-2016 Appendix G - Aggregate/DES Model
8	Baseline Model 4 (B4): ASHRAE 90.1-2016 Appendix G - Aggregate/DES Model with NYStretch overlay
9	Baseline Model 5 (B5): ASHRAE 90.1-2013 Appendix G - Building Stand Alone
10	Baseline Model 5 (B6): ASHRAE 90.1-2013 Appendix G - Aggregate/DES Model
11	Baseline Model 6 (B7): ASHRAE 90.1-2010 Appendix G - Aggregate/DES Model
12	Until Standards are updated with adoption of NYStretch
13	Modeling only required when prescriptive measures cannot be met
14	Projects are strongly encouraged to evaluate this option
	Modeling is not required for compliance with NYStretch as long as the project complies with the Prescriptive Measures of the Code. HOWEVER, until the IECS came back to life, we were on the road to rewriting our Standards indicating that Consultants would be required to design to NYStretch. Cornell already requires projects to perform (at least) a bulding stand-alone energy model for two reasons (1) compliance with EUI targets (2) compliance with 30% energy reduction over current Code. It is up to the modeler to choose either the Stand-alone or Aggregate Building/DES model for compliance; both scenarios may need to be modeled until we get a few projects under our belt; it is unknown whether the Building Stand-Alone or the Aggregate/DES Model will ultimately get us to compliance.
15	Projects are strongly encouraged to evaluate this option
	It's a little hazy whether we can actually use ASHRAE for this credit, but we should strongly negotiate this with the City/Town to minimize the Codes we (AND the City/Town) need to keep up with here. The City indicates that ASHRAE can be used if the baseline condition is not addressed by the ECCC. In reality, if the baseline is not addressed in the ECCC, then it isn't addressed in ASHRAE either... I would recommend targeting the use of ASHRAE Appendix G; the IECS did not indicate theparticular ASHRAE path (Section 11/Appendix G) to be used like they did for credits. I would say most Consultants are more familiar with Appendix G rather than Section 11 due to LEED.
16	Projects required to meet LEED goals (v4.0) are encouraged to evaluate this option by revising the model as follows:
	-Subtract PROCESS LOADS (as defined by the IECS)
	-ADD renewable energy equal to 25% of the baseline energy use
	-Determine if this is sufficient to achieve 17 Optimize Energy Performance credits
	-If over, adjust renewable energy until the project achieves the 17 points
	-Compare to the amount of renewable energy generation points needed for the project per C402.4 RE1 to comply with the Easy/Prescriptive Path of the IECS.
17	This may not be a viable compliance paths for projects connecting to the CHPP, HOWEVER
	Projects have the potential to evaluate this path by converting the OP6 Model from Stand-Alone to Aggregate/DES Model, and revise as follows:
	-Subtract PROCESS LOADS (as defined by the IECS)
	-ADD renewable energy equal to 25% of the baseline energy use
	-Determine if this is sufficient to achieve a 40% reduction in Greenhouse Gas (GHG) emissions
	-If over, adjust renewable energy until the project achieves the 40% reduction
	-Compare to the amount of renewable energy generation points needed for the project per C402.4 RE1 to comply with the Easy/Prescriptive Path of the IECS.
18	For information only, there is no compliance option that references the LEED v4.1, Optimize Energy Credit.
19	This matrix does NOT include all the compliance options available in the NYSECCC/NYStretch/ASHRAE 90.1/IECS. When energy modeling is required, Cornell recommends projects to use the modeling protocols included in ASHRAE 90.1 Appendix G (as amended by NYS) for compliance as allowed by the NYSECCC. This performance rating method (PRM) is intended to quantify performance that substantially exceeds the minimum requirements of 90.1; whereas, other performance rating methods (such as ASHRAE 90.1 Section 11 Energy Cost Budget, and ECCC Section C407 Total Building Performance) are only intended to address basic Code compliance for projects that cannot meet the prescriptive measures of the Code. Due to Cornell's LEED initiatives, many modeling consultants are already quite familiar with the Appendix G modeling protocols; Ultimately, it is desired to minimize the burden to projects by standardizing on a single compliance document, even though up to three versions (2010, 2013, 2016) may need to be used to comply with all the Cornell Standards and Codes.
20	Renewable Energy: It is likely that some projects will need to incorporate some renewable energy in order to comply with the IECS in both the Easy Path/Prescriptive and Whole Building Path options. Cornell has a limited stock of qualifying renewable energy credits (RECs) available for allocation to projects. HOWEVER, the primary goal of each project is to target GHG reductions in accordance with the Cornell Climate Action Plan as follows: AVOID carbon-intensive activities; REDUCE demand through aggressive energy conservation; REPLACE fossil fuels with low-carbon renewable energy; and AS A LAST RESORT - OFFSET what remains. Cornell will not consider allocating any RECs to the project required to OFFSET until the opportunities under AVOID, REDUCE, and REPLACE have been exhausted.

Appendix B – IECS submission checklist

Ithaca Energy Code Supplement
Commercial Compliance Summary Project Checklist

Project:
Date:
Area:

		2021 - 2023 IECS Compliance Checklist					
PRESCRIPTIVE PATH (EASY PATH)		A minimum of **6 points** must be achieved					
		Y	?	N	Max	Notes	
Efficient Electrification		Efficient Electrification					
EE1	Heat Pumps for Space heating				3	2 points for air source, 3 points for ground source	
EE2	Heat Pumps for Domestic Water Heating				1	See C402.2.2b)	
EE3	Commercial Cooking Electrification				3		
Affordability Improvements		Affordability Improvements					
AI1	Smaller Building/Room Size				2	Only for hotels and residential	
AI2	Heating Systems in Heated Space				1	Buildings connected to DESs are not eligible for this point?	
AI3	Efficient Building Shape				1		
AI4	Right-lighting				1		
AI5	Modest window-to-wall ratio				1		
Renewable Energy		Renewable Energy					
RE1	Renewable Energy Systems				3		
RE2	Biomass Space Heating				3		
Other Points		Other Points					
OP1	Development Density				1	Only 2 points can be achieved for OP1, OP2, OP3 combined	
OP2**	Walkability				1		
OP3**	Electric Vehicle Parking Spaces				1		
OP4	Adaptive Reuse				1	Need to have a different use from current	
OP5	Meet NY Stretch Code				1	2020 Version 1.0	
OP6	Custom Energy Improvement				2		
TOTAL POINTS							

PERFORMANCE-BASED PATH 1		Whole Building Energy Modeling **LEED v4.0 BD&C - ASHRAE 90.1-2010 Appendix G (PRM)**		
		Points Achieved	Max LEED pts. Available	
EAc2	Optimize Energy Performance		18	
EAc5	Renewable Energy Production		3	
TOTAL POINTS			21	A minimum of **17 LEED EAc2/EAc5 credits** must be achieved

PERFORMANCE-BASED PATH 2	Whole Building Energy Modeling **ASHRAE 90.1-2013 Section 11 Energy Cost Budget (ECB)**	
Budget Building Energy Cost:		Demonstrate a **40%** savings over the budget building energy cost.
Design Building Energy Cost:		Renewable energy generation capped at **25%** of the budget
Savings:		building energy use

PERFORMANCE-BASED PATH 3	Whole Building Energy Modeling **ASHRAE 90.1-2010 Section 11 Energy Cost Budget**	
Budget Building Energy Cost:		Demonstrate a **46%** savings over the budget building energy cost.
Design Building Energy Cost:		Renewable energy generation capped at **25%** of the budget
Savings:		building energy use

PERFORMANCE-BASED PATH 4	Passive House **WUFI Passive / WUFI Passive Free / EnerPHit**	
		Meet the design requirements of PHIUS+ Passive Building Standard OR Passive House Classic Standard. Certification is NOT required

PERFORMANCE-BASED PATH 5	Greenhouse Gas Emissions Reduction Modeling **ASHRAE 90.1-2013 Appendix G (PRM)**	
Electricity Emission Factor for Grid Electricity		548.37 lb CO2e/MWh
Baseline Building GHG Emissions:		Demonstrate a **40%** savings over the baseline building GHG
Proposed Building GHG Emissions:		emissions. Renewable energy generation capped at **25%** of the
Savings:		baseline building energy use

PERFORMANCE-BASED PATH 6	Greenhouse Gas Emissions Reduction for Additions	
Existing Building GHG Emissions prior to Addition:		The addition PLUS the existing building shall have a lower total GHG emissions than the original existing building
Existing Building + Addition GHG Emissions:		
Savings:		