LEED v4 and v4.1 BD+C/ID+C

Zero Energy Performance Index (zEPI) EA Pilot ACP 143

Produced by Canada Green Building Council

CAGBC

This document applies to:

- LEED v4 Building Design and Construction (BD+C)/Interior Design and Construction (ID+C) projects registered prior to the LEED v4 2024 Energy Update (that is, projects registered prior to March 1, 2024). These projects can continue to utilize this older version of EA Pilot ACP 143 noted within, which is now revised to include the newest code clone score for NECB 2020 and a few clarifications as noted.
- LEED v4.1 BD+C/ID+C of any date of registration. These projects may use either the version indicated below, or the identical ACP contained within the LEED Pilot Credit Library. The version below has been updated to include the newest code clone score for NECB 2020 and a few clarifications in line with the online version.

This document does not apply to LEED v4 BD+C/ID+C projects registered subject to the LEED v4 2024 Energy Update (registered on or after March 1, 2024). If these projects wish to apply this pilot credit, please see the revised zEPI EA Pilot ACP available in the LEED Pilot Credit Library.

LEED v4 projects registered before March 1, 2024 (see below)
LEED v4 projects registered on or after March 1, 2024 (see online)
LEED v4.1 projects with any date of registration (see page 8)

LEED v4 – zEPI EA Pilot ACP 143 (for projects registered before March 1, 2024)

Intent

Projects in Canada may document LEED v4 and LEED v4.1 EA prerequisite Minimum Energy Performance and EA credit Optimize Energy Performance credit using the zEPI (zero Energy Performance Index) calculation methodology. To apply this path, projects must confirm compliance with all mandatory provisions for the referenced version of the standard used.

Requirements

1. Develop a proposed energy model that incorporates the as-designed features of the project building. Document the energy modeling input assumptions for unregulated loads. Unregulated loads should be modeled accurately to reflect the actual expected energy consumption of the building. If unregulated loads are not identical for both the baseline and the proposed building performance rating, follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1–2016, G2.5).

Unfinished spaces: If the project is applying this ACP using an energy code with a zEPI score that is lower than the zEPI score for the local code(s) regulating the project, unfinished systems and equipment in the proposed model must be modeled using the prescriptive requirements from the less stringent local code regulating the project, and the baseline design must be modeled using the prescriptive requirements from the referenced code.

2. Generate a “code clone” energy model based on the proposed energy model, where each relevant feature of the proposed energy model is revised to reflect the prescriptive requirements associated with that feature. Schedules shall be modeled identically in the baseline and proposed design. For projects using

NECB for local code, the NECB Part 8 reference building may be modeled in lieu of a code clone building. For projects using ASHRAE 90.1 for local code, the ASHRAE 90.1 Section 11 Energy Cost Budget baseline building may be modeled in lieu of the code clone building.

For projects modeled using NECB 2017 Part 8, the reference model must comply with the following additional condition:

- Comply with mandatory requirements of ASHRAE 90.1-2016
  ASHRAE 90.1-2016 mandatory requirements must be met, in addition to the performance path limitations referenced in the NECB 2017 Sections 3.4.1.2, 5.4.1.2 and 6.4.1.2. In cases where ASHRAE and the NECB reference requirements are concerning the same item, the more stringent requirement shall be adhered to.

For projects modeled using NECB 2017 (any approach), the "code clone" energy model or the NECB 2017 Part 8 reference model must comply with the following additional conditions:

- Limit vertical fenestration in the reference building. The reference building shall maintain the same vertical fenestration and door area to gross wall area ratio (FDWR) as the proposed building up to the respective maximum prescribed by NECB 2017 Article 3.2.1.4.

  If the proposed building exceeds the prescribed maximum FWDR, scale down the vertical fenestration in the reference building to the corresponding NECB 2017 maximum while retaining a distribution proportional to the proposed building on each wall of the reference building.

- Limit skylight area in the reference building. The reference building shall maintain the same skylight area to roof area ratio as the proposed building up to the respective maximum prescribed by NECB 2017 Article 3.2.1.4.

  If the proposed building exceeds the prescribed maximum skylight area to roof area ratio of 2%, scale down the skylight area in the reference building case to 2% while retaining a distribution proportional to the proposed building.

- Apply supply air temperature reset controlled based on the warmest zone for VAV systems (NECB System 6) consistent with NECB 2017 Sentence 5.2.8.9.(1).

For all projects, the "code clone" energy model, the NECB Part 8 model, or ASHRAE 90.1 Section 11 model must comply with the following additional conditions:

- If the total outside air volume for the proposed design exceeds the minimum required outside air volume by more than 10%, the Baseline outside air volume for each system shall be reduced to the lesser of 110% of the required outside air volume for the system, or the design outside air for the system. Minimum required outside air volume is calculated per ASHRAE 62.1, ASHRAE 62.2 for residential dwelling units, or local code, whichever is more stringent,

3. Calculate comparative zEPI scores for the proposed design:
   a. Using site energy consumption as the metric.

   b. Using Greenhouse gas emissions as the metric
      (where GHG emission factors are determined consistently with the LEED v4.1 requirements)

Renewable energy:

- For the site energy metric, renewable energy generation meeting the ASHRAE 90.1-2016 definition for on-site renewable energy may be subtracted from the total site energy consumption.
- For the GHG emission metric, Tier 1 and Tier 2 renewable energy may be included for credit in the EAc Optimize Energy Performance calculation, as indicated in LEED v4.1 EAc Renewable Energy requirements.

ZEPI Score Methodology:

Assign the following zEPI score to the "code clone" building or the allowed alternative as noted above in #2. That is, for projects using NECB for local code, the NECB Part 8 reference building may be modeled in lieu of a code clone building. For projects using ASHRAE 90.1 for local code, the ASHRAE 90.1 Section 11 Energy Cost Budget baseline building may be modeled in lieu of the code clone building:

- NECB 2020: 46
- NECB 2017: 48
- NECB 2015: 54
- NECB 2011: 55
- ASHRAE 90.1-2016: 50
- ASHRAE 90.1-2013: 54
- ASRAE 90.1-2010: 58

Using site energy as the metric, calculate the zEPI score for the Proposed building as follows:

zEPIProposed = zEPICodeClone x SiteEnergyConsumptionProposed / SiteEnergyConsumptionCodeClone

Using Greenhouse gas emissions as the metric, calculate the zEPI score for the Proposed building energy modeled performance as follows:

zEPIProposed = zEPICodeClone x GHGemissionsProposed / GHGemissionsCodeClone

4. Determine the Zero Score for "EE w/ On-Site RE" associated with the modeled energy consumption of the proposed design using the AIA Zero Tool: https://zerotool.org/zerotool/. Enter it as an "Existing building", including the total modeled energy consumption per end-use, and total qualifying site-generated renewable energy from the proposed energy model.

Table 1: Site Energy

Use zEPI score calculated using units of site energy.

Points	ID+C	BD+C				
	Commercial Interiors, Retail, Hospitality	Multifamily Midrise	Core and Shell*	New Construction and Major Renovation		
				NC, WDC, DC, Hospitality, Retail	Schools	Healthcare
Prereq	53	53	53	53		53
1	-	50	50	50		51
2	52	48	47	47		49
3	51	46	45	44		47
4	50	44	42	41		44
5	48	42	40	38		41
6	46	40	38	35		38
7	44	38	35	32		35
8	42	36	32	29		32
9	40	34	29	25	-	29
10	38	32				25
11	36	30				
12	34	28				
13	32	26				
14		24				
15		20				
EP	30	15	20	20	20	20

Table 2: Greenhouse Gas Emissions

Use zEPI score calculated using units of Greenhouse Gas Emissions

Points	ID+C	BD+C				
	Commercial Interiors, Retail, Hospitality	Multifamily Midrise	Core and Shell*	New Construction and Major Renovation		
				NC, WDC, DC, Hospitality, Retail	Schools	Healthcare
Prereq	53	53	53	53		53
1	-	50	50	50		51
2	50	48	46	46		49
3	49	46	44	44		46
4	48	44	42	41		44
5	46	42	39	38		41
6	44	40	35	34		38
7	42	38	31	30		34
8	40	36	27	25		30
9	38	34	25	20	-	25
10	36	31				20
11	33	28				
12	28	25				
13	23	22				
14		15				
15		10				
EP	10	0	20	15	20	15

Documentation/Compliance:

- Confirm compliance with all mandatory provisions of the version of the standard used, or as stipulated above.
- The project shall provide documentation that includes all relevant inputs and outputs that are provided in the LEED Minimum Energy Performance Calculator, including quality assurance checks. It is acceptable to provide a different format, other than this LEED Calculator. However, any alternatives provided must include sufficient information to describe the relevant prescriptive requirements modeled in the code clone building (or allowed alternatives as per #2 above) (including controls), and to describe all efficiency measures modeled in the proposed design.

- The project shall provide in Excel format the performance outputs summary that indicates energy consumption, demand, and percent savings by end-use for the Baseline and Proposed design (shown in one comparative table), total site energy consumption and savings per energy source, total greenhouse gas emissions and savings per energy source, total renewable energy contribution for site energy and GHG emissions, total site energy consumption and savings, and total GHG emissions and savings. It is acceptable to use the LEED Minimum Energy Performance Calculator Performance Outputs tab to report this information, though that is not a requirement.
- The project shall provide all simulation inputs and outputs required in a standard ASHRAE 90.1-2016 submission for the proposed model and the code clone model (or allowed alternatives as per #2 above), including any exceptional calculations.
- The project shall provide a printout of the Zero Tool results.

Note that the narrative justifying the savings per end-use (required within the quality assurances checks), and the input and output summary excerpts from the simulation software must be very comprehensive when using this approach, because the project is not using a standard ASHRAE 90.1-2016 baseline.

See https://newbuildings.org/code_policy/zepi/ for further details of the zEPI score.

LEED v4.1 – zEPI EA Pilot ACP 143

Intent

Projects in Canada may document LEED v4 and LEED v4.1 EA prerequisite Minimum Energy Performance and EA credit Optimize Energy Performance credit using the zEPI (zero Energy Performance Index) calculation methodology. To apply this path, projects must confirm compliance with all mandatory provisions for the referenced version of the standard used.

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1. Develop a proposed energy model that incorporates the as-designed features of the project building. Document the energy modeling input assumptions for unregulated loads. Unregulated loads should be modeled accurately to reflect the actual expected energy consumption of the building. If unregulated loads are not identical for both the baseline and the proposed building performance rating, follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1–2016, G2.5).

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2017 Article 3.2.1.4.

If the proposed building exceeds the prescribed maximum skylight area to roof area ratio of 2%, scale down the skylight area in the reference building case to 2% while retaining a distribution proportional to the proposed building.

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Renewable energy:

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Using Greenhouse gas emissions as the metric, calculate the zEPI score for the Proposed building energy modeled performance as follows:

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Table 1: Site Energy

Use zEPI score calculated using units of site energy.

New Construction and Major Renovation (All rating systems except CS & ID+C, including Multifamily Residential)	CS	Points BD+C (except Schools, Healthcare) and BD+C: Multifamily	Points Healthcare	Points Schools	ID+C	Points ID+C
50	50	Prereq	Prereq	Prereq	50	Prereq
47	48	1	1	1		
44	46	2	2	2	47	2
41	44	3	3	3	45	3
38	41	4	4	4	43	4
35	38	5	5	5	41	5
32	35	6	6	6	39	6
29	32	7	7	7	37	7
26	29	8	8		35	8
23	26	9	9	8	33	9
15	23	EP	10	EP	31	10
0			EP		30	11
					28	12
						EP

Table 2: Greenhouse Gas Emissions

Use zEPI score calculated using units of Greenhouse Gas Emissions

New Construction and Major Renovation (All rating systems except CS & ID+C, including Multifamily Residential)	CS	Points BD+C (except Schools, Healthcare) and BD+C: Multifamily	Points Healthcare	Points Schools	ID+C	Points ID+C
50	50	Prereq	Prereq	Prereq	50	Prereq
47	48	1	1	1		
44	46	2	2	2	47	2
41	44	3	3	3	45	3
37	41	4	4	4	42	4
32	37	5	5	5	39	5
28	32	6	6	6	36	6
22	28	7	7	7	33	7
15	22	8	8		30	8
10	15	9	9	8	26	9
0	10	EP	10	EP	22	10
0			EP		15	11
					10	12
					0	EP

Documentation/Compliance:

- Confirm compliance with all mandatory provisions of the version of the standard used, or as stipulated above.
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