



LEED Pilot Credit Library

Pilot Credit 1: Life-Cycle Assessment (LCA) of Building Assemblies and Materials

This credit involves the use of an Environmental Impact Calculator & USGBC Credit Calculator which will be available for use by projects participating in the pilot. It is not available for public viewing at this time.

This credit is available for pilot testing by the following LEED project types:

- New Construction

Intent

To encourage the use of environmentally preferable building materials and assemblies.

Requirements

Part 1: LCA of Structure and Envelope Assemblies (Proposed as 5 post-pilot base points reallocated from MR Credit 1.1, MR Credit 4, and MR Credit 5. Pilot projects will only receive 1 point total for this credit.)

Use an USGBC approved Environmental Impact Calculator¹ to identify and calculate environmental impact estimates for generic assemblies used in the project from the following assembly groups: columns and beams, floors, exterior walls, windows, interior walls, and roofs.² Transfer those impact estimates to the USGBC Credit Calculator to produce the LCA impact score and subsequent LEED points to be awarded. This credit is currently available only to projects located in the United States or Canada, since it is based on a database that addresses these regions.

- Define the basic building type (high- or low-rise), geographic region, and area (square feet) of assemblies in each category.
- If reusing portions of assemblies in-situ within a renovation of an existing building:
 - For each assembly specified in (a), indicate how many square feet are reused from the existing superstructure.
 - For each reused assembly, indicate the percent of the assembly's component materials that have been reused. Calculate the percent by estimated cost, as if installing a completely new version of the specific assembly. This will allow the Credit Calculator to give 100% credit for reused assembly components.

The Environmental Impact Calculator will:

- Report environmental impact metrics for assemblies specified
- Adjust for the benefits of assembly reuse within existing buildings (if applicable)

The USGBC Credit Calculator will:

- Apply USGBC-defined life cycle impact category weightings to those metrics

¹ Current approved tool is the Athena Institute's Eco-Calculator for Assemblies available at <http://www.athenasmi.org/tools/ecoCalculator/index.html>. Further explanation can be found in the LCA Credit Background Document available to pilot projects.

² Additional information on LCA and the approach and methodology used in this credit can be found in the Background Document available to pilot projects.



LEED Pilot Credit Library

- Compare the results to the database average and best possible assemblies
- Provide an LCA score
- Calculate the number of possible LEED points.

Project teams *are not required* to perform LCAs on materials or assemblies, or to analyze LCA results since the Credit Calculator performs these functions based on information provided by the project team.

The credit's LCA does not include the assemblies' impacts on energy use during the building's operation phase. Accordingly, project teams should closely coordinate assembly choices with EA credit 1, Energy Optimization.

Scoring for Credit Submittals that Specify All Assembly Groups

For a submittal that specifies an assembly in each of the Credit Calculator's assembly groups, an LCA score (between 0 and 100) will be calculated by the Credit Calculator based on the equation:

LCA Score = $100 \times (B - S) / (B - T)$, rounded to the nearest integer, where:

"B" (benchmark) is the sum, across all assembly categories, of the area-weighted environmental impact scores for the *average (mean) of all assemblies* in each of the assembly categories (area-weighted environmental impact score = area [square footage] of the specified assembly times the environmental impact score per square foot for the average of the assemblies in that group),

"T" is the sum, across all assembly categories, of the area-weighted environmental impact scores for the *best performing assembly* in each of the assembly categories (area-weighted environmental impact score = area [square footage] of the specified assembly times the environmental impact score per square foot for the best performing assembly in that group), and

"S" is the sum, across all assembly categories, of the area-weighted environmental impact scores for the *specified assembly* in each of the assembly categories (area-weighted environmental impact score = area [square footage] of the specified assembly times the environmental impact score per square foot for the specified assembly in that group).

The LCA score is converted into LEED points as follows (*this is theoretical for pilot projects*):

- LCA score 1-14: 1 point
- LCA score 15-28: 2 points
- LCA score 29-42: 3 points
- LCA score 43-56: 4 points
- LCA score 57-70: 5 points
- LCA score 71-84: 5 points + 1 LCA innovation point for exemplary performance
- LCA score 85-100: 5 points + 2 LCA innovation points for exemplary performance



LEED Pilot Credit Library

Scoring for Credit Submittals that Specify a Partial Set of Assembly Groups

In some cases, an assembly cannot be found in the Credit Calculator because it is not in the Credit Calculator's assembly database. This might occur with a new, innovative approach or material³. If a project team cannot find an exact match for an assembly in the Credit Calculator,

the area of the unspecified assembly(ies) must be entered into the "Other/Unspecified" line. The Calculator assumes that the LCA performance of an unspecified assembly is equal to the benchmark (average) level of performance for that assembly group. Since the LCA score is based on how much better than average the building's full set of assemblies performs, choosing "Other/ Unspecified" – the average – reduces the total possible LCA score.

Part 2: Materials Not Addressed by Part 1 (LCA) *(Proposed as 2 post-pilot base point. Pilot projects will only receive 1 point total for this credit.)*

An LCA approach is only being applied to structural/ envelope assemblies at this time; LCA for additional assemblies and/ or products might be pursued in future versions of the credit. Therefore, two points (one point each reallocated from MR credits 4 and 5) are available for use within this alternative compliance path, to reflect environmental benefits of recycled and regionally manufactured finishes and other products not addressed in Part 1 of this credit.⁴

- One point is available from this portion of the credit for those projects that use non-structural, non-envelope assembly materials that meet the requirements of MR credit 4 for recycled content and, in total, constitute x% of the total value of all materials in the project. The denominator is the same as in the conventional MR credit 4.
- One point is available for those projects that use non-structural, non-envelope assembly materials that meet the requirements of MR credit 5 for regional materials and, in total, constitute x% of the total value of all materials in the project. The denominator is the same as in the conventional MR credit 5.

Projects may use the default method of calculating total costs or may tally all materials costs (the tally must include all materials, structural and non-structural, in the project).

Aside from the exceptions noted above, instructions and requirements for achieving these points are provided under MR credits 4 and 5.

³It is possible to add new assemblies to the database underlying the LCA Credit Calculator but it can be a lengthy process. Requirements and the process for proposing new assemblies are available at [insert web address].

⁴Consistent with other MR credits, Mechanical, electrical and plumbing components and specialty items such as elevators shall not be included in the calculations. Only include materials permanently installed in the project. Furniture may be included, providing it is included consistently in MR Credits 3-7