



1800 Massachusetts Ave,
NW, Suite 300
Washington, DC 20036
T: 202 828-7422
F: 202 828-5110
www.usgbc.org

LEED 2009 Weightings Background

The LEED 2009 scorecards are the result of several important development initiatives undertaken by USGBC. The farthest-reaching and most technically complex feature is the re-weighting of credits in the LEED Rating Systems. Credit re-weighting, as used in this context, is the redistribution of the available points in LEED so that a given credit's point value more accurately reflects its potential to either mitigate the negative environmental impacts of a building or promote positive impacts.

The LEED rating system has always been implicitly weighted by virtue of the different point values assigned to each credit and category. LEED has been successful in promoting market transformation with its existing weightings but USGBC has undertaken a process to re-weight the rating systems and redistribute points in each rating system in an effort to maximize the positive benefit realized by LEED certified buildings and capitalize on the extraordinary market traction LEED has enjoyed. To do this, USGBC has sought and used the best scientific data available and, via the expertise of the volunteers serving on LEED committees, substantial market and buildings expertise. The resulting scorecards are a composite of scientific and market analyses.

The weightings process developed for LEED 2009 and beyond serves as a replacement for the previous point allocation system. It is an important upgrade that provides LEED developers with the ability to access the latest scientific data and use it to inform the development of LEED in a transparent and defensible way.

Point weightings have been introduced into LEED 2009 through the creation of a unique workbook that filters and synthesizes available environmental and building system data into an integrated, dynamic point allocation tool. Because the workbook delivers this data in a compiled format with analytical capabilities built in, decision-makers are free to spend time considering how this science should be incorporated into LEED rather than tracking down one piece of information at a time as necessary.

The Big Picture

The first step in weighting LEED involved deciding which environmental impacts LEED should be addressing. LEED 2009 uses US EPA's [TRACI](#) environmental impact categories. TRACI is a computer software tool developed by the U.S. EPA to assist with impact assessment for Life Cycle Assessment, Industrial Ecology, Process Design, and Pollution Prevention. The TRACI categories were selected because they represent a comprehensive, currently available complement to LEED which is appropriate for the North American building market.

Layered on top of the TRACI environmental impact categories are weightings devised under the auspices of NIST (National Institute of Standards and Technology) which compare the impact categories to each other and assign a relative importance to each. Together, the TRACI impact categories and the weightings assigned by the NIST process provide a foundation for discussion of the environmental impacts related to the design, construction, operations, and maintenance of the built environment.



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A matrix is then created which places weighted impact categories on one axis with LEED credits on another axis. This matrix can then be used to evaluate which credits address which impacts, and to what degree. USGBC, working alongside several expert consultants, guided the development of a weightings workbook tool to analyze how each LEED credit interacts with the list of impacts. This tool served as the starting point from which the LEED Steering Committee discussed the reallocation of points in LEED 2009.

LEED 2009 Workbook Tool

The workbook tool is a credit weighting software program developed in Microsoft Excel 2007 which understands building impacts and uses this information to assign weights to individual LEED credits. It is a synthesis of a range of complex phenomena relating to a number of environmental and human health impacts such as climate change, water use, etc.

The tool is transparent, showing what impacts have been considered and the relative importance attached to each impact category. It is also flexible, allowing for addition or revision as changes occur in our understanding of the importance of environmental and human health issues consistent with scientific and market advances.

This is advancement over the current LEED rating system. Presently, even though individual credits contain implicit weights, these credits are weighted equally, except when higher levels of performance receive one or more additional credits (e.g., EA Credit 1). The workbook tool outperforms current standards in terms of transparency and flexibility, providing additional information to facilitate educated decisions.

In spite of its ability to theoretically individualize the rating system to account for project-specific location and use, LEED 2009 will not presently consider this aspect for project certification.

How It Works

The 3 main tabs of the workbook feed project information into the tool. Each project will be measured against a typical building based on a prototype of the average LEED registered project. The prototype is defined by the characteristics of its location, utility, proximity to mass transit, population density, materials used, and contribution to climate change.

It is possible for individual project teams to compare results accruing from this 'default' data with buildings specific to their location and conditions of use. Users will have the chance to toggle around to capture the essence of the impact categories, and compare/measure the results/performance against each of the LEED credits, and weigh each credit's relative importance under each building activity group.

However, this aspect of the tool will be limited to providing an understanding of the importance and relevance of each LEED credit to a specific building. This will afford the user an opportunity to make an informed decision to target certain credits and gain



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benefit for their project. It is not possible, at this time, for the user to utilize this data to claim extra credits.

Scorecards & LEED credits

Scorecards are the result of the data analysis processed by the workbook tool. The final weights are expressed as a percentage and each credit point is fed into a typical LEED scorecard to arrive at a sum total of 100 points for all the activity groups. A 100 point rating system informs the certification thresholds – certified, silver, gold or platinum require a 40%, 50%, 60% or 80% achievement of points, respectively.

Additionally, there will be 5 bonus points for Innovation and Design, 4 bonus points for Regionalization and 1 point for a LEED accredited professional. The total number of points available for each project is 110 points. These 10 points are over and beyond the 100 base points and will be used to help the project achieve its certification.

Scorecards have been derived to suit LEED for New Construction, LEED for Existing Buildings, LEED for Commercial Interiors, LEED for Core and Shell, and LEED for Schools.

Assumptions Used in the Spreadsheet

The impact categories are based off of a combination of data from existing studies and databases as well as the LCA database SimaPro. The data set combination chosen is reasonably representative of the U.S. economy within the confines of the analysis. The average building is considered to be a fully occupied, regularly working 2 story office building, with the physical characteristics of the average LEED registered project. Building scenarios for each rating system were envisaged in view of environmental analysis resulting from transportation control – this was kept in the median mode for most categories, except materials where it was fixed in the highest range. These scenarios were chosen for commonality of issues attached to U.S. buildings.

Results

The weightings process produced scorecards that look different from the existing scorecards. This was mainly due to the heavy emphasis on credits that reduce a building's carbon footprint.

Not surprisingly, credits showed fractional points; MR and IEQ credits got lower points than previously awarded, and some credits dropped to almost negligible value.

Guiding Policy Decisions and Deviation from Straight Results

The LSC vetted the straight workbook output with a USGBC vision/mission yardstick. Simulation of the workbook tool using the weighted model resulted in zero values for some LEED credits. Since scorecards recorded fractional and/or zero value credits, the LSC made a policy decision that fixed all existing LEED credits to at least 1 whole point. Additionally LSC favored a holistic view of environmental quality in place of indoor ventilation. As such, the NIST weights of the TRACI impacts were adjusted to allot 15% of credits to IEQ instead of 3% IAQ credits. Fractional value credits were rounded off to whole points and these remaining fractional points were allotted to



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credits related to climate change mitigation. This was justified from a market-oriented perspective to support market sectors that had invested considerable resources in that direction. It was also decided to allot 100 possible points to credits, excluding innovation and regional credits.

Benefits of the Tool to Cull Ineffective LEED credits

It is also envisaged that providing a substantial amount of information to the user will help inform about the immense possibilities that exist to maximize environmental savings relevant to the USGBC vision/mission.

It is hoped that the market will intuitively understand the revised weightings process as a methodology to identify high value credits and credits that are less important. Over time, the LSC has plans to phase lower valued credits out of LEED in favor of more effective credits. This methodology will be used to inform the market of such intentions well in advance.

Conclusion

One of the greatest benefits of the weighting process is that it does not change the language of LEED. The final LEED 2009 scorecards look quite similar to those that exist now, and the modest degree of change was the result of a conscious effort to enhance LEED's scientific muscle without alienating the market by changing too abruptly.

Though the scorecard results developed using the weightings process and explained here are not perfect, several different analyses have been prepared and the overall results are both consistent and intuitively correct. As such, LSC feels that this is a first step and a good start. The workbook immediately exposes holes in LEED where no credit exists to cover an impact category, thus identifying the areas around which research and development activities should be focused. The methodology is also quite flexible – an attribute that will allow LEED to respond to market advances much more nimbly and predictably than in the past. And as the science informing our weightings decisions advances, LEED will too.

Attachments

1. "LEED 2009 Workbook Tool" – the powerful new LEED 2009 Credit tool software
2. The following document (one document in two parts) provides details useful in understanding and using the workbook tool:
 - "Introduction to the LEED 2009 Credit Weighting Tool" – a manual for the workbook tool
 - "LEED 2009 Credit Weighting" – detailed weightings information by CTG Energetics

Resources

For more information about TRACI and NIST, please see the following resources:



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1. "TRACI: The Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts" in *Journal of Industrial Ecology*. By Jane C. Bare, Gregory A. Norris, David W. Pennington, and Thomas McKone. Vol 6, Number 3-4: 2003.
<http://www.epa.gov/nrmrl/std/sab/traci/>
2. "Life Cycle Impact Assessment Weights to Support Environmentally Preferable Purchasing in the United States" In *Environmental Science & Technology*. By Thomas Gloria, Barbara Lippiatt, and Jennifer Cooper. Vol. 41, 7551-7557: 2007.
<http://www.bfrl.nist.gov/oe/software/bees/>

Weightings Documents to Review

1. The weightings overview provides a summary of changes and description of the weightings process used in LEED 2009. This can be found in the Weightings link of the LEED 2009 section of the Public Drafts Page.
2. The weightings tool overview describes the components of the weightings tool and basic instructions for using the spreadsheets. This can be found in the Weightings link of the LEED 2009 section of the Public Drafts Page.
3. The weightings overlay tools are spreadsheets that allow commenters to understand the methods and calculations behind the weightings proposed for LEED 2009 in an interactive way. This can be found in the Weightings link of the LEED 2009 section of the Public Drafts Page.
Please note that the weightings overlay tools in XLS format have reduced capabilities as they were created in XLSX format. If you do not have Microsoft Office 2007 you can upload a file conversion patch [here](#) to view the tool in XLSX format.
4. The rating system scorecards show the proposed changes outlined in the spreadsheet as well as the proposed new prerequisites. These can be found under each rating system link of the LEED 2009 section of the Public Drafts Page.