



DUTCH GREEN BUILDING COUNCIL

MODEL COMPARISON FOR THE DUTCH GREEN BUILDING TOOL

final report, version 2.4

Dutch Green Building Council
Model comparison for the Dutch Green Building Tool

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01 INTRODUCTION

01.01 DGBC

The Dutch Green Building Council (DGBC) was set up on the initiative of ABN Amro and Redevco, and in cooperation with Dura Vermeer and SBR. There are now more than 50 founding partners, including ING Real Estate and TNT. The aim of the DGBC is to encourage and speed up sustainable development of the built environment, as well as making it transparent. One of the resources it uses for this purpose is an independent yardstick for the development and management of areas and buildings. It is important that the Dutch yardstick fits in with the rest of Europe, so that a hotchpotch of non-comparable assessments is avoided. This aim is also pursued under LEnSE (Label for Environmental, Social and Economic Buildings) [LEnSE, 2008], a European initiative to establish a common assessment methodology.

01.02 Assessment models

When the DGBC was introduced, it was proposed that the yardstick referred to should be based on the Building Research Establishment Environmental Assessment Method (BREEAM), because of its international recognition and the ease with which it could be translated to the Dutch market. However, there are many alternatives from which the DGBC could choose, such as the American model Leadership in Energy & Environmental Design (LEED), the Australian Green Star Rating, the Canadian Green Globes and more precise calculating instruments, including the Dutch GreenCalc+ and EcoQuantum. Before work finally goes ahead on developing a Dutch Green Building Tool entirely based on BREEAM, the Delft University of Technology was asked to conduct a small comparative study of BREEAM, LEED, GreenCalc+ and EcoQuantum.

01.03 Criteria for the comparison

The new yardstick for the DGBC must meet the following quality requirements:

- Performance-oriented: the emphasis must be on results, not on measures taken. It is a case of measuring rather than specifying particular measures to be taken.
- Objective and robust: the model must be independent of the assessor and this person's company. As this cannot always be prevented, the model must be robust against bias on the part of the assessor.
- Simple: the model must be relatively simple, that is to say easy to communicate and non-bureaucratic.
- Transparent: the model must be open to all parties in the market and transparent in its methodology.
- Qualifying: it is not intended that rules will be set on the basis of the model; it must offer developers freedom to do what they want but make an honest judgement. The score must therefore always be positive if a project fulfils the requirements.
- International: because of attachment to the international market and comparability, the model must fit in with models used outside the Netherlands.
- Harmonising: the model must have a harmonising effect for Dutch measuring instruments and supplement them or make use of them.
- Affordable: quality of assessment must be provided at a reasonable price. To ensure broad acceptance by the market it must also be possible for smaller firms to have testing carried out.

We wish to add to these the following content-related criterion:

- **Complete:** the model must be capable of covering the environmental problems in phases desired for the purpose (from initiative to realisation), scale (from town to building detail) and environmental themes (from materials to ecology).

In addition, the models to be assessed probably contain common denominators or components which barely differ in approach. Particular emphasis will therefore be put on components which are of significance to the DGBC specifically for the Dutch market and which differ from what has been done to date in other countries.

02 INFORMATION ON THE MODELS

02.01 A range of assessment methods

A limited selection of environmental assessment methods has been made for this study (LEED, BREEAM, Eco-Quantum and GreenCalc+), but it should be noted that there are many more calculating instruments and assessment frameworks around the world. Example from close to home are the EPBD (EU) and Haute Qualité Environnement (HQE, Frankrijk) and from further away GBTool (Canada), CASBEE (Japan) and Green Star Rating (Australia).

The IEA Annex 31, which focuses on energy-related environmental effects of buildings, conducted an extensive survey in 2001 (supplemented in 2004) of dozens of international calculation models [IEA Annex 31, 2004a]. This survey distinguishes between:

- energy-modelling software
- LCA instruments for buildings or building products
- environmental assessment frameworks/scoring systems
- environmental guidelines or checklists for building design and management
- environmental product declarations, catalogues, reference information, certification or labels

This survey is presented in Annex A. Not all the instruments were examined in detail by the IEA Annex 31. The selection was determined by researchers from the various countries.

LEnSE has also conducted an inventory, but no official report on this has been published [LEnSE, 2008].

Each of the models has its own applications, strengths and weaknesses [see also Dobbelsteen, 2001]. This is not the subject of the study, which instead examines the suitability of BREEAM, LEED, GreenCalc and Eco-Quantum as a general yardstick for the Dutch market.

02.02 BREEAM

Background

The BRE Environmental Assessment Model (BREEAM) was developed by the Building Research Establishment (BRE), the British equivalent of the Dutch TNO.

BREEAM is an instrument for analysing and improving the environmental performance of office buildings, from design to management. It was originally introduced onto the market to bring about sustainable construction; it is now used as a means of evaluation and benchmarking for environmental performance, focused on management.

Contents

Using software tools, the environmental performance of buildings is assessed by awarding points for different criteria. In terms of scale, BREEAM focuses on the world climate, the local climate and the indoor climate. Topics dealt with are: on-site separation of waste, material flows, energy flows, environmental impacts, effects on flora and fauna and finally effects on people. BREEAM makes use of LCA data ('Environmental Profiles'), but it is, in fact, an advanced multi-criteria analysis with weighted point scores and an overall score. On the basis of its final score, a project is rated as either Pass, Good, Very Good, Excellent or the recently introduced Outstanding.

There are around ten versions of BREEAM, for different types of buildings. EcoHomes, for example, is the version of BREEAM focused on homes. Originally developed separately, Envest too now forms part

of the BREEAM family. With Envest users can assess the life-cycle effects of material and energy consumption of a building design (principally focused on offices) and identify different variants. The program is focused on use in an early stage of design. Scores are expressed as 'ecopoints'. Envest is complementary to BREEAM, and results can be presented through BREEAM. It could be said that Envest is the British equivalent of GreenCalc.

Reach

The BRE reports that 65,000 buildings have already been certified in the United Kingdom and 270,000 have been registered, but none have yet been certified or registered in the Netherlands. BREEAM has been principally focused to date on the United Kingdom, but Europe appears to be generally adopting the model. LEED is based on BREEAM.

02.03 LEED

Background

LEED stands for Leadership in Energy & Environmental Design. It has been developed since 2000, on the basis of BREEAM, by the United States Green Building Council (USGBC). The USGBC is a coalition of commercial, public and non-profit parties in construction. The USGBC aims for a more sustainable approach to the design, execution and management of the built environment.

In terms of area of attention, LEED is targeted at homes, neighbourhood development, commercial interiors, core and shell, new construction and shops, healthcare and retailing. The program, according to the USGBC, is intended for almost everyone in construction [USGBC, 2006].

LEED is voluntary, open and based on consensus. It awards points for features of a building – described through criteria – which is regarded as 'green'.

Contents

If a project is to be LEED-certified, it is first registered; then examination takes place and finally certification.

There are nine different versions of LEED, for different applications. Existing buildings must meet nine primary requirements, and are additionally tested against 34 criteria, during a three-month performance period. Requirements under LEED are that the building is assessed over at least 12 months of use, that the whole building is concerned and that federal, state and local environmental laws or regulations are complied with.

LEED distinguishes between primary requirements (which a project must fulfil before certification can begin), basic requirements (the criteria against which the project is tested) and innovation points (which a project attains if it goes further than the basic requirement).

LEED assesses the following aspects:

- sustainable sites (8 criteria, which together provide 12 points, with a 13% weighting factor)
- water efficiency (4 criteria, 10 points, 8%)
- energy and atmosphere (first 3 requirements, 6 criteria, 30 points, 32%)
- materials and resources (first 2 requirements, 9 criteria, 14 points, 15%)
- indoor environmental quality (first 3 requirements, 3 criteria, 19 points, 21%)
- innovation and design (3 criteria, 7 points, 8%).

Using the criteria, a checklist is completed with 'yes', 'no' or a question mark.

Based on the final score a certificate can be issued at one of four levels: LEED Certified, LEED Silver, LEED Gold or LEED Platinum.

Reach

784 commercial projects have by now been awarded an LEED certificate, of which 291 with Certified, 240 with Silver, 218 with Gold and 35 with Platinum. No building in the Netherlands has yet been assessed by LEED.

As well as in its land of birth, LEED is at present becoming steadily more popular in the rest of America, in Asia and in Australia. India has its own LEED (LEED India).

02.04 GreenCalc+

Background

GreenCalc has been developed on behalf of the Dutch Government Buildings Agency by the Sureac Foundation (with DGMR, the NIBE and NUON), initially for the assessment of utility buildings [Linden et al., 1999]. GreenCalc+, its successor, is suitable for offices, schools and homes.

GreenCalc+ (GC+) is a spreadsheet with which the environmental costs of a building's consumption of materials, energy and water can be calculated, as well as the mobility of the building users. Because environmental costs are calculated, all outcomes (in euros) can be added together to produce the final result.

If a reference building or 'environmental budget' has been introduced by the user, GreenCalc converts the outcomes to an 'environmental index' which indicates how the building rates in relation to the reference. The Dutch Government Buildings Agency has had the environmental index of many buildings determined.

Contents

For the materials module, GC+ makes use of TVVIN²⁰⁰², the assessment model which broadly uses the latest version of the LCA (the CML-2 method), but which includes environmental effects lacking in the LCA in a different way [NIBE Research bv, 2002]. TVVIN²⁰⁰² replaces the final weighting by multiplying the environmental effects by hidden environmental costs. These are costs to society of combating and preventing environmental damage.

A choice can be made for the energy module between two NEN standards for energy performance. The water module is based on the water performance standard [Bleuze et al., 1995], which has never been introduced in the Netherlands. The mobility module has been developed by BEDS.

To obtain a rough determination of environmental performance, the user can enter a global design form and apply values of default buildings. For a more accurate calculation the user of a building enters the components, making use of a catalogue of products. It is possible to make one's own combinations of materials in a component. In the case of energy and water the solutions concerned can be selected from menus, after which the program calculates the water and energy consumption. The environmental costs of mobility can also be determined by selecting from scroll menus.

GC+ compares the calculated hidden environmental costs of the building with those of a reference building built according to the standards of 1990. With this, environmental indices are calculated for the separate models and for the total. G to A labels have recently been attached to the environmental index, in exactly the same way as for the EPBD.

Reach

GreenCalc was initially used principally by governments, but in recent years GreenCalc+ has been mainly picked up by the market. GC+ is used in education, for instance at the Delft University of Technology. GC+ has now been used to rate more than 400 buildings. A poster has been made of the buildings attaining the highest environmental index scores, determined by independent advisors [Haas & Groot, 2006].

02.05 Eco-Quantum

Background

Eco-Quantum (EQ) has been developed by IVAM Environmental Research and W/E Adviseurs Duurzaam Bouwen, with financial support from the de Stuurgroep Experimenten Volkshuisvesting (Experiments in Housing Steering Group, SEV), Stichting Bouwresearch (the Building Research Foundation, SBR), the Royal Institute of Dutch Architects and the Dutch Government [Kortman, 1999]. It was launched in 1999, after a period of testing by architects and local governments. This instrument is principally intended to improve building designs in environmental terms, not to calculate a performance rating.

Contents

EQ calculates the environmental performance of whole buildings on the basis of the methodology of life cycle assessment (LCA) [Heijungs et al., 1992], i.e. taking account of the whole life of the building.

There are two versions: Eco-Quantum Domestic and Eco-Quantum Research. EQ Research is based on the LCA spreadsheet SimaPro and is intended for in-depth analyses of the environmental performance of buildings. EQ Domestic is a simplified version of EQ Research intended for architects, who can use the program to see quickly the environmental consequences of the consumption of materials, water and energy by their design. EQ uses the EP calculation for the environmental effects of energy consumption. An LCA is used for water.

Architects have to select components with particular materials and enter quantities of these, as well as water and energy consumption. On this basis, EQ calculates an environmental profile with 11 LCA environmental effect scores, which are converted to four environmental indicators: depletion of raw materials, emissions, energy consumption and waste. These scores can be combined to produce a final score.

EQ adopts 50 years as standard for the reference life of the home. A standard life of 75 years per building component is used in calculation, but this can be adjusted by the architect. In EQ Research new components can be combined.

Reach

Eco-Quantum was used just after its introduction by several firms of architects and local authorities. It was also used in European studies [IEA Annex 31, 2004b]. In recent years little has been heard of EQ, but it is still used in the market.

03 COMPARISON

03.01 Overview table

Table 01 presents an overview comparison of BREEAM, LEED, GreenCalc+ and EcoQuantum on the previously stated criteria.

critierion	BREEAM	LEED	GreenCalc+	Eco-Quantum
performance-oriented	+	+	+	-/+ ¹
objective/robust	0 ²	0 ²	+	+
simple	-/+ ³	-/+ ³	0	0
transparent	0/+ ⁴	+	0	+
qualifying	+	+	+	+
international	+	+		
harmonising	+	+	N/A	N/A
affordable			+	+
complete	++	++	+	0
- building phases	area development to management	area development to management	building design and renovation	building design
- scale level	plot to building detail	area to building development	plot to building detail	building to building detail
- themes	integral, CO ₂	integral	materials, energy, water, mobility, CO ₂	materials, energy, water

1 EQ is intended as an improvement instrument, but if appropriate can be used for determination of performance

2 To some extent up to the assessor, who may interpret fulfilment of the criteria differently

3 Dual: simple in terms of representation of scoring, but not how it is determined

4 Less clear on multicriteria analysis

03.02 Interpretation of the comparison

Types of models not easy to compare

At first sight the differences between BREEAM and LEED on the one hand and GreenCalc+ and Eco-Quantum on the other do not appear to be great. A distinction can, however, be made between these pairs, because BREEAM and LEED are multicriteria analyses for more than the building alone, with an advanced method of assessment but checklists, while GC+ and EQ are calculation tools based on the LCA, which give a more accurate indication of the environmental performance of a building.

Differences between BREEAM and LEED

Table 01 appears to make the same assessment of BREEAM and LEED: the differences are small. BREEAM appears in its publications to be somewhat less open in transparency on the exact multicriteria analysis, except in the older publication which contains proposals rather than describing the situation as it is [Brownhill & Rao, 2002]. BREEAM does provide insight into CO₂ emissions, which is another advantage. In addition, LEED certification is very expensive.

Not included in the table are a number of aspects which may be of significance in choosing one or other model:

- BREEAM is partly based on the LCA methodology and therefore has a better scientific foundation. LEED does not have this LCA link.

- Both models are internationally oriented, but BREEAM can be more easily adapted to special national wishes (through BREEAM Bespoke). LEED is more rooted in American regulations – and the USGBC guidelines deviate from the Dutch situation – and has recently started to allow other uses.
- A specific example of this is that in LEED cooling is specified, which is not the case in the Netherlands, and this is something that we try to prevent from the point of view of sustainability.
- BREEAM calculates the scores with respect to a reference. This is better than working with absolute scores – which are not very meaningful – but the reference then has to be sharply and unambiguously defined. More importantly, with regard to future assessments either the reference must be continuously adapted or the scores (and label) must be linked to the year of assessment.
- BREEAM is known principally in the United Kingdom and increasingly in Europe. LEED is better known around the world.

Remarks regarding GreenCalc+ and Eco-Quantum

As already remarked, the Dutch LCA calculating instruments GreenCalc+ and Eco-Quantum cannot be easily compared with BREEAM and LEED. GC+ and EQ have a different aim and a different reach in the market, against which the new Dutch Green Building Tool would not have to compete.

In the past, when the Dutch market was still linked to one of the instruments, there was some competition between GV+ and EQ. This has no longer been the case in recent times: the databases of the two instruments have been harmonised and the programs each have their own market share, targeted at different buildings. Calculations can already be performed with GC+ for homes, while many architects have already built up experience with EQ. There is also a difference in aim: GC+ is targeted more at attaining an environmental index (as high as possible), while EQ is internally focused on improvement of a design, particularly through changes in materials. EQ is less easy to communicate through the final score in an environmental profile than the 'hard' figures of GC+.

Making an in-depth examination of methodological differences, advantages and drawbacks, therefore serves no useful purpose. Each of the two models has its own aim in the market, and a more qualitative model based on BREEAM or LEED would not remove this function either. Furthermore, great strength can be attained from a combination of a generally accepted checklist score alongside a detailed environmental analysis and an accurate assessment score.

03.03 Conclusions

If the Dutch Green Building Council had to choose among the large collection of environmental assessment models on the market for broad application, LEED and BREEAM would be the most suitable. On the basis of comparison of these two models the differences are not great, but BREEAM offers procedural advantages in particular for the Netherlands and is better suited to the Dutch market. Having said that, it is important that the model does not force the existing, and scientifically more justified, calculating instruments GreenCalc+ and Eco Quantum out of the market. They need not do so, because BREEAM is an advanced checklist, and would not have to be more than that. A great benefit is relative simplicity and communicability, which would be destroyed by complex calculations.

A possible way of running a BREEAM-based tool together with the existing LCA models might be to include criteria which require calculation with GC+ or EQ, but this would make working with GC+ or EQ compulsory and the system would be less workable and transparent. It is therefore better to offer a robust but simple basis, alongside which more precise calculations, such as with GC+ and EQ, remain possible or desirable. It should be borne in mind that in the United Kingdom BREEAM also supplements the more accurate spreadsheet Envost. It is easy to imagine a building soon receiving a DGB label plus, for example, a GC score which indicates in greater detail how the building performs.

BREEAM therefore appears to be suitable for the Netherlands as a generic assessment model, but there are specific circumstances in the Netherlands where the model would have to be adapted. These are discussed below under recommendations.

03.04 Recommendations

On the basis of this study and the discussion, it is recommended that a Dutch Green Building Tool based on the BREEAM methodology should fulfil the following requirements:

- The model must not be too complex: it is an advanced checklist and should not try to be more than that. It is better to look for a strong package of instruments: the new tool, GreenCalc+ and Eco-Quantum, in comparison with the British situation simpler in arrangement rather than more complex.
- The Dutch model must be completely transparent in its scoring per criterion and as a whole, including beyond the assessors.
- The highest score from the model must be high and not easy to attain, because otherwise there is no incentive to go further than what is now regarded as 'good'. The Netherlands could be best known for its strict Dutch Green Building Tool (e.g. BREEAM-NL).
- The final classification scores (Pass to Excellent or even Outstanding) would have to be linked to the year of assessment; Good in 2008 is less good in absolute terms than Good in twenty years.
- The assessment scale can be established annually – the summer period is recommended by the building industry – by determining the top 10% in the market and possibly the lower limit of this market. The final classification can then have the following significance: Pass: approx. 20% environmentally better than standard building (standard = complying with Building Decree + EPC at time of testing), Excellent: among the present-day sustainable top 10%, with the other two levels inserted in between.

Reworking the tool until it satisfies these requirements is an interesting and challenging task. The DGBC would have to tackle this in a proactive way together with the BRE.

Finally, it is advisable to implement the model quickly – there is good momentum at present – but also to be prepared to adapt its contents if new insights are obtained, so that scores may also change. No model is perfect and none ever will be.

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- USGBC; LEED for Existing Buildings: Operations & Maintenance (Powerpoint presentation); USGBC, 2008
- USGBC; Leadership in Energy & Environmental Design (Powerpoint presentation); USGBC, 2006

Websites of the assessed instruments:

- BREEAM: www.breeam.org
- LEED: www.usgbc.org
- GreenCalc+: www.greencalc.com
- Eco-Quantum: www.w-e.nl

ANNEX: SURVEY OF ENVIRONMENTAL ASSESSMENT MODELS

The source for this annex is IEA Annex 31 [2004a], the report "A Survey of LCA Tools, Assessment Frameworks, Rating Systems, Technical Guidelines, Catalogues, Checklists and Certificates".

Country (Annex 31 Member)	Energy Modeling Software	Environmental LCA Tool for Building or Building Product	Environmental Assessment Framework, Rating System (Whole Buildings or Building Stocks)	Environmental Guideline or Checklist for Building Design / Management	Environmental Product Declaration, Catalogue, Reference Information, Certification, Label
AUSTRALIA	<ul style="list-style-type: none"> o ENER_RATE o NatHERS o BUNYIP o ECOTECT o GSL-GISELLE o LCAid 	<ul style="list-style-type: none"> o LISA* DOE 	<ul style="list-style-type: none"> o NABERS* 	<ul style="list-style-type: none"> o Environment Design Guide 	<ul style="list-style-type: none"> o EcoSpecifier
CANADA	<ul style="list-style-type: none"> o BASECALC DOE o CATALOGUE DOE o EE4 CBIP DOE o EE4 CODE DOE o ENERPASS DOE o FRAME4 DOE o FRAMEplus DOE o GS2000 DOE o Lighting Boy DOE o VISION4 DOE o HOT2000 DOE 	<ul style="list-style-type: none"> o The Athena Model DOE 	<ul style="list-style-type: none"> o GBTool* o HOMERUN (Energide)* o Cities for Climate Protection* o Solution Spaces* o Quest* 	<ul style="list-style-type: none"> o Banff Green Development Guidelines* 	<ul style="list-style-type: none"> o Environmental Choice* o Super E* o Advanced Building Technology*

Country <i>(Annex 3 / Member)</i>	Energy Modeling Software	Environmental LCA Tool for Building or Building Product	Environmental Assessment Framework, Rating System <i>(Whole Buildings or Building Stocks)</i>	Environmental Guideline or Checklist for Building Design / Management	Environmental Product Declaration, Catalogue, Reference Information, Certification, Label
DENMARK	<ul style="list-style-type: none"> o BSIM2000 ^{DOE} o tsbi3 ^{DOE} 		<ul style="list-style-type: none"> o EDIP* o BEAT* 	<ul style="list-style-type: none"> o Environmentally Friendly Construction Guide 	
FINLAND	<ul style="list-style-type: none"> o BUS++ ^{DOE} o RIUSKA ^{DOE} o SMOG ^{DOE} 	<ul style="list-style-type: none"> o LCA-HOUSE* o TAKE-LCA* 	<ul style="list-style-type: none"> o BSEA 1.0* 	<ul style="list-style-type: none"> o ECOPROP* 	<ul style="list-style-type: none"> o Environmental Classification of Properties*
FRANCE	<ul style="list-style-type: none"> o SIMBAD Building & HVAC Toolbox* ^{DOE} 	<ul style="list-style-type: none"> o EQUER* ^{DOE} o TEAM* o ESCALE* o PAPOOSE* o REGENERS* 	<ul style="list-style-type: none"> o Performance Guidelines for Green Buildings* 		
GERMANY	<ul style="list-style-type: none"> o PVCad ^{DOE} o SolDesigner ^{DOE} o Sombrero 3.01 ^{DOE} o SUNDI ^{DOE} o T Sol ^{DOE} o THERMOSIM ^{DOE} 	<ul style="list-style-type: none"> o LEGOE* o EcoPro 1.5* 			<ul style="list-style-type: none"> o BAU Building Passport* o Blue Eco Angel
JAPAN	<ul style="list-style-type: none"> o NIRM 	<ul style="list-style-type: none"> o LCCO2 o BRI LCA* 		<ul style="list-style-type: none"> o ECDG* o Green Housing A-Z o Tokyo Metro Green Building Program* 	<ul style="list-style-type: none"> o MOC Checklist for Government Buildings

Country (Annex 31 Member)	Energy Modeling Software	Environmental LCA Tool for Building or Building Product	Environmental Assessment Framework, Rating System (Whole Buildings or Building Stocks)	Environmental Guideline or Checklist for Building Design / Management	Environmental Product Declaration, Catalogue, Reference Information, Certification, Label
NETHERLANDS	<ul style="list-style-type: none"> o NEN 2916: Energy Performance of office buildings* o NPR 2917: Energy Performance of office buildings - Calculation program* o NEN 5128: Energy Performance of housing buildings* o NPR 5129: Energy Performance of housing buildings-calculation program* 	<ul style="list-style-type: none"> o EcoQuantum* o Eco-Instal* o MMG* 	<ul style="list-style-type: none"> o GreenCalc o EcoIndicator* 	<ul style="list-style-type: none"> o National Packages Sustainable Building* o Costing Reference Model* 	<ul style="list-style-type: none"> o Dutch MRPI*
NEW ZEALAND	<ul style="list-style-type: none"> o e-Bench ^{DOE} 				
NORWAY			<ul style="list-style-type: none"> o EkoProfile* 		<ul style="list-style-type: none"> o Swan Eco-label
SWEDEN	<ul style="list-style-type: none"> o ID-HAM ^{DOE} o CELLAR ^{DOE} o DEROB-LTH ^{DOE} o EED ^{DOE} o HEAT2 ^{DOE} o HEAT3 ^{DOE} o IDA Indoor Climate and Energy ^{DOE} o SLAB ^{DOE} 	<ul style="list-style-type: none"> o EcoEffect* o LCAiT* 	<ul style="list-style-type: none"> o The Natural Step 		

Country (Annex 31 Member)	Energy Modeling Software	Environmental LCA Tool for Building or Building Product	Environmental Assessment Framework, Rating System (Whole Buildings or Building Stocks)	Environmental Guideline or Checklist for Building Design / Management	Environmental Product Declaration, Catalogue, Reference Information, Certification, Label
SWITZERLAND	<ul style="list-style-type: none"> o ACOU-SALLE^{DOE} o LESO- [Tools]^{DOE} 	<ul style="list-style-type: none"> o OGIP* 	<ul style="list-style-type: none"> o E2000* o Ökobau 	<ul style="list-style-type: none"> o Planer Kit for Controlled Ventilation systems o SIA D0122: Ecology and buildings 	<ul style="list-style-type: none"> o Ecological Submission Document SIA 493: Declaration form for building products Embodied energy of building materials*
UNITED KINGDOM	<ul style="list-style-type: none"> o APACHE^{DOE} o Building Energy Modeling & Simulation o ESP-r^{DOE} o FLOVENT^{DOE} o FLUCS^{DOE} o INDUS^{DOE} o LifeCYcle^{DOE} o Microflo^{DOE} o Pisces^{DOE} o Radiance Interface^{DOE} o ShadowFX^{DOE} o Solacalc^{DOE} o Suncast^{DOE} o TAPS^{DOE} o TAS^{DOE} 	<ul style="list-style-type: none"> o ENVEST^{DOE} 	<ul style="list-style-type: none"> o BREEAM* o SPeAR* 	<ul style="list-style-type: none"> o Environmental Management Toolkits* 	<ul style="list-style-type: none"> o Environmental Profiles of Construction Materials*
U.S.A.	<ul style="list-style-type: none"> o [See the DOE Tools Directory for complete list of over 180 Tools] 	<ul style="list-style-type: none"> o BEES^{DOE} 	<ul style="list-style-type: none"> o INDEX o Smart Places o LEED* 	<ul style="list-style-type: none"> o Built Green* o Minnesota Sustainable Design Guide* o NYC High Performance Building Guide* o City of Santa Monica Green Building Design & Construction Guidelines* 	<ul style="list-style-type: none"> o Green Building Advisor*

