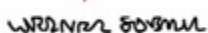


Sustainability Performance Assessment and Benchmarking of Buildings

2nd Newsletter



WELCOME to the second Newsletter of SuPerBuildings, a research project, funded by the European Commission, under the FP7 cooperation programme, that will support development of the next generation of sustainable building assessments systems.

During the first half of the project our consortium has been working hard to reach the project objectives. We produced a number of interesting deliverables and we are coming with this newsletter to share with you the main outcomes.

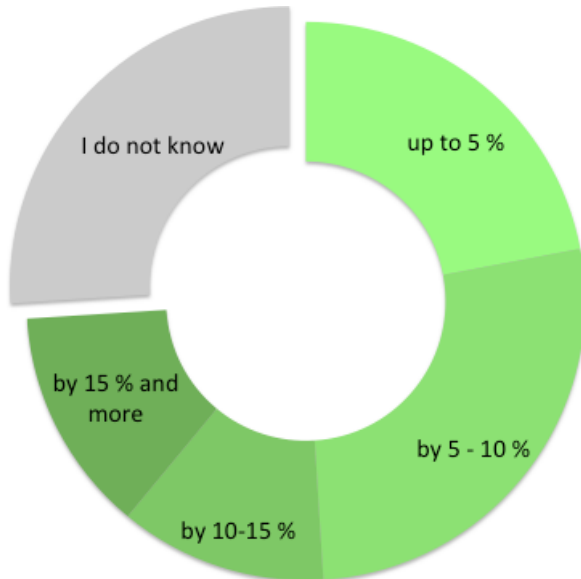
You will find below a summary of the most interesting outcomes of the project. The first reports of the project discuss the current assessment methods, stakeholders' expectations, potential of sustainability indicators from the view point of steering and the need to develop a logical structure for SB assessment systems. The most important message is that the sustainability of buildings should always be assessed with help of indicators, the validity and comparability of which are ensured. The selection and justification of indicators should be based on clear understanding about the issues of concern and the relevance of building sector to these issues.

On behalf of the project consortium I wish you good reading and ask you not to hesitate to send your feedback on the contents.

Tarja Häkkinen, VTT
Project Coordinator

SURVEY ON STAKEHOLDERS' NEEDS FOR SUSTAINABLE BUILDING ASSESSMENT AND BENCHMARKING METHODS

By Antonín Lupíšek, Czech Technical University in Prague



How can the assessment result increase the selling price of a building?

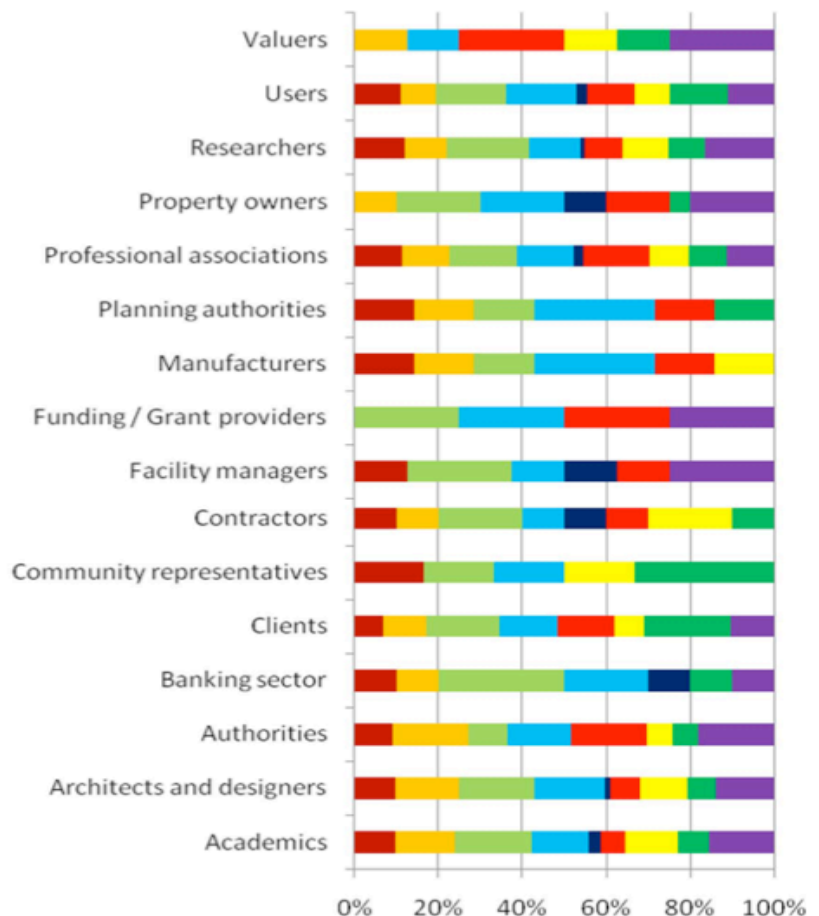
In order to better understand the needs of stakeholders in the process of buildings' sustainability assessment a wide survey has been organized. Survey forms were distributed during two sustainable building conferences Central Europe towards Sustainable Building (June 2010) and SB10 Finland: Sustainable Community (September 2010). From in total 450 survey questionnaires 73 were collected back. Parallel also an electronic version of the survey has been available and brought another 58 responses.

The major groups of respondents were researchers, academics, architects, designers, and users of the buildings.

Here is a sneak peak of the survey results, the full report D3.1 can be downloaded from <http://cic.vtt.fi/superbuildings>.

The main purpose of the assessment system according to different stakeholder groups. The main purpose is:

- to define project brief
- project quality assurance
- to support initial design
- to improve detailed design process
- portfolio analysis (funds)
- marketing purposes
- valuation
- green procurement
- sustainability reporting



POTENTIAL OF SUSTAINABILITY INDICATORS AS INSTRUMENTS OF STEERING

By Tarja Häkkinen and Tarja Mäkeläinen, VTT

An effective steering mechanism was defined to a) have an impact on its focus area, b) have support from the citizens and building owners, c) be feasible because tools needed in assessment and verification are available and accessible for all who need those and because guidelines and instructions needed are clear. The report deals with the following types of instruments of steering: 1) Control and regulatory instruments, Normative, 2) Control and regulatory instruments, Informative 3) Economic and market-based instruments, 4) Fiscal instruments and incentives, 5) Support and information, 6) Municipal steering (Steering actions in city planning and land use).

The true impact of the voluntary methods on the impacts of buildings on sustainable development has remained quite low. The reasons for this may be that the methods are often used in limited market segments and the required performance levels in high scores may not be ambitious. There is a need to understand and explain the linkage between property value and issues of sustainable development in order to promote the wide use of methods. There is also a need to get more knowledge about the real and desired performance levels of buildings in order to show real benchmarks for those who aim at developing the sustainability of buildings and designs.

The assessed impact of the use of SB assessment systems in the connection of different steering instruments varies:

- Normative regulatory instruments: Based on its normative character, the instrument affects directly on its focus area; is relatively easy to implement for new building but significantly more difficult to implement for existing building stock; the true impact depends on the selection of the required levels of performance.
- Mandatory information: The intended impact is to raise demand with help of information that enables comparisons; the impact depends on the extent of the focus area; it is easier to direct both to new and existing buildings than normative regulations; the impact may be significant if the focus area is wide.
- Voluntary certification schemes: The use of the instrument may become extensive if the marketing of the scheme is successful and if the relevant actors believe on the branding; the true impact of focus areas (like energy saving/ savings in GHGs/ improved accessibility) depends on several issues: the selection of right performance levels and weighting criteria needs good understanding of local conditions. If this is missing and the chosen criteria are too easy, the impact remains insignificant or even negative, a wide



system with a number of different indicators may enable "playing" - users are not interested in ambitious development but on easy credits. Well-recognized and valued voluntary system, which includes locally relevant and adequately demanding criteria may be effective in its focus area. The impact improves as the systems support target setting and design in addition to labelling. Stronger impact could be achieved if the certification results were integrated to the decision-making processes of investors and insurance companies.

- Incentives and taxation: A right timing is important: the market must be ready for the intended activities (like renovations that save energy) for example in terms of the availability of needed skills and capacity. The level of tax reduction/incentive etc. has to be right in order to be attractive but on the other hand it shall not be too high in order not to cause injustice for those who cannot make use of the instrument (for example because the instrument is directed only for small houses/ multilevel buildings). Correctly timed and directed instrument may have an important effect and stimulation on the targeted limited focus area.
- Municipal policy: The impact is different in different market segments. Municipal policy can effectively contribute to sustainability in the market segment of new residential buildings; the

impact in the segment of existing residential buildings is not very high. When voluntary agreements are made for existing residential buildings, social housing agencies for instance can take sustainable building into account in renovation projects.

The maximum potential impact of making use of individual indicators in the connection of building regulations has been widely assessed with regard to energy. However, the implementation of the EPBD and its measures has shown a large variation around Europe. It is particularly recommended in this regard that compliance and control approaches be implemented that do not increase administrative burdens. In addition, policy and regulation should not establish methodologies that could become barriers for innovation, and should allow for mechanisms to account for innovative technologies or innovative buildings.

The expected impact of sustainable building assessment and related policies include the optimization of healthy and comfortable indoor environments together with the minimization of the environmental impacts. While the impact on environmental aspects of policies and building assessment is relatively well studied on areas such as the reduction on energy use and CO₂ emissions, there is still a large scope for research on evaluation of social and economic benefits of sustainable building assessment and related policies.



LOGICAL STRUCTURE FOR SUSTAINABILITY ASSESSMENT SYSTEMS

By prof. Thomas Lützkendorf and Andrea Immendorfer

Sustainable Management of Housing and Real Estate, Karlsruhe Institute of Technology

One of the aims of SuPerBuildings is the development of proposals for a suitable structure for sustainability assessment systems for new and existing buildings and construction works. This work is intended to lay the foundations for the further development of existing systems as well as the development of new systems from scratch.

The outcomes of the work on SuPerBuildings suggest that a **top-down approach** should be followed. Certain overarching subjects of concern related to sustainable development and respective targets form the point of departure. All dimensions of sustainability have to be covered – environmental, economic and social aspects. For sustainability assessments these **general issues of concern** serve as “end points”.

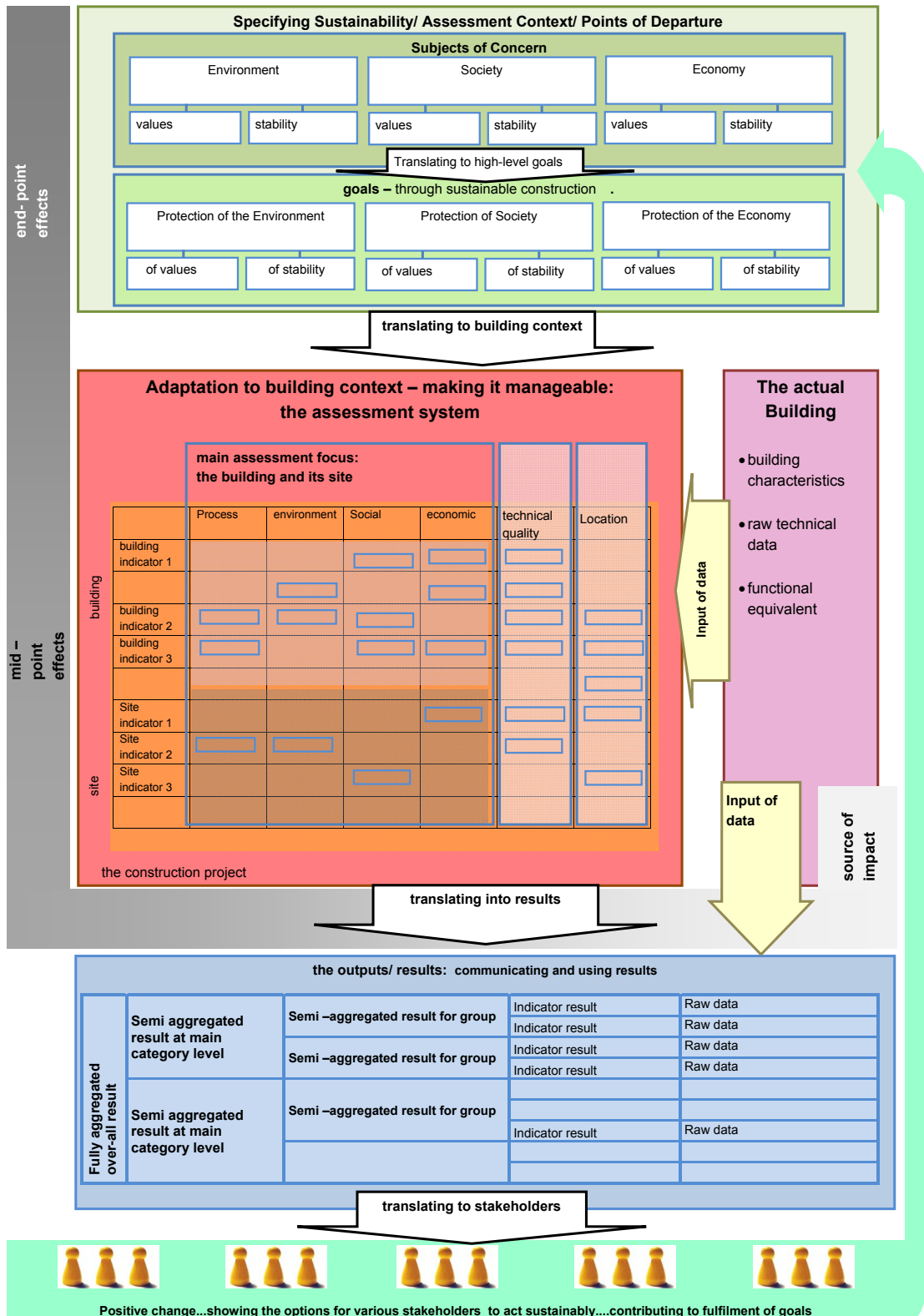
These general issues of concern have to be **adapted to the specifics of buildings and constructed assets**. They have to be translated to suit the activities and responsibilities of stakeholders in the construction industry. Indicators can then be attributed to these adapted issues of concern, which allow the evaluation of how and how well the building meets the challenges posed by these issues. A distinction can be made between indicators that refer to the

actual building and its environmental, social and economic qualities on the one hand and the quality of processes relating to planning, constructing and operating the building on the other. The object of assessment is the building and the plot it stands on. The **whole life cycle of the building** will be considered, which is seen as a trigger for energy and mass flows, environmental impacts and cash flows at various points. Additionally, there are criteria that assess the quality of the building on a technical level and those that assess the quality of the location. Where a building characteristic has effects in several of these categories, this is taken into account. The indicators should generally be chosen to reflect mid-point effects.

The assessment results have to be presented in a way that they can serve as a basis for decision making for the respective stakeholders (architects, engineers, investors, banks). In so far it is necessary to document raw data as well as partially and fully aggregated assessment results. Finally, the assessment results have to be able to reflect the actual progress against targets relating to the subjects of concern. The ultimate aim is to trigger actual improvements of the quality of the built environment.



SuPerBuildings - Logical Structure for Sustainability Assessment Systems



The top-down approach can be illustrated with the following example:

For this example we will focus on energy-related aspects of the environmental dimension of sustainability. This comprises subjects of concern such as natural resources and the eco-system inter alia. From these subjects of concern some general goals can be deduced, e.g. the protection of natural resources, a reduction in resource depletion and the protection of ecosystems and its functions from the effects of pollution.

These aims and objectives need to be adapted to the relevant objects of assessment, in this case buildings. Consequently, the goals are to reduce the consumption of non-renewable fuels in the building lifecycle and to relieve the stresses on the environment caused by greenhouse gases. These goals concern the whole life cycle of the building from production of components, construction, via the use or operational phase to end of life.

This means that both, existing buildings and new-builds, need to be assessed with regard to the amount of non-renewable energy they require within each of the stages of the life cycle stated above. The same applies to greenhouse gases. Consequently relevant indicators can be defined such as:

- total lifecycle primary energy demand (non-renewable) (kWh)
- total lifecycle global warming potential (kg CO₂-equiv.)

The positive change to be measured by the indicator would be the reduction in resource consumption and the reduction of negative impacts on the environment respectively.

The results of the assessment have to be tailored to the needs of different stakeholders and target groups, e.g.

- **Architects/ planners** need results in partially aggregated form in order to optimize the design as a result of weighing up the ratio of input into the production/ construction against savings in the operational phase.
- **Sustainability Assessors** aim for fully aggregated results, provided there are suitable benchmarks
- **Facility managers** need results in disaggregated form in order to be able to show energy savings achieved through good energy management not just as final energy, but also as primary energy and greenhouse gases.



SELECTED INDICATORS FOR ASSESSMENT OF BUILDINGS

By Boris Bosdevigie, Centre Scientifique et Technique du Bâtiment

In order to help in the **development of sustainability assessment systems**, SuPerBuildings project proposes to define and select **relevant indicators**. Starting from a top-down approach, indicators are chosen in consideration with their validity regarding general subjects of concern and their significance for the building sector. On the other hand, indicators must reflect a practical assessment of building characteristics, and therefore must comply with a bottom-up approach. SuPerBuildings aims at combining these two methods to set-up performance criteria.

One of the objectives of SuPerBuildings is to develop knowledge on typical performance levels (those observed in practice in each country, for different building types, ages and locations) and to establish required performance levels in order to show the way and achieve significant progress towards sustainable built environment. This work needs to take into account each national context especially in terms of technical and economic barriers or opportunities, and to be in line with European policies.

Seven key indicators have been selected for that purpose, and these were the objects of an inventory of accurate and actual data, based on statistical studies, regulation standards, voluntary schemes, or even case studies, across seven European countries.

According to the top-down approach, the study has focused on the following indicators:

Resources:

- Energy Consumption
- Water Consumption
- Land Use

Emissions and waste:

- Greenhouse Gas emissions
- Waste production

Indoor environment:

- Hygro-thermal comfort
- Indoor Air Quality



The first survey made by SuPerBuildings partners enabled to draw two main conclusions:

- **Considering the lack of comparability due to differences between national calculation methods** (functional equivalent, reference unit to express performance value, system boundaries, consideration of local requirements about buildings and local concerns), **SuPerBuildings project has to define rules for comparison between national performance levels of buildings.** This appears to be a “*sine qua non*” condition to set-up transparent performance criteria. It is part of the definition of benchmarking criteria, which is also a task of this project.

- **There is a lack of accurate data concerning typical performance values for buildings currently representing the best practices in terms of sustainability.** This issue can be explained by the **current paradigm shift**: assessment systems evolve from one indicator -such as energy or CO₂ - to a multi-criteria vision, from the operational phase to a lifecycle approach and from the consideration

of a single contributor (energy consumption) to multiple ones (products and materials, water consumption, etc.).

There are still problems in data availability and lack of EPDs around Europe. In addition, there are **problems in comparability of results.**

These come mainly from:

- **Reference unit:** the definition of the reference area widely varies across European countries
- **System boundaries:** consideration of different contributors to energy in different countries (heating, cooling, plug-in appliances...)
- **Functional equivalent:** lack of description regarding building functionality

Therefore, SuPerBuildings has to make proposals to homogenise national practices in assessment methods and related data, and help actors in this major change.



The SuPerBuildings CONSORTIUM

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W/E Consultants	W/E	Netherlands	Erik Alsema Saskia Hulten

The NETWORK GROUP

The project Network Group is still open for organizations interested in sustainable building benchmarking. Members of the Network Group are invited to help guide the project as it develops, and support the dissemination of project results. The Network Group will automatically receive copies of the SuPerBuildings Newsletter and other project deliverables, as well as being invited to an interim workshop and final conference.

If you would like to be part of the NETWORK GROUP, and receive more information about how you can get involved in SuPerBuildings contact us via email: Antonin.Lupisek@fsv.cvut.cz.



ACTUAL DELIVERABLES

Finalized public deliverables can be found on the **SuPerBuildings** website at <http://cic.vtt.fi/superbuildings>.

The reports that are already available are:

- D 2.1 Conclusions about the needs of development of sustainability indicators and assessment methods
- D 2.2 Conclusions about the needs of development of performance levels and benchmarking criteria and weighting methods
- D 3.1 Literature and interview survey about stakeholders' needs and requirements for SB assessment and benchmarking methods
- D 3.2 Opportunities to integrate sustainable building benchmarking methods with steering mechanisms and potential effect of sustainable building benchmarking methods on promoting sustainable building
- D 4.1 Systematic structure for sustainable building assessment with special focus on the validity of sustainability indicators

Reports that will soon be available are

- D 3.3 Needs, levels and potentials of integrating SB assessment and benchmarking with BIMs
- D 4.2 Description and explanation of the selected indicators and related measurement and assessment methods with special focus on reliability, comparability and compatibility
- D 5.1 Conclusions about the performance levels of buildings considering the requirements of sustainable building and considering the economic and technological barriers and regional differences

JOIN US AT SB11 IN HELSINKI

SuPerBuildings project will be present at the World Sustainable Building Conference SB11 in Helsinki this autumn in a special session focused on the development of indicators and next generation of assessment systems.

The session is prepared as a **joint presentation of the on-going European research projects** focused on assessment of building performance with help of sustainability indicators: SuPerBuildings, OpenHouse, Perfection and results of standardization developments such as ISO TC 59/SC17.

Presentations of the actual outcomes of the projects will be followed by moderated discussion on the future of sustainability assessment in Europe.



SB11 Conference:
October 18-21, 2011, Helsinki

Workshop:
Special Forum 7
October the 20th 11:00 – 12:30

