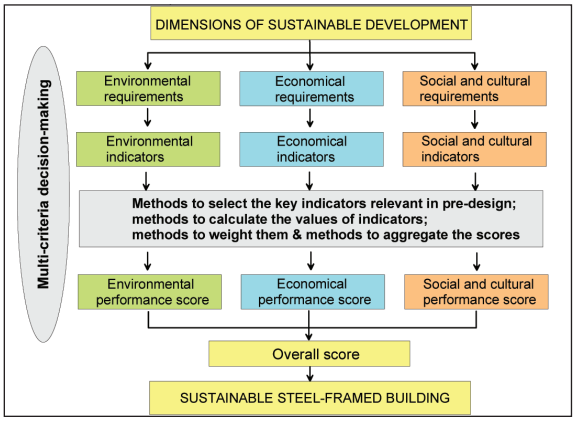
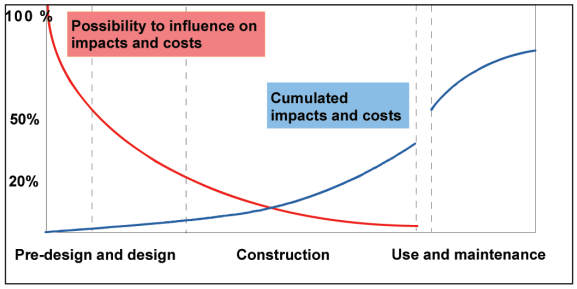
Goal of the project: The project aims at concepts of sustainable steel building both for new-built and renovation, and based on this approach, at a novel decision-making platform that supports selection of steel-intensive solutions in the early phases of a building project. The importance of an improved knowledge basis and also methods for the early phases is highlighted by the fact that framing and typical related technologies are also selected then. The decision-making platform will be made available to various operators of the steel construction sector by The European Convention of Constructional Steelwork – ECCS.

Short description of the project: The approach of the project to sustainable building is based upon holistic valuing processes that include environmental, economic and social dimensions.



SB_Steel develops methods and tools that are needed in the early phases of a building project. It is well known that pre-design decisions are crucial for the success of the entire construction project and for the performance and value of the completed building. The project will develop a software that will be available to various stakeholders of the steel construction sector. In order to achieve the goals, the R&D objectives of the project are:

•to build-up a sustainability assessment methodology for a new or renovation building project;
•to develop a multi-criteria assessment method for an early phase of a building project;
•to develop knowledge base for performance based requirements management;
•to develop a decision-making platform that supports selection of steel-intensive solutions;
• to develop a piloting version of the service concept.



The sustainable building or renovation concept comprises the key indicators by which a building or renovation project can be steered, and later on the overall performance of a completed building can be monitored and evaluated. A hierarchy of performance criteria includes sustainability requirements.

Project implemented by: VTT Technical Research Centre of Finland.

Implementation period:
01.10.2010 –30.09.2013

Main activities:
•Identification of key indicators of sustainable steel-framed building projects;
•Assessment of the overall life-cycle's impacts of steel framed buildings on the sustainable development, special emphasis on energy and material flows;

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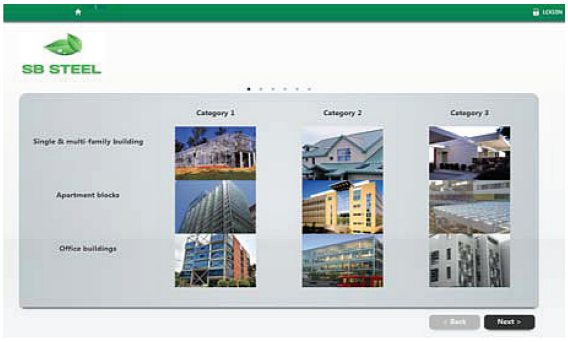
•Concept development for overall performance issues and their verification methods for a completed building during its whole life cycle (for a new build or renovated building);
•Development of a comprehensive approach to the pre-design and preliminary phases;
•Development of Environmental Software Tool aimed at a quick evaluation, at the pre-design stage, of the sustainability of steel-framed buildings, from the points of view of environmental life-cycle performance and energy efficiency;
•To provide case-studies on three steel-intensive projects in order to apply and validate the LCA-based methodology and the software tool developed.

Results:
•Identification of the case-studies;
development of a of data-bank of all casestudies; reference design of the case studies; localization of the case studies for the various climatic regions;
•Conceptual development of the architecture of the software and flowcharting: assembly of general methodology for environmental and energy assessment of steel framed buildings;
•Implementation of the software. Based on the alternative designs, which are stored in the database, and according to the priorities given by the user to each criterion, the program provides a ranking of the alternative solutions;
•Calibration and validation of the software based on case-studies.



Fields of interest: Sustainability of new and existing steel structures.

Financed through/by: Research Fund for Coal and Steel.

Research team: VTT Technical Research Centre of Finland (coordinator); Acciona Infraestructuras S.A., Spain; Fundacion Tecnalia, Spain; "Politehnica" University of Timisoara, Romania; Mostostal Warszawa S.A., Poland; University of Coimbra, Portugal; University of Minho, Portugal; Aristotle University of Thessaloniki, Greece; European Convention for Constructional Steelwork ECCS, Belgium; ArcelorMittal, Luxemburg.

Research centre: Research Centre for Mechanics of Materials and Structural Safety (CEMSIG), Department of Steel Structures and Structural Mechanics, Faculty of Civil Engineering.

Applicability and transferability of the results:
The early phases of a building project are known to be most crucial for the success of the construction work and for the performance and value of the completed building. The platform is available to various operators of the steel construction sector. The piloting web-based service will be run by the European Convention of Constructional Steelwork.

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