BUILDING INTEGRATION OF RENEWABLE ENERGIES

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Many building surfaces are ideally suited for the use of solar energy, but high costs, technical and aesthetic considerations have long kept building owners and architects from using even a small part of this potential. Our projects address the key issue of optimal architectural integration of photovoltaic and thermal solar systems at the building and urban scales.

Published work relates to

- Development of new and comprehensive urban and building strategies, to maximise solar energy use while ensuring an appropriate architectural quality to the local contexts. (LESO-QSV, Cross-mapping solar irradiation maps with criticity maps)
- Development of new adapted solar products, conceived for building integration
- Development and diffusion of architects’ and solar product manufacturers’ knowledge on solar integration issues / available solar technologies / integration criteria

2016 Activities

An important activity consisted in the lead of the working group on "Processes, methods and tools" within the IEA SHC Task 51 “Solar Energy in Urban Planning”. In this context, an innovative approach to combine information of solar potential with urban sensitivity and system visibility was developed (cross-mapping). Furthermore, the LESO-QSV method for implementation at urban scale of criteria defining the quality of architectural integration was transferred to practice in collaboration with several local councils and universities. Much effort has also been spent on the transfer of knowledge gained from recent research and development to students both at EPFL and at Venice IUAV University.

In collaboration with other EPFL Labs, LESO-PB has also been very active in the design of a blueprint for an R&D building unit in the NEST experimental building currently under construction at EMPA. Called SolAce | REcomfort, it will feature and test multi-functional facade technologies with the aim of achieving an Energy-Plus and Low Carbon combined working/living space. After several months of planning, the building permit was granted in the beginning of 2017.
Current Projects

IEA SHC Task 51 Solar Energy in Urban Planning

**Funding:** Swiss Federal Office of Energy (SFOE)
**Duration:** 2013 – 2017

The main objective of Task 51 is to provide support to urban planners, authorities and architects to propose urban areas and eventually whole cities with architecturally integrated solar energy solutions (active and passive), contributing to cities with a large fraction of renewable energy supply. This includes the objective to develop processes, methods and tools capable of assisting cities in developing long term urban energy strategies.

LESO QSV Method

**Funding:** Swiss Federal Office of Energy (SFOE)
**Duration:** 2011-2017

The goal of the project is to propose a method to help improving the architectural quality of the active solar installation projects. The method offers a way to assess the quality of a proposed integration, and helps define required quality levels, function of site sensitivity and system visibility. Extension of the concept of criticity into urban planning, in combination with irradiation mapping, was additionally included in the method.

NEST SolAce | REcomfort

Perception based Human Comfort and Multi-Functional Solar Facade

**Funding:** ETH Board
**Duration:** 2016-2020

Even in old-established branches like the heating, ventilating and air conditioning industry there are blank areas: one of these spots is the capture of solar energy and daylight by the building envelope. These topics will be investigated by EPFL Researchers and their industrial partners in the SolAce | REcomfort unit: multi-functional facade technologies will be implemented to achieve an Energy-Plus and Low Carbon combined working/living space.

Selected publicatios in 2016


Award

Maria Cristina Munari Probst, Christian Roecker: Swedish Sustainable Building Award, category “Innovator of the Year” 2016, given by the Foundation for the development of energy efficient construction, the Foundation for the development of good building culture, Lund University, the journal Fastighetsvärlden, and the Eliasson family (www.åretsframtidsbyggare.se)