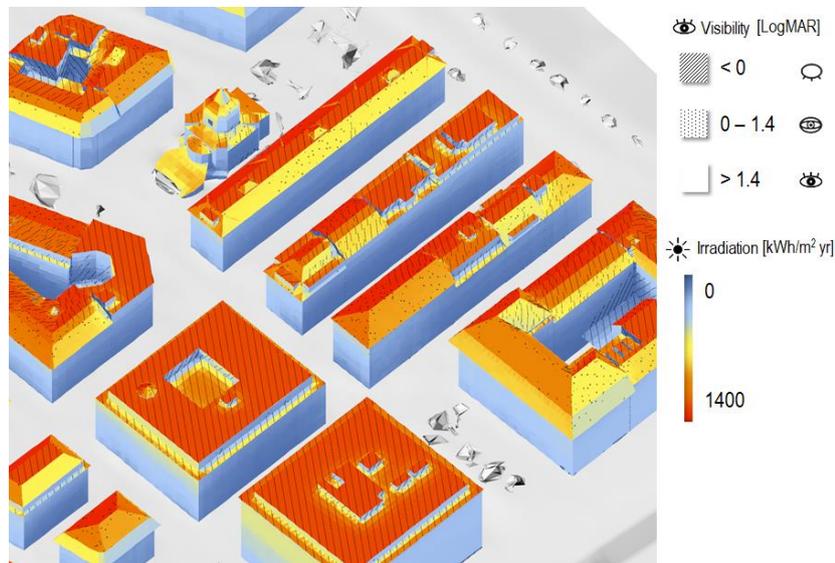


# BUILDING INTEGRATION OF RENEWABLE ENERGIES

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Visibility and irradiation map.

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 promotion of architects' and solar product manufacturers' knowledge on solar integration issues / available solar technologies / integration criteria

## 2017 Activities

The IEA SHC Task 51 "Solar Energy in Urban Planning" was concluded with the publication of documents summarising the results to the attention of practitioners, in particular a report on the State-of-the-Art of Education on Solar Energy in Urban Planning as well as a collection of international case studies on the prospective of solar energy in Urban Planning. The LESO-QSV method developed in the context of this task to help the solar integration decision process with urban scale criteria defining the quality of architectural integration was promoted and implemented in collaboration with city councils from Switzerland and Sweden.

Much effort has furthermore been spent on the transfer of knowledge gained from recent research and development to students both at EPFL and at Venice IUAV University as well as to energy delegates of several Swiss cantons.

In collaboration with other EPFL labs, HEIA-FR and industry partners, LESO-PB has also been very active in the design of 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.

## Current Projects

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### 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 was 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 included the objective to develop processes, methods and tools capable of assisting cities in developing long term urban energy strategies. LESO-PB acted as subtask leader.

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### LESO QSV Method

*Funding:* Swiss Federal Office of Energy (SFOE) / EPFL ENAC INNOSEED

*Duration:* 2011-2017

The goal of the project was to propose a method to help improving the architectural quality of active solar installation projects. The developed 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. The concept of criticality was introduced in urban planning, in combination with irradiation mapping. 2017 was primarily dedicated to knowledge transfer. A PhD focusing on visibility assessment and cross-mapping is currently under finalization.

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### 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 are investigated by EPFL Researchers and their industrial partners in the SolAce|REcomfort building unit of the test building NEST set up at EMPA in Dübendorf: multi-functional facade technologies are implemented to achieve an Energy-Plus and Low Carbon combined working/living space.

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## Selected publications in 2017

- Florio P., Munari Probst M. C., Schueler A., Scartezzini J.-L., Visual prominence vs architectural sensitivity of solar applications in existing urban areas: an experience with web-shared photos, CISBAT 2017 International Conference, Lausanne, Switzerland, 6-8 September 2017, in Energy Procedia - CISBAT 2017 International Conference Future Buildings & Districts - Energy Efficiency from Nano to Urban Scale, p.955-960
- Delmas, A. et al., State-of-the-Art of Education on Solar Energy in Urban Planning, IEA SHC Task 51 Report, 2017
- Bruun Jorgensen O. et al., Illustrative Prospective of Solar Energy in Urban Planning: Collection of International Case Studies, IEA SHC Task 51 Report, 2017