

TASK 66 INTERVIEW

Solar Energy Buildings

Harald Drück



The SHC Programme finalized its work on *Solar Energy Buildings* (SHC Task 66) this past year. To learn first-hand about the Task's impact, we asked the Task 66 Manager, Harald Drück of the University of Stuttgart, to share his thoughts on this 3-year project.

Why was a project like this needed?

Harald Drück (Harald): This Task on Solar Energy Buildings was mainly needed due to two reasons.

The first reason is that the operation of buildings requires a lot of energy that is still predominately generated by burning fossil fuels. If a significant share of this energy is generated by using solar energy, a huge amount of CO₂-emissions can be avoided.

The second reason is that nearly all buildings require both – electric energy for the operation of household appliances such as lights, fridges, and communication devices as well as thermal energy for heating and cooling. Both forms of energy can be provided in an environmentally friendly and cost-effective way by using solar thermal collectors and PV modules. Hence, Solar Energy Buildings are a nice example for the combined applications of the different technologies being part of the Solar Heating and Cooling (SHC) Programme within the framework of the International Energy Agency (IEA).

What is the current status of the applications used for solar planning?

Harald: The knowledge required for planning and also constructing Solar Energy Buildings is still quite rare. Buildings with high solar thermal and solar electric fractions are still a niche market. In this Task, we performed a survey related to process and tools for planning Solar Energy Buildings. The survey showed that in Germany, POLYSUN is the most popular program,

followed by TRNSYS, nPro and Hottgenroth Energiberater. In China, TRNSYS is the most popular program, followed by EnergyPlus and Dymola Modelica. In Austria, Trimble Nova is the most used program followed by Plancal. In Denmark, POLYSUN, EnergyPro and Revit are most used.

The survey also showed that many stakeholders use self-made programs, mainly because of the complexity and costs of the programs but also due to limitations in the commercially available software. A high number of tools and programs are used in the design and planning phase for Solar Energy Buildings. A smaller number of the tools and programs are used in the construction and verification phases and the operation and maintenance phases. No tools and programs, up to now, are used in the renovation and end-of-life phases.

Is there one result/outcome that really surprised you?

Harald: In fact, more results surprised me. One is that many countries and regions require new buildings to be built as “nearly zero energy buildings” (NZEB), “zero emission buildings,” or “low-carbon buildings,” but that Solar Energy Buildings are not mentioned in this context – this means we have to do much more promotion and lobbying work.

One other result I find remarkable is that the results of a survey showed that besides subsidies, aesthetic aspects and the availability of a potential solar energy label for Solar Energy Buildings are of high relevance for many stakeholders.

What is a Task success story from an end-user or industry?

Harald: Concerning end-users, I consider our collection of 27 demo cases of Solar Energy Buildings a success story because this document can serve as a basis for inspiration if someone intends to realize a Solar Energy Building. The collection provides a large variety of different Solar Energy Buildings. Both with regard to specific applications such as residential or office buildings as well as with regard to countries and climate zones.

For industry, our technology radar is of high interest, as it provides information about current and future technologies for Solar Energy Buildings and also assesses the market potential of these technologies.

How has the Task's work supported capacity and skill building?

Harald: Task 66 lasted for a bit more than three years. In this period, we performed 5 industry workshops and one event where we presented the final Task results. In total, around 320 people from approximately 50 countries participated in these events. The industry workshops were dedicated to different subjects such as “Demonstration project of Solar Energy Buildings around the globe”, “Solar thermal and/or PVT combined with heat pumps as an innovative energy supply solution,” and “Solar Energy Buildings – Design, Planning and Operation in Practice.” Plus, we held an IEA SHC Solar Academy webinar on Solar Energy Buildings.

What is the future of Solar Energy Buildings – new developments, markets, policies, etc.?

Harald: Most relevant to establish Solar Energy Buildings as THE new building standard is awareness raising for the concept itself as well as for the advantages. This is also the reason why we produced two target-group specific information brochures: one dedicated to investors and one for policymakers.

Furthermore, it is important to generate awareness by looking on the overall lifecycle cost and not only at the investment cost. Even if it is more expensive to build Solar Energy Buildings compared to conventional buildings, Solar Energy Buildings are much more cost-effective as they save a lot of money during the operation period.

What were the benefits of running this as an IEA SHC Task?

Harald: The main benefit of dealing with Solar Energy Buildings within an IEA SHC Task was the possibility of working with an international team. Due to this, we were able to learn a lot from China, where both the building sector as well as the use of renewable energy is much more dynamic than in Europe.

Also, the collection of the demo cases and the elaboration of the technology radar benefited a lot from the international framework provided by IEA SHC. Thanks to the fact that we had experts from many different countries in the Task we were able to investigate a large of technologies and Solar Energy Building solutions for a huge spectrum of different climate zones and specific local boundary conditions.

Will we see more work in this area in the IEA SHC Programme?

Harald: This is what I really hope! With Task 66, we did a first step towards the total energy supply, which means heat, cold and electricity, of new and existing buildings with a large share of solar energy. During the work, we noted that a lot of technologies are already available and some Solar Energy Buildings exist. However, to make the Solar Energy Building concept even more cost-effective additional R&D is needed. In parallel, awareness raising for Solare Energy Buildings is required, as they are the perfect solution for the realization of “nearly zero energy buildings” (NZEB), “zero emission buildings” and “low-carbon buildings” required in many countries today and in the near future. And finally, they offer many interesting and promising future options for our solar energy sector.