TASK 63 INTERVIEW

Solar Neighborhood Planning

Maria Wall

The SHC Programme finalized its work on Solar Neighborhood Planning (SHC Task 63) this past April. To learn first-hand about the Task's impact, we asked the Task 63 Manager, Maria Wall of Lund University, to share her thoughts on this 4-year project.

Why was a project like this needed?

Maria Wall (Maria): This project was important since an increased use of solar energy is central for sustainable development, where the urban fabric needs to utilize passive solar gains and daylight to reduce energy consumption in buildings and improve indoor and outdoor comfort for inhabitants. In addition, active solar energy systems integrated in the urban context contribute to the production of renewable energy in the form of heat and electricity. We need to push for solar planning since all these solar strategies support cities and citizens in achieving sustainable and healthy developments.

In particular, results from our earlier SHC Task 51 on Solar Energy in Urban Planning underlined the need for further work on a neighborhood scale, especially looking at solar planning strategies and concepts, economic strategies, and stakeholder engagement. In addition, solar planning tools and their coupling in an efficient workflow were becoming more and more important due to an increasing need for decision support tools in the early planning phases. Urban planning and design are complex in that many aspects need to be considered in parallel, and when available, information to support decisions is limited.

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

Maria: We can see that although the extensive use of passive and active solar strategies can pave the way for more sustainable urban environments, there are still major challenges to overcome. Pressures from population growth call for more dense cities, which may cause difficulties in creating good solar access in urban areas. Due to this, we need a "right-to-light" for indoor daylighting, a healthy outdoor environment, and to ensure solar access for active solar panels on buildings and outdoor areas. In some countries, solar easements are in place to protect the installed capacity of solar energy systems. Climate change and increasing heat waves also highlight the need for "right-to-shade," especially in areas experiencing urban heat island (UHI) effects. However, there is a lack of specific standards regulating these aspects.

Good examples of solar neighborhoods show the overall high potential but also show the need for new business models, and ones that include and elucidate added values (human health and well-being, resilience, energy security, biodiversity, etc.) in such business models.

With an increasing need for and use of solar energy, challenges also arise from the competing uses of urban surfaces and the implementation of active and passive solar strategies in urban planning. It is, therefore, important to consider solar strategies in the early urban planning phase and use supportive tools starting in the urban design phase. However, despite the large number of tools available today, many of them still lack interoperability. At the same time, the field of advanced simulation is evolving rapidly and will be influenced by Artificial Intelligence and Machine Learning, allowing for faster and more advanced analyses for larger neighborhoods and different time horizons, which may create new opportunities.

Is there one result/outcome that surprised you?

Maria: Nothing really surprised me, but I was glad to see engaged stakeholders in different initiatives working on solar planning through the case studies we present in Task 63. This, although we were hit by the pandemic, which caused problems and delays in the realization of some of the neighborhoods. The pandemic made it very clear how important face-to-face meetings and collaborations are!

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

Maria: I think there are many success stories within the case studies, in particular where different stakeholders engaged and took part in the process of developing their neighborhood. Such engagement increases the possibility of a successful implementation.

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

Maria: We learned from each other, when we worked in the Task to develop material. For example, most of the experts (including me) were not experts in financing mechanisms and business models. We were lucky to have an expert on this from Eurac/Italy leading this activity, but he on his side was not an expert in solar energy strategies. As a win-win, we learned from each other, and he applied his knowledge of economics

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and business models to solar planning with feedback from the solar experts. As a result, we got a basic understanding of potential business models to support solar energy in neighborhood planning, and the expert in economics learned about solar planning. We needed each other to create skill building outside our own competencies.

Of course, when reaching outside the Task team, an essential part of capacity and skill building was the communication and cooperation around the case studies from different countries. We also organized public seminars presenting results from the Task and invited stakeholders to present their views and experiences.

What is the future of solar planning – new developments, markets, policies, etc.?

Maria: We will definitely see more energy communities, positive energy districts, solar neighborhoods – different concepts and naming to identify energy and environmental strategies for groups of buildings and urban areas.

Also positive is the push from governments and cities, which will help to speed up the developments. The global Covenant of Mayors emphasizes the importance of climate change mitigation and adaptation and increased access to clean and affordable energy. The Covenant of Mayors in Europe has a vision that by 2050, everyone will live in decarbonized and resilient cities with access to affordable, secure, and sustainable energy. Solar strategies have an important role here. However, since the built environment has a long lifetime, we must also ensure long-term solar access for buildings and outdoor environments when developing neighborhoods and cities. Therefore, we need to promote legal reforms to solar access protection and improved planning approval processes where informed decisions can be made.

I think the possibilities to plan and evaluate strategies for neighborhoods and cities using a multi-criteria approach will continue to increase due to the continuous development of digital tools, a co-simulation approach, and advanced computer techniques, such as machine learning and AI. This will enable more reliable and detailed digital models of buildings and cities.

AND more: the never-ending story of development needed to improve the architectural integration of solar panels (solar thermal, PV, PVT) into the built environment! Personally, at home on our single-family house, we are on the way to installing orange PV panels on our roof since I could not accept putting black panels on our orange-tiled roof, as many others have done. However, it was a struggle to find the right contacts and companies that could help – a builder to do the work in collaboration with a company delivering such orange panels. When we asked for orange/red panels during the last years, many simply asked back, “Does it exist?” In Sweden, we have many companies offering to install PV panels, but all are black. Since we plan for a large increase of solar panels in the built environment, we need to ensure that the architecture is not damaged or lost during the implementation of solar systems.

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

Maria: By working together in an international environment, we learn from each other and can accomplish results that are difficult or impossible to do locally by ourselves. It also minimizes the risk of doing the same work in parallel in different regions. Some aspects, like definitions of suitable design criteria and thresholds, benefit from international cooperation and agreement. Thus, the benefits are enormous – not to mention that it is great fun. I truly enjoy the solar family we have. You get friends for life.

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

Maria: Yes, I hope so. More developments are needed, so I definitely think the work will continue. For me, however, it was my last Task. I am slowly planning for my retirement when I can start enjoying the sun more regularly.