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## **“Building performance and Utilization of RES in buildings”**

*Abstract.* Why use RES in buildings? Why the effort to reduce energy need for heating and cooling in buildings? The answers can be found on different levels. If we try to search for the answer in the one of the recent theories, which is gaining momentum in scientific society, we would find that because that is the only way. The constructal law states that living and non-living nature tends to evolve in time in order to survive - that is getting more and more efficient. In addition to the natural tendency to improve systems there are great challenges ahead of us and some of them can be addressed with the improved build environment.

Basic task of the building envelope is to separate indoor and outdoor environment. The concept of the traditional building envelope as a static/passive element of a building will be replaced by a concept of adaptive, multifunctional and evolving building envelope. Utilization of renewable energy sources is expected to be a standard function of building envelopes as well as building services. Monitoring of the building system's performance will enable optimization of the building performance in real time. Fast growing field of Internet of Things will not only enable to control buildings, it will also enable them to communicate with the outdoor environment and act accordingly. As more than 70% of world's population is expected to live in city centres by 2050, the thermal comfort and air quality in the city centres will have a great impact on the humankind. It can be concluded that in the future users, buildings and urban areas will be even more connected and dependent on each other. Therefore, researchers, developers, policymakers and users have to cooperate to develop a sustainable build environment and address future climatic issues.

In the lecture a brief insight of the future evolution of the buildings will be presented and complemented with the research activities in the Laboratory for Sustainable Technologies in Buildings at University of Ljubljana.

*Bio.* Tomaž Šuklje is a researcher and teaching assistant at Faculty of Mechanical Engineering, University of Ljubljana, Slovenia. His PhD study entitled Thermal response of adaptive building envelopes has been carried out at home institution and at Eindhoven University of Technology, Nederland. As a teaching assistant he holds lectures in Renewable energy sources at Faculty of Mechanical Engineering as well as Building physics and Building services at Faculty of Architecture both at University of Ljubljana. As an active member of Laboratory for Sustainable Technologies in Buildings he has been involved in numerous projects related to the utilization of renewable energy sources in buildings, building physics, building performance, urban physics and smart cities. He is also a consultant for the national building performance policy makers, a project manager of open data innovation in Ljubljana (capital city) and an active member of the COST Action 1403 Adaptive façade network. In addition to the research work, he works as a HVAC designer in a consulting company, consultant for the company KnaufInsulation and developer of smart home solutions for the company Entia.