Track 2 - The smart energy system transition in cities and regions

Title of the proposed paper
Steps to transform a Low Energy Building Towards the Nearly Zero Energy Status

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Text abstract (max. 300 words)
Due to a combination of incentives and advertising, a significant amount of buildings were refurbished during the past five years, particularly for increasing the energy efficiency by reducing the energy losses, while the newly built residences were designed from the beginning aiming at reducing the energy losses. Thus, more and more buildings are close to or are already fulfilling the Low Energy status, as defined in the countries where implemented. This is the first step for developing green communities, but to have a real transition towards sustainable communities, the fossil fuel consumption for energy production should be drastically limited. As Low Energy Buildings have – according to their name – low energy consumption, they represent the first choice in getting the Nearly Zero Energy Status, as the renewables that should be implemented have to cover a rather low energy demand. The paper presents the conceptual design steps that should be followed for transforming a LEB into a Nearly Zero Energy Building, by implementing renewable –based energy mixes, designed according to the available on-site resources. A case study is presented, a building in the R&D Institute of the Transilvania University of Brasov, where the R&D Center “Renewable Energy Systems and Recycling” is located: an energy mix based on solar energy conversion systems and geothermal systems is analysed as a pre-feasibility study. The power for common use is provided by five PV platforms (each of eight Si modules) and the thermal energy is provided by solar thermal systems (domestic hot water and, partially, for heating) and by the heat pump. Cooling during summer is proposed based on a combination using natural ventilation (during night) and the heat pump in reversed mode.