The Building as the Cornerstone of our Future Energy Infrastructure - The importance of dynamic and real data for reliable assessment.

Outcome of the SYMPOSIUM, that took place 10-11 April 2019 in Bilbao, Spain.

The DYNASTEE network took the initiative to organise a symposium to bring into discussion the future of the building stock in a changing society where climate issues, information and communication technology, renewable energy technologies and the citizen will play an important role. The aim of the symposium was to present and discuss the challenges that the energy transition may create for companies, governments, researchers and most importantly, the citizen. Several topics that will have an impact on the energy transition have been selected and experts were invited to bring to the floor their views on the future energy infrastructure and the position that the building stock will take. In particular research institutes and the academic world were investigated to seek the present status of research and innovation in technologies that could support the energy transition and especially the building sector. Two IEA EBC Annexes were invited to present the status of their research project. The selected topics for this symposium are related to monitoring, data analysis and modelling, energy standards, the gap between design and real values of energy performance of buildings, renovation of the huge building stock and integration of renewable energy resources. Interesting questions were raised by the audience and discussed by the experts. Will a carbon free society be feasible using innovative technologies? Will the greenhouse gas emissions and final energy consumption be reduced while maintain the standards of living and working? Are the citizen aware and willing to pay? Will it be feasible to adjust the present building stock to the requirements set by the political targets of reducing GHG emissions? Are the variable energy resources like wind and solar power giving the security of energy supply?

In the transition towards a new energy system, based on minimal carbon use and circular economy principles, the building is the cornerstone of the future energy infrastructure. Energy use in European buildings is still around 40 % of the total final energy use. Decarbonisation of power and heat are high on the agenda of EU Member States. Present initiatives by governments for a proper energy transition are based on reducing energy consumption, increased use of renewable energy resources and making the energy infrastructure more intelligent Smart Readiness Indicator (SRI) as mentioned in the Energy Performance of Buildings Directive (EPBD). Presently, the major part of final energy in buildings is heat. In the near future, this will be converted more from (renewable) electricity. The energy transition should be a play between governments, industry and end-users. Often not considered, the citizen should become at the centre of the energy system; from passive consumers to engaged energy customers. For that purpose digitisation is essential, enabling monitoring and control of optimised energy use for a comfortable living and working environment.

The energy infrastructure needs to address the balancing for energy at different levels (transmission system operator (TSO) and distribution system operator (DSO)). The energy markets play an important role in managing the flows of energy in multi-directions. However the level of balancing between the building end-user and the climate is not often carefully considered. Also, the energy flow between buildings and the energy networks will become more and more bi-directional. Buildings will have to become flexible and produce energy: electricity that is partly delivered to the grid, and heat that is stored in the building or underground. The near future may see more self-consumption in buildings, including the electricity stored in electric cars. One may conclude that buildings in which presently 40% of final energy is consumed, will take a more prominent position in the energy infrastructure.