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How to reach renewable energy and climate targets in a cost-efficient way? A dynamic energy model applied on regional scale

Many countries and regions in Europe and worldwide have set ambitious climate and renewable energy targets to be met till 2020, 2030 and 2050. But with which energy system can such targets be met? What technology combination, to which extend, must be applied to reach the target in a most cost-effective way? Can the targets be reached considering technical, social, environmental and economic constraints? Within Eurac Research, a method has been developed, that allows the modelers to give answers to these questions considering the hour by hour energy consumption for a reference year. The North-Italian region of South Tyrol with its energy consumption, building stock, landscape and natural resources, transportation mix and its climate plan (target 1.5-ton CO₂ emissions / capita till 2050) has been taken as a demo model. Technical, social and environmental constraints have been considered with regards to the possible expansion of renewable energy sources for electricity and heat production. The energy efficiency potential has been considered, especially with regard to the existing building stock. Therefore, a detailed building clusterisation has been carried out with regard to building type, year of construction, applied construction technologies and possible refurbishment interventions and the related investment cost. Furthermore, the mobility sector and its transition to zero emission transport has been considered. The energy model shows that the target can be reached with a series of measures based on today's existing technologies. Considering the cost, not only the target scenarios are not more expensive than today's energy system, but especially a very relevant cost part is shifted from fossil fuels in local investment in energy efficiency and technology development; leading to an important push for the local economy. The model can be applied to other regions and countries.

Biography

W Sparber is heading the Institute for Renewable Energy at Eurac Research since its foundation in 2005. Since 2011, he is Vice President of the European Technology and Innovation Platform for Renewable Heating and Cooling (ETIP RHC). Since 2016, he is Chairman of the Board of Directors of the North Italian Energy Utility Alperia which is one of the largest renewable energy producers in Italy, and has a special focus on sustainable energy solutions. He studied Applied Physics at Graz University of Technology and Universitat Autònoma de Barcelona.

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