

International Conference on

RENEWABLE ENERGY AND RESOURCES

July 24-25, 2017 Vancouver, Canada



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Exergy as measure of sustainability of energy system

Do we need energy or exergy? Amount of exergy in energy carriers is very different and prices include value of quantity and not the quality of energy. Exergy is measure for quality of energy, because the only part of energy available to do work is exergy. For different purposes we need energy with different amount of exergy: For heating and cooling energy mixture between small amount of the exergy and large part energy is needed. Transition to sustainable energy system without GHG emissions, based on RE, open the questions how to evaluate exergy from solar energy. Solar energy in all form (irradiation, water flows, wind and biomass) consists from nearly 100% of exergy. Solar energy is for free, conversion systems are not. To exploit at maximum the present infrastructure, there is common agreement that, we need sustainable energy system with four main energy carriers: Electricity, gaseous, liquid and solid fuels. Our vision is the new Sustainable Energy System (SES) based on the biomass carbon recycling using solar and planetary energy for electricity and hydrogen production. SES is based on the existing infrastructure and known chemical processes. With regards to availability of renewable energy resources (RES) it is unrestricted in comparison to present fossil fuels use. The proposed SES consists of the three main energy carriers: Electricity, synthetic methane (CH_4) and synthetic methanol (CH_3OH).



Biography

Peter Novak was the Professor and Chief of Laboratory for HVAC and Solar Energy at Faculty of Mechanical Engineering, Ljubljana, Dean of Faculty, Dean of High School for Technologies and Systems and Director of the Institute for High-technologies and Systems. He became Honorary Member of IIR in 2003, Fellow and Life Member of ASHRAE in 1999 and Honorary Member of REHVA, SITHOK and SLOSE. He has authored and co-authored more than 430 scientific papers, studies, reviews and he is the owner of 10 patents.

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