Low Carbon Energy Supply for South East Europe - DTU Orbit (13/11/2019)

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Southeast Europe consists of several smaller countries in terms of energy systems and thus, integrating energy systems of the whole region has significant benefits for all the countries included. However, as there are large differences between energy mixes of the countries included, careful energy planning needs to be carried out in order to satisfy energy needs of all the countries of the region. Due to the significant differences in geography and the climate of different parts of the region, many different technologies need to be introduced in order to have optimal, low-carbon energy mix. In this paper, steps toward the 100% renewable energy system (RES) for the year 2050 have been presented. Novelty in this paper, compared to the similar research already being carried out, is the sustainable use of biomass in 100% RES, as this is the only way in which biomass can be considered as carbon-neutral. Smart energy systems’ approach has been used in planning of 100% RES, which considers significant integration of the electrical, heating and gas sectors. Many technologies have been employed in the year 2050, but the major share is put on photovoltaics and wind energy, followed by geothermal, solar thermal, CHPs driven on biomass, hydro power and synthetic fuel technologies. Finally, it was shown that the 100% RES in the year 2050 is cheaper than the reference system, developed for the year 2012.

**General information**
- Publication status: Published
- Organisations: Department of Energy Conversion and Storage, Adria Section of the Combustion Institute, University of Zagreb, Aalborg University, Macedonian Academy of Sciences and Arts
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- Pages: 660-660
- Publication date: 2015

**Host publication information**
- Title of host publication: Book of Abstracts : 10th Conference on Sustainable Development of Energy, Water and Environment Systems
- Article number: SDEWES2014.1192
- Research output: Chapter in Book/Report/Conference proceedings → Conference abstract in proceedings – Annual report
- year: 2015 → Research → peer-review