

Establishing Forecasts Pointing Towards the Hungarian Energy Change Based on the Results of Local Municipal Renewable Energy Production and Energy Export

Kulcsár B.

Abstract— Professional energy organizations perform analyses mainly on the global and national levels about the expected development of the share of renewables in electric power generation, heating and cooling, as well as the transport sectors. There are just a few publications, research institutions, non-profit organizations and national initiatives with a focus on studies in the individual towns, settlements. Issues concerning the self-supply of energy on the settlement level have not become too wide-spread. The goal of our energy geographic studies is to determine the share of local renewable energy sources in the settlement-based electricity supply across Hungary. The Hungarian energy supply system defines four categories based on the installed capacities of electric power generating units. From these categories, the theoretical annual electricity production of small-sized household power plants (SSHPP) featuring installed capacities under 50 kW and small power plants with under 0.5 MW capacities have been taken into consideration. In the above-mentioned power plant categories, the Hungarian Electricity Act has allowed the establishment of power plants primarily for the utilization of renewable energy sources since 2008. Though with certain restrictions, these small power plants utilizing renewable energies have the closest links to individual settlements, and can be regarded as the achievements of the host settlements in the shift of energy use. Based on 2017 data, we have ranked settlements to reflect the level of self-sufficiency in electricity production from renewable energy sources. The results show that the supply of all the energy demanded by settlements from local renewables is within reach now in small settlements, e.g. in the form of the small power plant categories discussed in the study, and is not at all impossible even in small towns and cities. In Hungary, 30 settlements produce more renewable electricity than their own annual electricity consumption. If these overproductive settlements export their excess electricity towards neighboring settlements, then full electricity supply can be realized on further 29 settlements from renewable sources by local small power plants. These results provide opportunity for governmental planning of the realization of energy shift (legislative background, support system, environmental education), as well as framing developmental forecasts and scenarios.

Keywords— energy geography, Hungary, local small power plants, renewable energy sources, self-sufficiency settlements

B. Kulcsár is with the University of Debrecen Faculty of Engineering, H-4028 Debrecen, Ótmető str. 2-4., Hungary (phone: +36 30 743 6867, e-mail: kulcsarb@eng.unideb.hu).