



Editorial



Renewable Energy and Environmental Impact

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Renewable energy is usually considered to be an appropriate alternative to the conventional energy sources based mainly on the combustion of fossil fuel, which is able to reduce emissions of greenhouse gases and environmental pollution leading to the climate change and serious environmental problems of a local and regional (acidification, eutrofication) scale. The other significant advantage of renewable energy sources is a possibility to supply energy from local sources – wind, biomass, hydropower, etc. and to reduce dependence on imported energy. Taking into account that Lithuanian energy sector is still exclusively dependent on Russian energy sources (oil, mainly gas), an increase in the consumption of local renewable energy is of great importance not only from an economic but from a political point of view as well.

The program for fast development of local renewable energy resources is currently under development in Lithuania and it should be assumed as a very positive process. On the other hand, serious attention should be given to the environmental impact of different local renewable energy sources, primarily to the possibilities of further hydropower development. Obstacles for migrating fishes (salmon and the others) and considerable reduction in their population are relevant environmental problems caused by hydropower stations. However, taking into account that Lithuania is a plain country (its highest point does not exceed 300 m above the sea level), hydro-energy potential of our rivers is very low while the areas of flooded forests and grasslands with exclusive biological diversity are very big, thus the obtained benefit would be inadequate to ecological losses.

Currently in Lithuania there are 84 operating hydropower stations which belong to the category of small hydropower stations and one big station established on the biggest Lithuanian river Nemunas. Installed capacity of Kaunas hydropower station on the Nemunas is 100 MW, the pond area being 64 sq. km (flooded area - 54 sq.km.). General installed capacity of 84 small stations comprises only 26 MW, and they produce 0.5 percent of the necessary electricity, however, the total flooded area occupies more than 50 sq. km (5000 ha) of green areas and arable lands.

It is worth noting that the highest biological diversity and the most natural state of biological communities in Lithuania are dotted in the valleys of rivers and wetlands. Well saved natural forest and grassland ecosystems in river valleys is a sequence of strongly limited anthropogenic pressure long before the protected areas were started to be established. Even during the period of Lithuanian occupation special protective strips along rivers

were set up with very strong regulation of human activities. For this reason, the major part of Lithuanian protective areas, including Natura-2000 territories, are situated in river valleys.

In order to make a proper choice and decision on further development in a sustainable manner, eco-efficiency of different renewable energy sources should be taken into consideration and energy sources with lower environmental impact should be preferred. Taking into account that installed capacity of small hydropower stations comprises about 300 kW on average, and their flooded area spans over about 60 ha, one up-to-date onshore wind power station can produce six times more electricity than a small hydropower station and can save from flooding about 350 ha of the areas rich with exclusive biological diversity. The current fast development of offshore wind power technologies allow to reach higher energy productivity and one such station can substitute even 20 small hydropower stations and save more than 1200 ha of green areas.

Having in mind that in Lithuania there are a lot of abandoned former agricultural fields, the establishment of short rotation energy plantations is another promising option of the local renewable energy sources. According to approximate evaluation, from 1 ha of planted short rotation energy plantations almost twice more energy could be produced than from the same area of flooded land for small hydropower needs.

More detailed studies on productivity and environmental impact of different renewable energy sources are needed and articles on this topic are welcome to our journal.