Water and Energy – Challenges for the future

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Zusammenfassung

Wasserkraft ist eine der wichtigsten erneuerbaren Energiequelle in Südosteuropa (Southeast Europe - SEE). Aus diesem Grund und in Hinblick auf die Umsetzung der Erneuerbaren-Energie-Richtlinien der Europäischen Union soll die Produktion von Energie aus Wasserkraft gesteigert werden. Die Nutzung der Wasserkraft verursacht jedoch hydro- und morphologische Veränderungen im Fließgewässer und beeinträchtigt damit die ökologische Durchgängigkeit sowie aquatische Lebensräume. Das EU-Projekt SEE Hydropower beschäftigt sich mit der Stromerzeugung aus Wasserkraft und der Optimierung der Verwendung von vorhandenen Wasserressourcen mit Schwerpunkt auf deren nachhaltiger Nutzung. Im ersten Teil des Projekts wurde der Stand der Gesetze und des nationalen Gewässermanagements betreffend Wasserkraft untersucht. Dabei sind signifikante Unterschiede beim Stand der nationalen Umsetzung der Wasserrahmenrichtlinie fest zu stellen. Der Schwerpunkt in diesem Beitrag liegt auf der Vorstellung des Projektes SEE Hydropower und den Ergebnissen betreffend die Umsetzung der Wasserrahmenrichtlinie in den Projektpartnerländern.

Abstract

Hydropower is one of the most important renewable energy sources in Southeast Europe. On a global scale it helps to increase the share of electricity production by renewable sources, but on a local scale it creates ecological impacts in river ecosystems. The EU-project “SEE Hydropower” deals with the optimization of water resources management and the improvement of hydropower implementation with respect to the environment. The objectives of the project are the review of the state of national legislations and the national water resources management concerning hydro power implementation as well as the summarization of different management methodologies for reservoir operation in the Southeast European partnership countries. Concerning the implementation status of the Water Framework Directive significant differences were observed in the national legislation and the national and regional water resources management in the project area. In this paper the main focus is laid on the presentation of the EU project “SEE Hydropower” and on its results concerning the implementation of the Water Framework Directive and the existing differences between the project countries.

Introduction

Due to the fact that in Southeast Europe (SEE) water is one of the most important resources for renewable energy production the project “SEE Hydropower” is an important part of the Southeast Europe Programme, which is funded by the European Union. The project shall contribute to improve the water resources management for a growing renewable energy production in Southeast Europe. The project’s aim is a better utilization of water concerning hydropower production regarding renewable energy sources development, preserving the environmental quality and minimizing the flood risk. SEE Hydropower is carried out by 12 partners coming from Austria, Greece, Italy, Moldova, Romania and Slovenia.

1 Background

In the Southeast European countries the structure of electricity production concerning the different energy sources is quite similar. As shown in figure 1 hydropower and fossil fuels are dominating the market. Therefore hydropower plays an important role to reach the targets set by the European Union in the RES-e Directive 2001/77/EC.

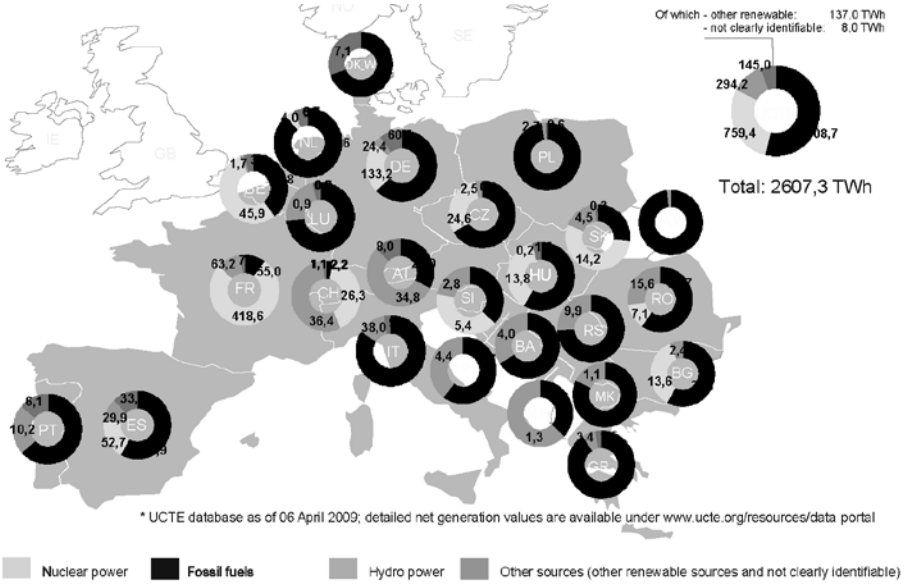

Figure 1: Electricity production in Continental Europe in TWh (source: UCTE, 2009)

The electricity production by hydropower shows advantages for the global CO_2 balance but creates at the same time ecological impacts on the river ecosystems on a local scale. Affecting the connectivity of water bodies and injuring river ecosystems has severe hydrological effects. For this reason the Water Framework Directive 2000/60/EC obliges member states to reach a "good ecological status” in water bodies by the year 2015. Administrators in Southeast Europe are facing an increasing water demand, but are lacking reliable tools to evaluate the effects of water withdrawal on river systems. In addition, competition between water users is

becoming a serious problem. So there is a strong need of accurate planning and optimizing the management of water resources.

1.1 Divergent objectives in the Water Framework Directive (WFD) and the RES-e Directive

The implementation of the Water Framework Directive is a great challenge for all member states of the European Union. The classification of surface water bodies is based on biological, hydro morphological, chemical and physico-chemical quality elements (European Parliament, 2000). To reach the targets of the Water Framework Directive, the minimum instream flow of hydropower plants has to be increased and hydropeaking has to be reduced. As a consequence of these measures the hydropower production will decrease. For example in Austria the loss of hydropower production will be about 15% for small hydro power and about 9% for hydropower bigger than 10 MW (Stigler et al, 2005).

The objectives mentioned above are causing a conflict between the targets of the WFD and the aims of the RES-e Directive. On the one hand river ecosystems shall be protected, which means a decrease of hydropower production and on the other hand the generation of electricity out of renewable sources, including hydropower as a very important source, shall be increased.

2 Methods

The SEE Hydropower region includes 6 countries, Austria, Greece, Italy, Moldova, Romania and Slovenia. In figure 2 the area of the Southeast Europe Programme is shown. The domiciles of the 12 SEE Hydropower project partners are indicated by stars.

Figure 2: Southeast Europe Programme region with countries of the study area (source: Southeast Europe Transnational Cooperation Programme, 2009)

2.1 Review of the state of national legislation and the national water resources management

Based on the review of the official documents concerning the implementation of the Water Framework Directive in the member states of the European Union a questionnaire was designed and sent to all project partners. The questions were related to the status of water resources management and the national procedures concerning hydro power implementation in the SEE partnership countries. The most important part was the evaluation of the national problems and targets concerning the implementation of the Water Framework Directive and the RES-e Directive. Especially for the WFD a lot of documents were available only in the national languages. Therefore the required data has been collected and translated by the project partners in order to give an overview of the countries involved and to be able to compare the implementation status of the different directives (SEE Hydropower, 2010).

3 RESULTS AND DISCUSSION

3.1 State of national legislation regarding the permission process for new hydropower plants

An EU Directive gains legality when it is ratified by the national legislation. The Water Framework Directive was transposed in time by all new member states including Bulgaria and Romania. In contrast, most of the former EU 15 member states did not transpose the directive in the required time, among these Belgium, Finland, France, Germany, Italy, Luxemburg, the Netherlands, Portugal, Sweden and the United Kingdom (Commission of the European Communities, 2007).

The implementation of the WFD and the RES-e Directive causes amendments and substitutions of laws concerning the permission of hydropower plants. In practice, the permission process often differs largely from the original schedule. This leads to a discouragement of potential investors and hinders investments in RES-e projects (SEE Hydropower, 2010).

The most important but also the most time consuming part in the permission process for new hydropower plants is the Environmental Impact Assessment (EIA). There is a wide range of necessary studies and documents for the Environmental Impact Assessment. They vary largely depending on the country, the capacity of the hydropower plant, the size of the reservoir and the ecological status of the affected river section.

3.2 Divergent objectives of the Water Framework Directive and the RES-e Directive

The divergent objectives of the Water Framework Directive and the RES-e Directive require accurate coordination of the National Action Plans. So the objectives determined in the National Action Plans according to the RES-e Directive have to be harmonized with the environmental objectives defined in the National Action Plans according to the WFD and nature preservation. The coordination of opposite interests mentioned above is not only difficult on a national level, but also on a local, regional and international level. In most countries of the SEE Hydropower study area the WFD and the RES-e Directive are under the competency of different ministries. This causes the need of harmonizing different activities on an intersectional level.

3.3 Actual status of the rivers in Southeast Europe

The implementation of the Water Framework Directive forced the EU member states to evaluate the actual status of the national river systems according to the criteria constituted by the European Union. Most of the member states succeeded in reporting the actual status in time. As one of the countries which failed to submit all the necessary information related to the actual status of the river systems, Italy has to be mentioned. There the new classification scheme in compliance with the WFD definition of the ecological status has been put into force in 2009 and will be implemented in national law in 2010. In Italy the “poor or bad ecological status” is mainly determined by biological parameters. In Greece the ecological status of a large number of rivers (174 out of 379) is still unknown and the pollution and the chemical status of the rivers are the main problems. At a national level Romania identified as the main problems the pollution with organic substances as nutrients and with hazardous substances as well as hydro morphological alterations. Considering the different problems it becomes obvious that each country has to deal with different difficulties. In Austria, for example, the hydro morphological conditions are causing great problems (BMLF, 2005).

4 CONCLUSIONS

The implementation of the WFD and RES-e Directive with their evidently divergent objectives is a major task for all stakeholders. The review of the national legislation and the status of water resources management in the Southeast European countries showed that some countries have already defined their targets; others still have backlogs. The national legislation and the permission process of hydropower plants are still divergent. The modification of the permission process, especially the conditions for the Environmental Impact Assessment, has not been finished in most of the Southeast European countries. Due to this fact, it is very difficult for investors to get permissions for new hydropower plants.

ACKNOWLEDGEMENTS

The project SEE Hydropower is funded by the Southeast Europe Programme of the European Union. The data for this report was collected by our project partners ERSE S.p.a. (Italy), University of Ljubljana (Slovenia), Ministry of Environment and Spatial Planning (Slovenia), University "Politehnica" of Bucharest (Romania), National Water Administration "APELE ROMANE" (Romania), Prefecture of Serres Province (Greece) and the Prefecture of Arta Province (Greece).

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