Lithuanian Environmental Protection and Energy Policy on Hydropower

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Abstract. Lithuanian environmental and energy management regulates the development of hydroelectric power in the country. Hydropower is a renewable energy source (RE) that stands as a viable alternative solution for fossil fuel-based energy and environmental protection. The legislative provisions established by the European Union (EU) promotes the development of RE and hydropower by creating favourable conditions for the revision of national RE policy. The success of RE regulation in the EU depends not only on Member States’ legislative measures transposing the EU Directives and to eliminate obstacles for the development of hydropower, but also on the active role of the European Commission (EC) to ensure that legal acts set by EU are being implemented adequately. Current Lithuanian environmental policy is not compatible with the EU hydropower development principles. Particularly stringent environmental requirements caused complete suspension of large and small hydropower development. Therefore, this article reflects the new concept of scientific research, policy and practice interfaces.

This article presents an content analysis of Lithuanian environmental and energy policy on hydroelectric power, an assessment of the conformity of Lithuanian national policies to EU policies, an analysis of strategic documents and strategies, and an expert comparative evaluation of legal obstacles in the Lithuanian and European legal system differences. Hydropower development problems have been investigated according to Lithuanian and foreign countries research studies. This paper presents the comparison methods of the hydropower development problems in foreign countries.

Keywords: Legislation; Directives; Strategic documents; Hydropower; Renewable energy; Obstacles; Assessment; Development

1. Introduction

Hydropower development evolves rapidly, there for it is necessary to emphasize the scientific evaluation. Scientists Suhardiman D., M. Giordano and F. Molle (2015) states that although the environmental impact assessment is often criticized, existing scientific development evaluation studies could be used to create political hydropower management alliances and democratize decision-making processes at both national and international level (Suhardiman et al., 2015).

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Lithuanian environmental and energy policy aims to increase sources of hydropower. National strategies also aim to promote the development of national hydropower, analysing environmental requirements for the construction of hydroelectric power plants. However, despite the fact that national strategies promote the development of national hydropower, only few of the objectives they promote are actually being met. New legal prohibitions emerged not allowing to construct the dams on the Nemunas River as well as other ecologically and culturally significant rivers. This also affected natural and complex reserves where constructing dams on natural rivers, regulating their course, altering riverbeds and the water level of natural lakes was also prohibited. Banning the construction (reconstruction) of new dams in ecologically and culturally significant rivers has placed great limitations on the use of hydroelectric power. While EU policy directives promote the application of hydroelectric power and the construction of dams, certain Lithuanian laws and bylaws contradict the provisions laid out by EU policies and prohibit the construction of new hydroelectric power plants as well as the adaptation of old dams for the purpose of producing hydroelectric energy. The implementation of hydropower strategies should be seen as a task of national importance, ensuring the sustainable development of RE and the country's energy independence, currently that is is not always achievable on the institutional level.

Assessing the conformity of environmental and energy policy and Lithuanian legislation to EU legislation is a new and still-developing task. In Lithuania, hydropower and the practical application of EU norms has recently been receiving a lot of attention, but there is still no new model for assessing the development and environmental impact of hydropower, which as of yet has not been sufficiently explored in scientific literature. European institutions constantly emphasise the importance of practical and theoretical integration of EU legislation into the Lithuanian legal system, but also practical relevance of implementation. The assessment of conformity between Lithuanian and EU legislation in line with the aim of applying it in practice is a novel and relevant task. The recent rise of interest in energy policy and analysis of the conditions necessary for its successful implementation can also be attributed to an idea increasingly prevalent in Lithuania that states that hydropower has a negative effect on the environment and its ecological balance. Such views drive the need to find specific measures to address and overcome these issues of assessment. It is these solutions that should direct Lithuanian national energy development. Most likely, concerns about environmental and energy policy will attract more attention to this phenomenon and encourage Lithuanian politicians and authorities effectively address the implementation of hydroelectric power development.

Hydropower is a source of renewable energy (RE) that stands as a viable future alternative for fossil fuel-based energy and environmental protection. Use of hydroelectric power results in the smallest amount of environmental damage compared to heat energy or atomic energy. Hydropower is a constant source of cost-effective energy. Hydropower, considered clean source of energy production, while emitting into the environment little amount of pollutants, including greenhouse gases. However, according to D. Streimikienė and J. Vveinhardt (2015) must be assessed emission of gases contributing to "greenhouse" effect. This is why developing an effective environmental protection and energy policy, legal framework and regulatory system remains one of the most
important tasks for the country. The practical development of hydropower should be ensured by eliminating legislative gaps and strengthening regulatory legislation. Because Lithuanian hydropower is inextricably linked to coordinating EU institutions, the legislation that regulates its development must be integrated with EU law and the requirements set out by EU institutions and it must also be implemented in adherence to EU directives and other EU legislation. Based on this context, the article seeks to evaluate Lithuanian environmental and energy policy with regard to hydropower and analyse the compliance of Lithuanian national law with EU law as well as various strategies and strategic documents.

**Purpose:** to analyse Lithuanian environmental and energy policy on hydroelectric power.

**Objectives:**
- analyse strategies, strategic documents and identify development prospects;
- assess the compliance of the provisions of Lithuanian legislation to EU legislation;
- identify existing legal obstacles for the development of hydroelectric power.

**Method:** analysis of document content and legislature, analysis and synthesis of scientific literature, comparative analysis.

### 2. The Promotion of National Hydroelectric Power

The Government of the Republic of Lithuania (GRL) approved the first National Energy Strategy by Resolution No. 288 on 19 April 1994. The strategy established the general provisions for reorganising and developing the energy sector for the period leading up to 2015. It also provided for the increased use of RE, the potential of which had previously low exploited. Later, the 1994 strategy was revised based on accumulated experience and approved by the Seimas of the Republic of Lithuania as the revised and updated second National Energy Strategy on 5 October 1999 by Resolution No. VIII-1348, which laid out the main provisions for encouraging the Government to restructure the energy sector by the year 2020. Even though the Law on Energy of the Republic of Lithuania has established that the National Energy Strategy should be revised and updated every five years, the Government, in view of Lithuania’s campaign to become a member of the EU in 2004, prepared a third National Energy Strategy in 2002, which was approved on 5 July 2002 by Resolution No. IXP-1773. The strategy proposed an increase of hydropower in the balance of the country’s RE output, which up to then had not been used to its full potential. This strategy also provided for the renewal and modernisation of the Kaunas Hydroelectric Power Plant by 2007.

Because such strategies age very quickly due to rapid global change, which continually brings about new challenges and trends, the fourth National Energy Strategy of 2007, approved by the Seimas of the Republic of Lithuania (SRL) on 18 January 2007 by Resolution No. X-1046, was drafted by taking into account crucial changes occurring in the economy and the energy sector both on a national and regional scale as well as by incorporating accumulated knowledge and up-to-date information. The strategy proposed various methods and measures for ensuring the strategic reliability of energy by reducing or neutralising the negative influence of the country’s dependency on a dominant supplier of primary energy and promoted the use of hydropower. In view of these
aims, the strategy called for an increase of hydropower in the balance of Lithuania’s RE output, reducing the country’s dependency on fuel imports and mitigating the negative consequences of growing fossil fuel prices. The strategy emphasises that strategic energy targets should be met by using power links to the Polish and Swedish grids in order to increase energy supply reliability and allow the country to integrate into the electric energy market of Western Europe. The new Kruonis pump-storage power plant was expected to improve balancing possibilities and to allow the more effective use of the plant and electric energy transit. Based on the principles for the promotion of sustainable development, the overall installed capacity of hydroelectric power plants with a capacity of less than 10 MW was to be increased to 40 MW. The strategy also proposed analysing environmental requirements for the construction of hydroelectric power plants using the potential of the Neris River and its catchment basin.

The main goal proposed by the 2012 National Energy Independence Strategy approved on 26 June 2012 by the SRL by resolution No. XI–2133 was to evaluate the altered situation of the Lithuanian energy sector after the decommissioning of the Ignalina Nuclear Power Plant, taking into account Lithuania’s drastically increased dependency on the energy supply of the Russian Federation. The strategy establishes the main strategic goals for the Lithuanian energy sector and the directions these goals should be implemented in up to the year 2020 as well as guidelines for stimulating development in the energy sector for 2030-2050. The three main strategic principles for the energy sector remain the same: energy independence, competitiveness and the promotion of sustainable development. Lithuania continues the effort to increase the use of RE in the production of electrical power and simultaneously seeks to use such a portion of its hydroelectrical potential that would not have a negative impact on the environment. In view of this goal, plans have been made to install hydroelectrical power plants with a capacity of 141 MW in Lithuania in 2020.

Table 1 Production of hydroelectric power leading up to 2020

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<td>Installed capacity (&lt; 10 MW), MW</td>
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<td>Electricity produced, GWh</td>
<td>89</td>
<td>93</td>
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<td>Installed capacity (&gt; 10 MW), MW</td>
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<td>Electricity produced, GWh</td>
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<td>Installed capacity, MW</td>
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<td>Electricity produced, GWh</td>
<td>441</td>
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The measures of electricity produced in Table 1 were calculated according to the normalisation rules presented in Directive 2009/28/EC for calculating contributions of hydropower and wind power. Despite the fact that all of the strategies mentioned promoted the development of national hydropower, only some of the objectives they set out were actually met. New legal obstructions emerged prohibiting the construction of dams on the Nemunas River as well as other ecologically and culturally significant rivers. This also affected natural and complex reserves where constructing dams on natural rivers, regulating their course, altering riverbeds and the water level of natural lakes was also banned. The ban on the construction (reconstruction) of new dams in ecologically and culturally significant rivers has placed great limitations on the use of hydroelectric power. Standard rules for the use and maintenance of reservoirs are no longer appropriate for the
present situation. The Lithuanian electrical grid has not been connected to the Polish grid, as work on this project only began in 2014. The power link will have a capacity of 500 MW, and it will only be ready for operation by the end of 2015 (PAP, 2014).

EU policy directives promote the development of hydropower and the construction of dams (Borja et al., 2004), which is reflected in Lithuania's national energy strategies. However, there are certain national laws and bylaws that contradict certain provisions set out by EU legislation and prohibit the construction of new hydroelectric power plants and the adaptation of old dams for the purpose of producing hydropower. For example, the national Law on Water prohibits the construction of dams on the Nemunas River and various bylaws follow suit with regard to ecologically and culturally significant rivers. The hydrokinetic energy resources of Lithuania's rivers have also not been adequately assessed. Up to now only the theoretical hydrokinetic power of the Neris and its cross-section densities have been evaluated. The average power density of the Neris is approximately 0.3 kW/km² whereas the average cross-section density is approximately 50 kW (National Renewable Energy Development Programme for 2020). The results of the theoretical hydrokinetic power studies will be used to assess the river's technically available hydrokinetic power. Even though the hydrokinetic power of Lithuanian rivers is not great, the promotion of technological development can produce technology that will be able to contribute to the production of electric power. From the technological perspective, the near future will mostly be concerned with traditional hydropower solutions.

These circumstances lead to the conclusion that present-day methods for stimulating development in the hydropower sector do not conform to the principles of EU hydropower development. The construction of dams is prohibited in nearly all of Lithuania's large, medium and small rivers. The remaining rivers, where dams can be built, are either poorly suited to energy production (water-stressed) or are already being intensely used for the production of energy. It must be noted that there is a need for an accurate methodology for evaluating the components of hydropower potential because as of now such efforts are limited to the reduction of this potential in rivers flowing through protected territories or the outright obstruction of dam construction on various grounds established by the law. The promotion of Lithuanian hydropower is also limited by the unresolved problem of using hydropower for the purposes of balancing and reserve accumulation and an absence of energy calculations that would determine the quantity, capacity and other technical properties of hydroelectric plants that would be necessary for balancing out other types of RE and reserve accumulation.

The development of hydropower is determined in all EU member states by national legislation that can be seen to have both limiting and stimulating characteristics. However, in Lithuania, the system for promoting RE does not incentivise the development of hydroelectric power plants. The compliance of Lithuanian legislation to EU law will only be achieved if a system to promote hydroelectric power would be formed as identical as to the systems implemented by other countries leading in the field of RE.

3. The National Renewable Energy Action Plan

The development of a national RE action plan and further actions are geared towards the principles
of sustainable development, according to which the installed capacity of hydropower plants with a capacity of less than 10 MW will be increased to 40 MW.

The Plan of Measures for the Implementation of the National Strategy for the Development of Renewable Energy Sources for 2010-2015, approved by the Lithuanian Minister of Energy on 23 June 2010 by order No. 1-180 (Official Gazette, No. 78-4030, 2010), outlines the need to analyse possibilities for the application of damless hydropower in Lithuania and to evaluate the potential of applying such technology. However, such an analysis has still not been carried out and the potential of damless hydropower technology remains unknown. In addition to this, the incredibly active lobbying efforts of various environmental NGOs and imported fuel businesses have practically put a stop to the construction of hydropower plants from 2004 to the present day (Punys, 2011). The only hope is that several members of the Lithuanian Seimas are trying to solve the problem of suitable shipping infrastructure for the Nemunas water route in connection with the installation of dams of moderate height and drafting a bill for the revision of the current Law on Protected Areas (TAR, 2014-00032) and the Law on Water (Official Gazette, 2009, No. 154-6955).

The ban on the construction of new dams in ecologically and culturally significant rivers has placed great limitations on hydroelectric activity. Standard rules for reservoir use and maintenance are no longer relevant because hourly water-level readings with automatic measuring and recording tools are required, as well as new procedure for managing the release of surplus reservoir water.

The goal of the national RE action plan is to set certain RE indicators and outline measures to achieve them. Greater use of renewable energy reduces the demand for imported fossil fuels, ensures the effective use of the country's energy resources and reduces air pollution as well as impact on climate change. Hydropower is currently the principal source of renewable energy used to generate electricity in Lithuania and the entire world, and energy-producing technology is constantly advancing. Hydroelectric power plants play a very important role in today's energy sector, a role that is closely linked to the principles of sustainable development (Bonilla et al., 2010). Research has shown that small dams built at a height within the natural range of a river's water level fluctuation and with all the necessary environmental measures that meet environmental requirements do not have a significant impact on river eco-systems.

The Water Council of the Lithuanian Academy of Sciences gave their approval for the draft amendment of article 14 of the Law on Water, which opens up various possibilities for rebuilding and restoring old hydroelectric stations (watermills), ensuring adequate protection for biological diversity and the natural landscape as well as restoring crumbling hydrotechnical heritage. The bill also proposes a revision of all related legal acts such as the List of Ecologically and Culturally Significant Rivers (GRL resolution No. 1144 approved on 8 September 2004), which unconditionally blocks any progress with regard to this goal. The majority of the most effective potential hydroelectric stations are located on these rivers.

Old water mills and plants lie in ruins (there are about 200 of them), obstructing the rational use of rivers and streams. Due to these limiting legal regulations, stakeholders have for decades not been able to acquire permits to fully rebuild or reconstruct hydroelectric stations on the rivers. Land-based watermill buildings are recognised as cultural heritage, while hydrotechnical buildings are
left to ruin. P. Punys and B. Ruplys (2014) note that there have been cases of individuals taking it upon themselves to clean up around hydrotechnical stations out of desperation, even though such activity is legally prosecuted and threatened with high fines of up to hundreds of thousands of euros. According to the National RE Action Plan, the restoration of these hydroelectric stations would have to have minimal impact on the environment and damming levels within the range of a river’s natural water level fluctuation. The plan also provides the comprehensive use of bodies of water, also emphasises social effects on rural locations. It proposes consideration of the interests of local residents because river beds are often visible with undesirable slabs of concrete, river banks are overgrown and strewn with the slowly disintegrating parts of former hydroelectric structures and dams, tarnishing the landscape and obstructing the migration of water species (Punys, Ruplys, 2014).

The National RE Action Plan also establishes goals for the assessment of possibilities for RE development. Thus, hydropower should be seen as a task of national importance that would ensure the sustainable development of RE and the country’s energy independence. In addition to this, the principles laid out by the National Sustainable Development Strategy should be taken into account and the possibilities for the use of the country’s hydro resources should be assessed for the purposes of ensuring energy balance and a sufficient energy reserve. In this context, it is crucial that simplified conditions are established for rebuilding former hydroelectric stations, which have long proved their viability in many respects (including from the perspective of environmental protection).

4. Municipal Action Plans for Promoting the Use of Hydropower

The National RE Development Strategy, approved by the Government of the Republic of Lithuania on 21 June 2010 by resolution No. 789 (Official Gazette, No. 73-3725, 2015), outlines that one of the possible routes for the development of the RE sector is to involve municipal institutions in the development of hydropower and thus ensure cooperation between state and municipal institutions for a more effective process in the implementation of the country’s strategic energy plans. The strategy seeks to involve municipality governments and their competences in the push to reach hydropower objectives.

According to the Plan of Measures for the Implementation of the National Strategy for the Development of Renewable Energy Sources for 2010–2015, the following Lithuanian ministries will also be involved in the implementation of the National Hydropower Action Plan: the Ministry of Energy, the Ministry of Environment, the Ministry of Agriculture, the Ministry of Transport and Communications, and the Ministry of Economy (National RE Action Plan, 2010).

Municipal governments must contribute to the implementation of this action plan by preparing municipal RE action plans that will outline specific objectives and implementation measures. Implementation reports will have to be prepared on a yearly basis, so that action plans are adjusted accordingly and objectives are reached. Municipal governments can have a formal influence on the development of hydropower by evaluating the stretches of river that flow through their territories.
5. Assessment of Conformity between Eu and National Legislation

The Water Framework Directive (2000) will provide a unique opportunity to improve the regulation of public institutions and restore the ecological status of water bodies in the European Union (Ioris, 2015). Passing Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (OJ 2009 L 140, p. 16) achieved great progress for the EU in the area of RE regulation. Hydropower makes up a significant portion of RE and is a cost-effective type of energy as well as being a stable generator of energy. The directive sets mandatory national targets for every member state, introduces cooperation mechanisms between member states and lays down rules relating to statistical RE transfers from one member state to another system, which should ensure the development of hydropower.

Directive 2009/28/EC presents a recommended schedule for the gradual implementation of overall national targets according to which member states calculate their RE contribution based on their overall energy consumption and gradually move towards their targets, as required by the directive.

Directive 2013/39/EU of the European Parliament and Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC allows altering the physical characteristics of a natural body of water on a union-wide or national scale if this does not violate Directive 2000/60/EC and takes into account various risks as well as socio-economic and cost assessments. The directive also establishes the fundamentals of the European Community’s water policy. The provisions of the directive were integrated into the Law on Water of the Republic of Lithuania and other national legislation. Thus, a new principle for the management of bodies of water was implemented in Lithuania based upon which these bodies of water are now protected and managed according to their hydrologically defined natural catchment basins because the water that ends up in the country’s rivers and lakes does not travel along man-made municipal, district and national boundaries.

It must be noted that the physical characteristics of a body of water should only be altered if there are no other environmentally superior ways of producing public gain. However, such gains should be sought by implementing all possible measures for the protection of the environment and, in compliance with EU environmental policy, Lithuania should effectively protect its bodies of water by using hydroenergetic potential in a way that would not have a negative impact on the environment.


Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) was approved in 1992 in connection with the deteriorating state of the
natural habitats in the European territory of member states. The main purpose of the directive is to promote the protection and preservation of biodiversity with respect to economic, social, cultural and religious requirements, to contribute to the general goal of balanced development, to preserve biodiversity and, in some cases, to support or even promote human activity. As required by the directive, member states have to establish special protected territories that, along with territories important for the preservation of birds, would create the common Natura 2000 network. The annexes to the directive were revised after Lithuania became a member of the EU. The Habitats Committee, set up for the purpose of assisting the Commission in the implementation of the Habitats Directive (92/43/EEC), established a work group for managing affairs related to the strict protection of animal species listed by the Habitats Directive. The principal purpose of the work group was to contribute to the legal explanation of the Habitats Directive. According to Article 17 of the Habitats Directive, member states must present reports on the measures used to implement the directive every six years. The reports must include information about implemented protection measures and the impact of these measures on natural habitats and protected species (Council Directive 92/43/EEC, 2004). In Lithuania, it is the Ministry of Environment that is responsible for the assessment report on the country's habitat situation. All EU countries are obliged to comply with the provisions of EU directives. Improving the existing legal framework is an endless process that is influenced by both the implementation of EU regulation and the local changes occurring in every member state. Thus, it is crucial that legislation is drafted in consideration of changing economic and environmental protection requirements and in consultation with both specialists and other stakeholders. Public opinion must be taken into account, especially in relation to national peculiarities. Legal documents should also be drafted in line with the top priorities of the state. Certain EU environmental measures should be revised and adjusted to the relevant issues of the day.

6. Assessment of Lithuanian Legislation

In the process of establishing a robust legal framework for the development of RE, Lithuanian legislation needs to ensure its practical implementation. Because Lithuania's integration into EU energy systems is inextricably linked to coordinating EU institutions, the legislation that regulates RE development must also comply with EU law. EU legislation promotes the consolidation of the energy sector and addresses many pertinent issues, thus, its effectiveness is relevant when eliminating obstacles and ensuring the development of Lithuanian RE.

Lithuanian RE policy-making falls in line with the goals set by the EU and is determined by the following key objectives: increasing RE contributions to overall energy consumption and ensuring energy security. The EU also seeks to lower energy costs, meet environmental objectives and establish a common energy market based on which it could build integrated RE regulation and an integrated legal system. RE prospects are linked to the development of hydropower and the comprehensive management of water resources for the production of electricity, irrigation, shipping, supplying water, fish farming and other purposes. Hydropower is a calculable form of water energy accumulated in rivers and bodies of water that, according to national laws and bylaws, can be harnessed now and in the near future (Litbioma, 2008).

The Law on Energy from Renewable Sources (LERS), passed on 12 May 2011, establishes the legal basis for the organisation of activity in the renewable energy sector as well as state regulation and
supervision of the operations of RE producers and their relations with controlling authorities. This law has become a fundamental piece of legislation and the vessel through which Directive 2009/28/EC of the European Parliament and Council was integrated into national law. The Government, the Ministry of Energy and the National Commission for Energy Control and Prices is currently passing the legislation necessary for the implementation of the law. In adherence to the procedures and terms established by law and based upon their competencies in the field, the Ministry of Environment along with the Ministry of Energy coordinate the implementation of measures promoting the use of sustainable hydropower for the production of energy, monitor their implementation and ensure state supervision and control. The Law on Energy from Renewable Sources has outlined the following requirements for the construction of hydroelectric power plants:

- the construction of damless hydroelectric plants should be prioritised;
- if the reservoir of a hydroelectric power plant floods a territory, compensation must be paid out to the owner or proprietor of the territory according to the procedure established by law or the land shall be bought out subject to their mutual agreement;
- hydroelectric power stations must be built with fish ladders and allow for the possibility of the periodic removal of accumulated silt from reservoirs and dammed lakes;
- other environmental requirements for the construction of hydroelectric power plants are established in adherence to the procedure stipulated by law (part 4 of Art. 49 of LERS).

It must be noted that the law was passed rather hastily and later amended and therefore, it is still in need of improvement if the goal is to harness the potential of hydropower without having a negative impact on the environment. The first obstacle that needs to be addressed is the fact that the law requires land use status for hydroelectric stations with low installed capacity – a requirement that no power plant run on any other RE has to be met. Sustainable ecological effectiveness can be achieved by conducting environmental impact assessments for economic activity and by preparing comprehensive measures for the prevention of negative environmental impact. Thus, if Lithuanian laws or normative documents prevent the use of river energy for the production of electricity, they must be revised.

The provisions of Directive 2000/60/EC and Directive 2008/105/EC of the European Parliament and Council, integrated into the Law on Water of the Republic of Lithuania, stipulate that the physical characteristics of a natural body of water can be altered. The main effects that influence the condition of bodies of water in Lithuania are point and non-point sources of pollution as well as hydromorphological effects mostly caused by hydropower. Based on the said EC directives and the provisions of the Republic of Lithuania Law on Water and for the purpose of ensuring the effective management of water and bodies of water, authorities established the smallest administrative water management units, namely bodies of water. One body of water is composed of hydrologically related sections of the same type and condition. The division of rivers into sections (separate bodies of water) is necessary because the different stretches of a river often have different characteristics and, in turn, different communities of species, requiring different criteria for assessing the condition of the body of water. The physical (hydrological, morphological) characteristics of certain natural bodies of water have altered drastically due to economic human activity. Such bodies of water include reservoirs of water larger than 0.5 km². The effect of dam technology has transformed the river characteristics of such bodies of water into conditions more characteristic of a lake. For example, the Širvėnos Lake is listed in the national internal waters stock.
as a lake. This lake formed after the construction of a dam at the confluence of the Agluonė and Apaščia rivers. A 3-meter rise in the water level flooded a territory of 3.3 km², and the pool of water that later formed in the meadows dotted with sinkholes was named the Širvėnos Lake. Thus, based on origin, the Širvėnos Lake should be considered a reservoir (Directive 2013/39/EU of the European Parliament and the Council; Law on Water of the Republic of Lithuania). An analysis of the Law on Water suggests that the correct identification of water-related environmental problems is very important in the process of developing environmental water policies and planning the construction of dams. Identifying water protection problems allows the selection of appropriate measures for the reduction and elimination of negative environmental impact and is an essential part of achieving hydropower development while maintaining bodies of water in good condition.

In the process of EU energy policy-making, the Lithuanian Ministry of Environment is also dealing with the task of integrating the provisions of two EU directives – Directive 79/409/EEC on the Conservation of Wild Birds and Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora – into national legislation and all of the consequences thereof. The laws and legal documents that served the same functions as the Birds Directive (79/409/EEC) and the Habitats Directive (92/43/EEC) were either revised or redrafted. The provisions of the directives were integrated into national legislature. The following are the most important documents to have incorporated the said provisions: the Law on Environmental Protection; the Law on Protected Areas; the Law on Forests; the Law on Territorial Planning; the Law on Wildlife (which incorporated the provisions of the Habitats and Birds Directives); the Law on Welfare and Protection of Animals; the Law on Protected Species of Flora, Fungi and Fauna as well as Communities; and the Law on Wild Flora.

Various legal documents have been drafted and approved by the Government and various state institutions for the implementation of the provisions outlined by these laws, and these documents comply directly with the requirements of the said EU directives. An assessment of the compliance of Lithuanian legislation with these directives has revealed that, according to Directive 92/43/EEC, special areas of conservation must be designated based on both natural habitat types and species’ habitats. Thus it is important to draft amendments for these legal acts with regard to the designation of special areas of conservation. Special protective measures should be implemented for the protection of regularly encountered species of migrating birds in consideration of their breeding, rearing and hibernation sites as well as their resting points during migration. Apart from measures for protecting migrating species, the Ministry of Environment must also assess and designate potential territories. A special order must be issued for specifying the criteria and procedures for selecting potential special areas of conservation. Lithuanian bylaws and other legal documents do not comply sufficiently with the criteria presented in the directives and therefore, the current legal framework must be improved if the goal is to implement the said EU directives.

In 2014, a legislative bill (No. XIIP-1803) for the amendment of Article 9 of the Law on Protected Areas (No. I-301) was submitted to the Environmental Protection Committee of the Seimas. The purpose of the bill was to unify the provisions of item 5 of part 2 of Article 9 of the Law on Protected Areas with the provisions of legislative bill No. XIIP-1629 on the amendment of part 3 of Article 14 of the Law on Water and allow the reconstruction of former dams in conservation areas.
with the aim of reconstructing and restoring damaged natural and existing cultural heritage as well as former hydroelectric stations.


In consideration of the contradictions in these laws, it should be said that part 3 of Article 14 of the Law on Water stipulates the following: “the construction of dams in the Nemunas River and in other ecologically and culturally significant rivers is prohibited”. The list of ecologically and culturally significant rivers or their sections is approved by the Government. Thus, new regulatory provisions could be proposed based on which rebuilding dams and other hydrotechnical structures, reinforcing banks, cleaning river beds, forming artificial bodies of water and doing other kinds of work could be allowed on ecologically and culturally significant rivers or their sections if the aim is to restore and clean up damaged natural and existing cultural heritage and water mills, rebuild, reconstruct and restore former hydroelectric stations and ensure the appropriate protection of the natural landscape and biological diversity by amending part 3 of the Law on Water according to the provisions of item 5 of part 2 of Article 9 of the Law on Protected Areas. The country should not be rebuilding former interwar period hydroelectric stations, but rather planning to rebuild former watermill and sawmill dams by adapting them for the purpose of generating electricity and thus conserving technological heritage; rebuilding dams in protected areas should only be allowed if an environmental impact assessment is conducted beforehand and produces positive results. These changes would create suitable conditions for the more effective use of natural water resources and the restoration of damaged natural and cultural heritage. The sites of former hydroelectric stations (watermills) have already shaped favourable landscapes and river eco-systems and are suitable locations for the production of electricity. Approximately 80 of these structures and dam remnants, including various weirs, are in rivers of ichthyological significance and rebuilding them is therefore prohibited by the Law on Water. If a change in this position were allowed, it could enable the restoration of natural assets and ruined landscapes in the process of implementing the provision in the Law on RE stipulating that the installed capacity of hydropower plants connected to the grid must be increased to 141 MW by 2020. At present, this capacity only reaches 128 MW. What is more, there will be no need for the state to make sizeable investments in the removal of remnants of former hydroelectric stations for the purpose of improving fish migration routes. State investments such as this can be avoided by attracting private capital and creating a legal framework that would provide for the rebuilding of small hydroelectric stations, which would also create opportunities for developing rural tourism, water recreation and more diversified rural business. Both research and practical experience have proved that the comprehensive use of river waters for the purposes of shipping, hydropower, water supply, fish farming, flood prevention, increasing water levels during periods of drought, recreation, etc. produces the most benefits to society.
7. National Hydropower Development

In advanced countries, hydropower develops alongside RE (Jager et al., 2015). The negative effects of hydropower development on the environment is minimal when using modern technology (Govorushko, Rupert 2014). In Switzerland more than 55 percent of electricity is being produced from hydropower (Notter, 2015). Sweden prohibited the construction of dams in only 4 rivers and separate smaller river stretches, Finland - only several large rivers (Puranen , 2003). Analyzing the French protected rivers and hydropower development opportunities in protected rivers and territories for hydropower development exclude less favorable and unfavorable to the river (Crepon , 2009). There are opportunities to implement Hydropower projects in protected rivers. In Lithuania there is no such possibility. There for, today, hydroelectric plants are becoming increasingly more significant, their development is supported by the European Commission, and various developments have led to great increases in their capacity. The reservoirs that come hand in hand with hydropower provide suitable infrastructure for the comprehensive use of rivers, making it a very useful form of RE. In the comprehensive sense, the potential of Lithuania's hydropower development is evaluated favourably by scientists. However, hydropower is now encountering a host of problems related to the lack of conformity between Lithuanian and EU legislation as well as to national environmental policy. In view of the fact that the principles of Lithuanian RE policy correspond to EU goals – both seek to increase the use of hydropower in the overall balance of RE – the attention that is focused on hydropower is simply insufficient. Thus the effective management of state policy with regard to ensuring the effective development of hydropower is still a very important task.

Up to 2012, hydropower generated more electricity than any other RE. Today, the potential of hydropower for the production of electricity is constrained by environmental limitations: the rivers that have the greatest hydropower potential are listed as ecologically and culturally significant and the national Law on Water prohibits the construction of dams in their waters. More lenient environmental requirements would allow an increase of 30 MW for hydroelectric stations, and the development of such stations would be purposeful because hydropower is one of the cheapest renewable resources. When assessing the possibilities for the development of hydropower, it becomes clear that unless essential changes are made to environmental laws, the country’s hydropower potential can already be considered nearly exhausted (GRL resolution No. 789). P. Punys et al. (2010) propose reducing environmental limitations and doing more to integrate the potential of hydropower development with environmental law in accordance with environmental best practices.

In view of this goal, an amendment act for the national Law on Water was proposed that sought to establish a provision that would allow the reconstruction of former dams and other hydrotechnical structures and the reconstruction of former hydroelectric stations on the Nemunas River as well as on other ecologically and culturally significant rivers or their sections. When implementing ruling No. SV-S-671 of the Board of the Seimas of 12 June 2014 On the Verdicts on Legislative Bills, the Ministry of Environment presented a verdict in which the ministry recommended rejecting act No. VIII-474 for amending Article 14 of the Law on Water because the provisions it proposes allegedly create the conditions for violating Directive 2000/60/EC of the European Parliament and Council of
23 October 2000, which outlines the fundamentals of the European Community’s actions in the field of water policy. On 15 January 2015, the Ministry of Justice, repeatedly analysed the Government resolution On the Bill for Amending Article 14 of the Law on Water, submitted a legal verdict indicating that the bill can still be considered and that it should be systematised with an appropriate unification of the legislative provisions. The legal acts must be unified and detailed analyses of specific projects and their environmental impact assessment material must be conducted. Thus, it is likely that the bill will reach its goal at some point in the near future.

The development of hydropower essentially leads to positive consequences for the environment and its components. Hydropower structures must be adapted to each specific territory in consideration of the site’s particular circumstances and its sensitivity to planned activity. When implementing the development of hydropower it is crucial that possible negative results are taken into account and that specific measures for reducing, preventing or compensating such consequences are also provided for.

To conclude about the prospects for development, it should be noted that at present, the development of large hydroelectric power plants (over 10 MW) is not being planned. With the current economic climate, ungrounded environmental requirements (prohibiting the construction of dams on rivers with hydropower potential) and complex procedures for acquiring construction permits, the construction of small hydroelectric stations is, at present, nearly impossible. The construction of hydroelectric stations is prohibited in ecologically and culturally significant rivers and their sections, which leads to the idea that the development of hydropower in Lithuania should be based on the principle of ecological effectiveness, i.e. making as little negative impact on the environment as possible. Because the potential of hydropower and the possibilities for developing hydropower without amending environmental legislation have been exhausted, the remaining
avenue of development becomes installing water turbines on existing dams, at former watermill sites and conservation areas. For this purpose, in-depth impact assessments should be conducted in order to determine both economic and environmental effectiveness.

8. Conclusions

1. Analysis of Lithuanian RE development strategies has revealed that development prospects are linked to:
   - the use of damless hydrotechnology;
   - the increase of additional quotas for small hydropower stations that use traditional dam technology once environmental requirements are made less stringent;
   - the development of large hydroelectric power stations on the Nemunas shipping route.

2. Analysis of the compliance of Lithuanian legislation to EU requirements has led to the conclusion that in integrating the provisions of EU directives into national law, Lithuania has established especially stringent environmental requirements and has thus halted the development of both large and small hydropower.

3. Identified legal obstacles:
   - the Law on Water, prohibiting the construction of dams on ecologically and culturally significant rivers;
   - the national list of ecologically and culturally significant rivers;
   - the Law on Energy from Renewable Resources, with its exceptional regulation of traditional (dam) hydropower, which requires a change of land use status in the presence of low capacities;
   - lack of a simplified permit acquisition procedure for traditional hydropower.

References

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