# Recommendations for Sustainable Hydropower Development in Montenegro

Podgorica, October 2012

## Contents

# Introduction

The purpose of this document is to propose a set of recommendations pertaining to general conditions and various stages in the development and use of hydropower projects in order to ensure their sustainability. Recommendations are based on initial considerations of the Dinaric Arc Sustainable Hydropower Initiative (DASHI) project Working Group[1] and a review of relevant policies, legislation and reports. In particular, materials and recommendations available from various EU projects and initiatives, the World Commission on Dams (WCD), International Hydropower Association (IHA) and International Commission for the Protection of the Danube River (ICPDR) have been used as the key reference points. Furthermore, efforts have been made to adjust the available international guidelines and recommendations to the conditions and issues typical for Montenegro. A wider group of stakeholders involved in the DASHI project was consulted in the process of preparing the document and their suggestions were taken into account for this final version.

The recommendations are meant to assist decision makers in the process of approving specific hydropower projects, as well as to serve as a lobbying tool for other stakeholders to ensure best practices and sustainability requirements are integrated in planning, implementation and utilisation of hydropower plants in Montenegro. At the same time, these recommendations are developed to be used as a point of reference for monitoring the implementation of hydropower projects and their operation.

The document is structured in a way as to first discuss general policy and institutional framework and provide recommendations on what is needed to create enabling conditions for sustainable utilisation of hydropower. Recommendations are identified and listed, and a brief justification is provided for each of them, including references to relevant international (and in some cases national) sources that address the point in question.

Following the general recommendations and based on the same approach (recommendation – justification – references), the various stages of a project life cycle are considered. More detailed recommendations are provided for i) the early stage of hydropower development (coinciding with strategic and spatial planning phases in Montenegro), ii) project preparation (development of project documentation and preparation of Environmental Impact Assessment – EIA), iii) implementation (construction); and iv) operation. The IHA's "Hydropower Sustainability Assessment Protocol" has been used as a model for the identification of project stages. Recommendations are made bearing in mind all sizes (small and large) and all types (with dams/ reservoirs, run-of-river, pumped storage capacity) of hydropower plants, and they refer, as applicable, to both new and existing plants.

The recommendations address the crucial issues for sustainability of hydropower projects, including:

- Transparency and public participation;
- Social and socio-economic issues, full assessment of costs and benefits and their equitable sharing;
- Water management to maintain or achieve good ecological water status or potential;
- Protection of important natural assets (habitats, species, ecosystems);
- Quality and effectiveness of environmental impact assessments;

[1] Names and positions of the Working Group members are provided in Annex 1.

- Design and implementation of mitigation measures to address adverse environmental impacts;
- Climate change.

As for the specific materials and sources used in preparation of this document, the starting point for the review of relevant international policies, standards and guidelines was the 2000 report of the World Commission on Dams "Dams and Development: A new framework for decision making". The report is a milestone in considering and understanding the impacts of dams (as one of the most common yet often controversial solutions for hydropower utilisation), and its findings and recommendations have been integrated into EU legislation (for example, in the Linking Directive 2004/101/EC). The "Hydropower Sustainability Assessment Protocol" – a manual published in 2010 by the IHA to help evaluate whether a specific hydropower project is sustainable or not – was another important source. ICPDR's "Guiding Principles on Sustainable Hydropower Development in the Danube Basin" (draft from June 2012) were also consulted and used.

It is important to stress, however, that for the analysis conducted for this document the relevant EU legislation and policies were used as a benchmark, including the Water Framework Directive (WFD), the Birds and Habitats Directives, the Renewable Energy Sources Directive (RES) and the Linking Directive. Materials from the DG Environment project "Hydropower Generation in the Context of the EU WFD" (the so called Arcadis report from 2011) and proceedings from the Common Implementation Strategy (CIS) workshops on Water Framework Directive and hydropower[2] have also been used as key references. Furthermore, Montenegro EC Progress Reports for 2009 and 2011 have been consulted, together with the EC 2010 Analytical Report accompanying the Commission Opinion on Montenegro's application for EU membership.

Other sources used in the preparation of this document include WWF guidelines and recommendations on sustainability criteria for hydropower as well as policies and procedures on environmental and social impacts assessment and management applied by several International Financial Institutions[3].

Finally, national legislation and relevant materials were used, together with preliminary deliberations and advice of the DASHI project Working Group. A full list of references is provided in Annex 2 of the document.

## Policy and institutional framework

Given the current status in developing various hydropower projects in Montenegro and some shortcomings in the process of their planning, permits and construction, it can be expected that a number of new small-scale facilities will start operating in the next couple of years, while the completion of planned larger hydropower plants (installed capacity > 10 MW) is expected to take a longer period of

[2] Including the Summary Report from the workshop held in 2007 and the Issue Paper following the 2011 Brussels workshop.

[3] The World Bank requires application of a set of safeguard policies and operational procedures (including policies and procedures on environmental assessment, natural habitats, involuntary resettlement, dam safety etc.) for all the projects it supports if by their nature or scale they can cause negative impacts on the environment and people. Similarly, the European Bank for Reconstruction and Development has defined a set of requirements for project implementation which form its environmental and social policy. As of 2012, the International Finance Corporation is requiring the application of policy and performance standards on environmental and social sustainability and access to information.

time. For the latter, it is highly unlikely that any of those considered so far could start operating before 2015 (2020 being a more likely timing for possible completion of such projects).

This means that planning and operation of new hydropower plants is and will be taking place in the context of the country's advancing EU integration and in parallel with significant global efforts to mitigate climate change and adapt to its impacts. Both of these (EU integration and climate change) are resulting in more complex and stringent climate, energy, and environmental policies and legislation, also calling for the adoption of new approaches at a national level. The approach that has prevailed so far in the Montenegrin energy sector administration and with related stakeholders needs to be reconsidered in order to adjust to the on-going European and global trends, as it is largely rooted in out-dated positions of promoting hydropower as a solution with almost no negative impacts on the environment, while neglecting potential impacts of climate change (primarily reduced availability of water resources[4]) on hydropower generation. The need for a changed approach is also emphasised in the last (2011) EC Progress Report for Montenegro which specifically recommends that "the environment and climate change has to be integrated into other sectors more systematically, in particular energy." At the same time, a significant change is needed to ensure transparent policy making and institutions, better cooperation and coordination between different sectors (e.g. water management, environment, spatial planning and energy) and institutional strengthening. With this in mind, recommendations for sustainable hydropower development concerning policy and institutional frameworks are the following:

1. It is necessary to ensure **coherence between policies and plans to develop hydropower with the objectives set under the EU water and nature protection legislation**.

**JUSTIFICATION:** EU water and nature protection legislation has, to a large degree, been transposed onto Montenegrin laws and bylaws, while further harmonisation is on-going. In light of the country's ambition to join the EU, objectives set under European policies represent a guiding framework for national ones, and are an ultimate goal to be attained during the accession process and further on. In the EU, hydropower is widely recognised as a reliable $CO_2$-free and renewable source of electricity, nevertheless with significant negative impacts on the environment (primarily on water and biodiversity). In the efforts to align national with EU policies, it is necessary to ensure that hydropower development objectives and plans are set in a way that does not: i) jeopardise the achievement of the objectives of the WFD, notably the general objective of good ecological status or potential of water bodies[5]; and ii) entail destruction of critically important nature reserves and biodiversity. (References for the recommendation: proceedings of the EU Common Implementation Strategy workshops: 2007 *Workshop on WFD & Hydropower,* 2010 *Workshop on Biodiversity and Water: Links between EU Nature and Water Legislation,* and 2011

[4] The IPPC "Climate Change 2007: Synthesis Report", for example, states the following: "There is also high confidence that many semi-arid areas (e.g. the Mediterranean Basin, western United States, southern Africa and north-eastern Brazil) will suffer a decrease in water resources due to climate change. Drought-affected areas are projected to increase in extent, with the potential for adverse impacts on multiple sectors, e.g. agriculture, water supply, energy production and health."

[5] The general objective of attaining good status by 2015 applies to all surface waters and it entails achievement of good ecological and good chemical statuses. The ecological status (or the potential) of a water body is expressed in terms of "classes" (e.g. high, good, moderate, poor or bad). Specific requirements for different classes are defined under the Water Framework Directive and refer to the quality of the biological community, the hydrological characteristics and the chemical characteristics. Good chemical status is defined in terms of compliance with all the quality standards established for chemical substances at European level. A less stringent objective of achieving good ecological potential and good chemical status applies for heavily modified and artificial water bodies.

*Workshop on Water Management, Water Framework Directive & Hydropower*; Arcadis (2011), "Hydropower generation in the context of the EU WFD")

2. Hydropower development should **take into account future impacts of climate change**.

**JUSTIFICATION:** According to the IPCC's projections (from the IPCC "Fourth Assessment Report, Climate Change 2007"[6]) of climate change impacts, significant decreases (ranging from 20 to 50% depending on the area) in runoff and electricity production potential can be expected from the mid-21st century onwards for the rivers in South East Europe. The EC's White Paper "Adapting to climate change: Towards a European framework for action" (2009) also highlighted that hydropower production potential could decrease by 25% or more in southern Europe as a result of changing climate by 2070. Bearing in mind the life-cycle of hydropower projects, these projections and related risks must be thoroughly considered and integrated in the planning and decision making process in Montenegro. As suggested by ICPDR, the economic viability of new infrastructure projects needs to be considered with a view to altered flow regime due to climate change. Furthermore, possible future conflicts between new hydropower plants, other water uses (increased pressures on water resources are expected under the conditions of changed climate due to increasing demand for water supply, agriculture, etc.) and the aims of the WFD to achieve good ecological status or good ecological potential should be taken into account early in the planning and permit process. To this end, available international (especially EU) guidance on river basin management planning and integrating impacts of climate change should be used. (References for the recommendation: proceedings of the EU Common Implementation Strategy workshops: 2007 *Workshop on WFD & Hydropower* and 2011 *Workshop on Water Management, Water Framework Directive & Hydropower*; Arcadis (2011), "Hydropower generation in the Context of the EU WFD"; ICPDR (2012, draft) "Guiding Principles on Sustainable Hydropower Development in the Danube Basin")

3. **Water sector reform and strengthened capacities are necessary, in parallel with capacity building in environmental and energy sectors**.

**JUSTIFICATION:** In order to implement new regulations (partly or fully) harmonised with relevant EU legislation, strengthening of administrative capacities in all sectors is necessary. This has been repeatedly emphasised by the European institutions and experts assessing Montenegro's progress in the accession process. In particular, weaknesses and slow pace of reforms in water sector have been reiterated, together with insufficient coordination between water, environmental and other administrative sectors. For hydropower development, improved coordination between the energy sector, spatial planning, concessions issuing, water and environmental administrations is of crucial importance in order to achieve sustainable outcomes. The current practice of approval and construction of small hydropower plants has also shown that the lack of relevant and updated information (e.g. Water Information System does not exist despite the fact it is required under the water legislation) is an obstacle that needs to be overcome to allow sustainable planning and implementation of hydropower projects. A further difficulty is linked to the fact that river basin management plans are still not prepared, which means that baselines and guidelines for integrated water management are missing. Sustainable hydropower projects cannot be ensured under existing conditions of weak administrative capacities and lack of coordination. (Reference for the recommendation: EC Progress Reports for Montenegro for 2009 and 2011; EC (2010), "Analytical report accompanying the Commission Opinion on Montenegro's application for membership of the European Union")

[6] As quoted in the UNDP and UNFCCC "Handbook for Conducting Technology Needs Assessment for Climate Change", 2010.

4. **Instruments to support and promote hydropower development should be linked to ecological criteria for the protection of water status and other sustainability requirements**.

**JUSTIFICATION**: In order to stimulate energy generation from renewable sources (RES) and achieve RES targets[7], incentivising instruments need to be developed and implemented. On the international/ EU level, these instruments are already in place and include tradable emission reduction certificates, feed-in tariffs, support schemes for renewables, eco-labelling and others[8]. As such instruments are introduced or applied in Montenegro over the course of the next years, ecological criteria for the protection of water status and other sustainability requirements[9] should be used as a determining factor whether specific hydropower projects are entitled to benefit from particular support scheme. Provisions of other relevant EU legislation (e.g. the Linking Directive)[10] would also apply. In this way, it would be ensured that unsustainable hydropower plants (those degrading good ecological water status or potential, or in other ways causing significant negative environmental or social impacts) are not supported through such schemes. (References for the recommendation: proceedings of the EU Common Implementation Strategy workshops: 2007 *Workshop on WFD & Hydropower* and 2011 *Workshop on Water Management, Water Framework Directive & Hydropower;* Arcadis (2011), "Hydropower generation in the Context of the EU WFD")

5. **High level of transparency needs to be insured** in energy policy making and implementation.

**JUSTIFICATION:** Transparent work of the lead institutions and involvement of stakeholders in policy making (as well as in all the stages of hydropower project planning and execution) are prerequisites for achieving equitable outcomes, preventing conflicts of interest and corruption, and for sustainable development at large. Independent institutions and the professional integrity of civil servants and elected officials, together with effective provisions for access to information and public participation (as required under EU legislation) are the main means of insuring that sustainable choices will be made in policy making and planning. Transparency and openness are particularly important for the needs and options assessment phases, which can and should be carried out at various levels in the decision making process – from policy level down to project-specific choices. They are also crucial for the general conduct of policy making and planning processes, as well as for the reconciliation of interests of different stakeholders and consensus building. Enabling access to information and participation of the public in all the project development stages are highly prominent requirements of the environmental

[7] National target for the share of renewable energy sources in the energy balance is being discussed and is likely to be set as at least 20% share in the primary energy consumption (in line with EU targets).

[8] A range of instruments are used to support power generation from renewable energy sources. Feed-in tariffs, for example, usually entail long term contracts with electricity generators, guaranteeing grid access and purchase of produced electricity at incentivising prices that cover the costs of generation. Labelling schemes are based on assessments and audit procedures that are conducted in order to ascertain whether certain producers can be allowed to market their electricity under 'green energy' or similar labels (if their operation is in compliance with conditions set under specific labelling scheme).

[9] Including, for example, biodiversity protection, social and equity issues.

[10] Article 11a (6) of the Linking Directive imposes additional qualitative restrictions on the approval and use of Certified Emission Reductions or Emission Reduction Units in cases of hydropower plants with a generating capacity of > 20 MW. These additional restrictions include ascertaining that relevant criteria and guidelines, including those contained in the WCD report "Dams and Development: A New Framework for Decision-Making", were respected during the development of such projects.

and social policies of International Financial Institutions such as the World Bank (WB), International Finance Corporation (IFC), European Bank for Reconstruction and Development (EBRD) and others. Transparency requirements also refer to the project implementation stage and determine whether agreed standards are followed for environmental and social mitigation, compensation and enhancement. (References for the recommendation: WCD (2000), "Dams and Development: A New Framework for Decision Making"; IHA (2010), "The Hydropower Sustainability Assessment Protocol"; EC (2010), "Analytical report accompanying the Commission Opinion on Montenegro's application for membership of the European Union"; environmental and social policies of the WB, IFC and EBRD)

## Early stage of hydropower development

In order to ensure that hydropower utilisation is based on sustainability principles, it is necessary to apply a number of criteria at an early stage of the planning process, prior to the development of specific projects. The integration of sustainability principles in decision-making on hydropower development means that a comprehensive approach to social, environmental and economic dimensions is applied in an integrated manner, that greater levels of transparency and certainty are ensured for everyone involved, and that the rights of future generations to meet their energy and water needs are taken into account. The following recommendations are made towards this end:

1. **Assessment of alternatives must be ensured in the development of energy policies, strategies and plans**.

**JUSTIFICATION:** Comprehensive assessment of all possible options to meet the energy needs (as well as realistic assessment of needs) is necessary before a policy, strategy or plan calling for further development of hydropower is adopted. This has been a weak point in energy sector planning in Montenegro so far, where potential hydropower projects are uncritically transmitted from one strategic document to another without a thorough analysis of those and other available options, and their comparison. As indicated by the WCD, alternatives to dams often exist (and this is also true for other forms of hydropower utilisation), and they include improvements in the existing plants, energy efficiency, diversification of energy sources (including, where applicable, small-scale decentralised solutions) and others. A thorough assessment of all options can be *inter alia* facilitated by a meaningful application of Strategic Environmental Assessment (SEA). A properly conducted SEA provides information on the reasons for and against different options for meeting the objectives set under the given policy, strategy or plan, and allows for comparison of environmental (as well as social) impacts of different options. In this way, SEA informs planners and enables selection of options that have best performance under several criteria (not only on energy or economic grounds). Timely provision of data needed for the description of existing conditions (biological, geological, hydrological and other baseline data) is of major importance for the quality of the SEA processes and SEA reports. The options assessment process needs to continue through all the planning and project development stages. The SEA process also contributes to transparency through mandatory public discussions and other forms of consultations.

When assessing alternatives and/ or conducting SEAs for energy policies, strategies and plans, it is of particular importance to use the criteria set out in Article 4.7 of the WFD. Article 4.7 regulates the circumstances under which failure to achieve certain of the WFD objectives are permitted (and is discussed in more detail below, within the first recommendation for the project preparation stage). Under Article 4.7 exemptions from the general WFD objective (achievement of good status or non-

deterioration) are allowed for new modifications that adversely affect the status of water but are considered essential and for new sustainable activities. Examples of such projects include flood protection and essential drinking water supply. In such cases, derogations from the requirement to achieve good status are granted as long as all appropriate mitigation measures are taken. Less clear-cut cases are navigation and power generation, where alternative approaches can be selected (transport can be switched to land, other means of power generation can be used). Derogations can be provided for these cases too, but they are conditional on the fulfilment of three criteria: that the alternatives are technically impossible, that they are prohibitively expensive, or that they produce a worse overall environmental result. The development of energy policies, strategies and plans in Montenegro has to be subjected to the tests prescribed by Article 4.7 of the WFD whenever they include proposals that have the potential to adversely affect water status on some of the country's water courses. (References for the recommendation: WCD (2000), "Dams and Development: A New Framework for Decision Making"; IHA (2010), "The Hydropower Sustainability Assessment Protocol"; proceedings of the EU Common Implementation Strategy workshops: 2007 *Workshop on WFD & Hydropower* and 2011 *Workshop on Water Management, Water Framework Directive & Hydropower;* Arcadis (2011), "Hydropower generation in the Context of the EU WFD"; EC (2009), **"**Common Implementation Strategy for the Water Framework Directive, Guidance Document No. 20 on exemptions to the environmental objectives")

2. **Public acceptance of the key decisions needs to be ensured.**

**JUSTIFICATION:** Gaining public acceptance is one of the key requirements for sustainable hydropower development. According to WCD's report, an unacceptable and often unnecessary price has been paid to secure benefits provided by dams built during the last century, especially in social and environmental terms. The price was paid by displaced people, by downstream communities, by taxpayers and by the natural environment. Lack of equity in the distribution of benefits has called into question the value of many dams in meeting water and energy development needs when compared with the alternatives. That is why the WCD suggested that all those whose rights are involved and who bear the risks associated with different options for water and energy resources development should be consulted and included in discussions to resolve competing interests and conflicts. Early consultations with affected parties and conducting of a wide and open participatory process, recognition of entitlements of all water users downstream and reaching mutually agreed approaches to benefits sharing[11] need to be secured. As stated in the WCD report: "…public acceptance of key decisions is essential for equitable and sustainable water and energy resources development". Stakeholder involvement and securing equity in the rights to use water upstream and downstream are also at the core of the EU WFD concept of integrated river basin management. (Reference for the recommendation: WCD (2000), "Dams and Development: A New Framework for Decision Making")

[11] According to IHA Hydropower Sustainability Assessment Protocol, benefit sharing is distinct from one-time compensation payments or resettlement support, and it refers to: i) equitable access to electricity services – project-affected communities are among the first to be able to access the benefits of electricity services from the project; ii) non-monetary entitlements to enhance resource access – project-affected communities receive enhanced local access to natural resources; and iii) revenue sharing – project-affected communities share the direct monetary benefits of hydropower according to a formula and approach defined in regulations.

3. **Suitable, less favourable and non-favourable areas** (water bodies or their parts) **for hydropower development should be determined**.

**JUSTIFICATION:** Rivers, river basins and aquatic ecosystems are considered to be the biological engines of the planet. They play a very important role not only in the maintenance of natural balance but also in the provision of life-support services and sustaining economic activities and livelihoods. It is therefore necessary to protect a certain share of rivers and aquatic ecosystems from any form of disturbance, including hydropower development. To that end, a national plan should be developed identifying areas suitable for new hydropower projects, less-favourable and non-favourable areas, taking into account WFD and other environmental criteria as well as socioeconomic aspects (including other water uses). The areas should be identified with the involvement of all stakeholders based on transparent criteria, they should be monitored and revised within a period of time.

On the European level the Natura 2000 areas/ Special Areas of Conservation as defined and designated under the EU Habitats Directive are commonly considered as "*no-go areas/ water bodies*", or at least highly sensitive areas, for hydropower development. The ICPDR's draft report (June 2012) on principles for sustainable hydropower development includes guidance on the assessment approaches and criteria that can be used to determine favourable, less-favourable, non-favourable and exclusion areas for hydropower development. Further guidance and recommendations on the methods to identify priority areas for freshwater conservation in light of infrastructure development is available from the recent WWF publication (WWF 2011). (References for the recommendation: proceedings of the EU Common Implementation Strategy workshops: 2007 *Workshop on WFD & Hydropower* and 2011 *Workshop on Water Management, Water Framework Directive & Hydropower;* Arcadis (2011), "Hydropower generation in the Context of the EU WFD"; WCD (2000), "Dams and Development: A New Framework for Decision Making"; ICPDR (2012, draft) "Guiding Principles on Sustainable Hydropower Development in the Danube Basin"; WWF (2011), "Rivers for Life: The Case for Conservation Priorities in the Face of Water Infrastructure Development")

4. **Methodology for definition of ecologically acceptable flows should be agreed and regulated.**

**JUSTIFICATION:** When water use conditions are issued in the process of planning and permits for hydropower projects in Montenegro, it is required that a minimum amount of water, so called 'guaranteed' or 'water minimum', is released into the water course below the dam/ abstraction point at any given time. So far, the value of the guaranteed minimum was usually calculated as 10% of the multi-annual mean flow and was constant for the entire year. The concept does not provide for simulation of the natural flow fluctuations during different seasons and it allows minimum water release to be below the mean monthly flow for the driest months. For these reasons, the application of the concept does not provide for the ecological needs of aquatic ecosystems and organisms and undermines the ecological integrity of the system – a situation that is unacceptable from a sustainability point of view. It is therefore necessary to revise this approach and propose an adequate methodology for the calculation of ecologically acceptable flows, bearing in mind that downstream from the hydropower plant sufficient water flow must be guaranteed in order to simulate the natural environmental conditions upon which living organisms depend for their survival (growing, feeding, migration, spawning and other functions).

Ecologically acceptable flows have to be determined taking into account the species living in the various parts of the water body (e.g. upper, mid and lower parts of the river flow) and their ecological needs in terms of a given quantity of water at a given time of the year. Flushing events (usually in spring and autumn) also need to be factored into the definition of ecologically acceptable flows as they cause river

bed washing and sediment transport and are highly significant for the life cycle of aquatic organisms. Other elements that need to be considered in an attempt to define the methodology for determining ecologically acceptable flows are river basin specificities and presence of protected areas downstream (in case of the latter, minimum flows must be sufficient to guarantee the integrity of such sites). Approaches to determine ecologically acceptable flows have been developed by several EU countries and countries from the Balkan region, and there is a growing pool of knowledge and experience to draw upon. Efforts to prepare and adopt a bylaw prescribing methodology for the determination of ecologically acceptable flows for different types of rivers in Montenegro are underway. (References for the recommendation: proceedings of the EU Common Implementation Strategy workshops: 2007 *Workshop on WFD & Hydropower* and 2011 *Workshop on Water Management, Water Framework Directive & Hydropower;* Arcadis (2011), "Hydropower generation in the Context of the EU WFD"; WCD (2000), "Dams and Development: A New Framework for Decision Making"; DASHI Working Group materials)

5. **Improvements in project permits system and spatial planning** are needed to contribute to sustainable hydropower utilisation.

**JUSTIFICATION:** Spatial planning plays a very important role in determining different land uses and in the project permits and implementation cycle in Montenegro. Existing practices have, however, shown that this important role is not always carried out in a way that contributes to sustainable development. It has become evident that spatial plans are often developed to accommodate potential investors' interests and maximise profits rather than to ensure sustainable use of natural resources. This has also proven true in the case of detailed spatial plans developed for areas where specific hydropower projects were/are planned.

Furthermore, recent approval of some small hydropower plant (SHPP) projects highlighted problems with timing and alignment of steps in the development of spatial plans, issuing of energy permission and water use concessions and project development itself. Under the current permits system, the energy administration first assesses the energy viability of a project and based on this assessment gives a green light for the next steps (or rejects the project). As for the approval process for construction of necessary facilities (including issuing permits for construction and later on for operation), the adoption of detailed spatial plans for suitable areas should be the first step. Detailed plans define conditions for locating and constructing objects, facilities and infrastructure and are supposed to integrate requirements with a rational use of natural resources and protection of the environment. Water use conditions should be issued as the next step, followed by detailed project designs (prepared in line with planning and water use conditions). Decisions to go ahead with project preparation for certain SHPPs have, however, been made despite the lack of detailed plans for the given areas, whereas regular permits procedures were bypassed with a government decision to start with project preparation based on the plans of higher order (such as national or municipal spatial plans). This proved to be problematic later on in the process as a number of issues slowing down the implementation of projects has emerged, including the opposition of local communities and water use conflicts, uncertainties about water availability and so on. In principle, these issues should have been resolved in the earlier stages of project development, prior to detailed design preparation. Their occurrence highlights the system inefficiencies and the need for improvements in the future.

Some of the current initiatives that are expected to contribute to necessary improvements include preparation of strategic energy plans on local (municipal) level and compilation of Small Watercourses Cadastre. The preparation of local energy plans has already been initiated in some municipalities with

the participation of stakeholders. These plans are expected to identify energy potential and solutions on a local level (in line with national plans and strategies) and provide inputs for spatial planners to define suitable areas for implementation of necessary projects. The idea is to avoid a situation that has been usually seen so far where i) spatial plans were also proposing technical solutions for energy projects and ii) designing spatial solutions for the implementation of projects identified in the energy plans. Finalisation of the Small Watercourses Cadastre for hydropower plants of up to 1 MW (prepared by the Ministry of Economy in cooperation with EBRD) will, on the other hand, alleviate part of the problem caused by insufficient hydrological data.

The provision of water quality and hydrological data for watercourses that are not included in the regular monitoring system still remains one of the weak points in the system, despite a growing number of public and private initiatives for collection of such data. Establishment of a Water Information System would significantly strengthen the structure for development of sustainable hydropower in Montenegro as it would enable efficient and comprehensive use of all available data and information on water regimes. Preparation of River Basin Management Plans (as soon as possible) is also of exceptional importance since these plans determine elements for water management and set a framework for the development of hydropower projects. In preparing these plans it will be necessary to provide for harmonisation of hydropower development ambitions and WFD objectives. In addition to strengthening information and planning bases for water management, it is also necessary to improve the availability of other environmental data, especially for biodiversity[12]

The spatial planning guidelines[13] for SHPPs have been developed covering the topics important from sustainability perspective such as adequate siting (location selection), avoidance of areas protected for natural or cultural values, availability of water, preservation of ecosystem and landscape values, assessment of cumulative impacts when several SHPPs are planned on the same watercourse, and others. What is needed for the future is that these and other relevant guidelines are applied in the planning process, not only for small HPPs but for all forms of hydropower development, and that better and more effective communication between spatial planning and SEA processes is secured. At the same time, capacities of spatial planners (in terms of specific skills and techniques and multi-sectoral expertise) need to be strengthened and their independence provided.

In summary, significant improvements to the information base and harmonisation between the spatial planning, energy approvals and concession issuing and permits processes need to be secured in order to avoid obstacles and delays later in the project implementation cycle. It is also necessary to improve coordination and cooperation between relevant bodies in order to overcome lack of data in the period until reliable and detailed databases are established (References for the recommendation: DASHI Working group discussions; national guidelines for spatial plans for small hydropower plants; suggestions received through consultations with a wider group of DASHI project stakeholders)

[12] Lack of biodiversity data is, for example, often reported as one of the problems that have a negative effect on the quality of Strategic Environmental Assessments (note: according to Montenegrin regulations, SEAs are mandatory for energy as well as for water management and spatial plans).

[13] The responsible Ministry has, in cooperation with international institutions, prepared two documents to advise planners on how to integrate good practices and sustainability requirements into spatial plans for small hydropower projects. These documents are titled "General guidelines or urban and spatial conditions for construction of small hydropower plants" and "General guidelines for concession areas for the use of watercourses for small hydropower plants construction". (available from the Ministry of Economy and at http://www.oie-res.me/index.php?mact=News,cntnt01,detail,0&cntnt01articleid=74&cntnt01origid=58&cntnt01lang=hr_HR&cntnt01returnid=58)

6. When applicable, **cross-border impacts should be addressed** in a timely and adequate manner.

**JUSTIFICATION**: The use and management of trans-boundary rivers/ water bodies must be conducted in line with applicable international standards. Hydropower development on such water bodies must be subject to consultation processes, and agreed to by potentially affected neighbouring countries early on in the planning process. The SEA and EIA both require an assessment of cross border impacts, and Montenegro has signed a number of international conventions (e.g. Espoo Convention, Kiev Protocol, Aarhus Convention, UNECE Water Convention) that require proper assessment and procedures in these cases. (References for the recommendation: WCD (2000), "Dams and Development: A New Framework for Decision Making"; WWF presentations and recommendations)

## Project preparation stage

The preparation stage normally includes issuance of permits, detailed project planning and design, environmental and social impact assessments, including design of mitigation measures, tendering procedures and all the other steps that lead to project implementation. The following recommendations are proposed for this stage:

1. **The development of new hydropower projects needs to be assessed against the requirements of the Water Framework** (Article 4.7) **and Habitats** (Article 6.3/ 6.4) **Directives**.

**JUSTIFICATION:** In order to enable sustainable development of new hydropower projects in Montenegro it is necessary to ensure that their negative impacts are limited as far as possible and acceptable in terms of water management and nature protection objectives. As mentioned before, the EU WFD, as well as the Habitats and Birds Directives represent a guiding framework for national policies and a legal requirement as most of the provisions of these directives have already been transposed into national legislation.

As for the EU policies and practice, the EU 2011 Issue Paper (proceeding from the CIS workshop on WFD and hydropower) suggested that Member States should avoid taking action that could further jeopardize the achievement of the WFD objectives of good ecological status or potential of water bodies, and that further use and development of hydropower should be conditional to meeting the environmental objectives of the WFD and in particular requirements of Article 4.7. This means that new hydropower projects can be considered compatible with the WFD if they comply with the Article 4.7 criteria. Other analyses conducted in the EU suggest that both requirements of the WFD (and of the Birds and Habitats Directives) and the objectives of the Renewable Energy Directive[14] (promoting the use of hydropower) can be met through implementation of win-win measures to improve the status of water bodies with acceptable loss of energy production and through measures to increase hydropower generation without negative effects on water ecology (the latter include raising efficiency at existing sites and defining suitable sites for new hydropower plants). Ecological standards need to be developed for new facilities (they should, for example, have fish passages and respect minimum ecological flow).

[14] 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.

For the existing facilities ecological standards should be set bearing in mind their modernisation and improvements in the operation conditions.

As mentioned before, assessment of hydropower projects against the WFD requirements can take place already at an early stage of project development. What is important is that in the process of planning of "new modifications", an assessment of the environmental impacts is carried out which demonstrates that the criteria and conditions of Article 4.7 are fulfilled. Article 4.7 of the WFD defines conditions that have to be met if new modifications or alterations of water bodies (causing failure to achieve good ecological status/ potential, or failure to prevent deterioration from high status to good status) are to be permitted without breaching WFD provisions. These conditions require that:

- all practicable steps are taken to mitigate the adverse impact on the status of the body of water;
- the reasons for those modifications or alterations are specifically set out and explained in the river basin management plan;
- the reasons for those modifications or alterations are of overriding public interest and/ or the benefits to the environment and to society of achieving good ecological status/ potential are outweighed by the benefits of the new modifications or alterations to human health, safety or to sustainable development;
- beneficial objectives served by those modifications or alterations cannot be achieved by other means (they are not technically feasible or have disproportionate costs), which are a significantly better environmental option.

Similarly, Articles 6.3 and 6.4 of the Habitats Directive impose stringent criteria for approval of projects in order to safeguard integrity of critically important natural habitats and species designated as ecological network Natura 2000. In accordance with article 6.3 of the Habitats Directive, for any plan or project that is likely to significantly affect a Natura 2000 site, an appropriate assessment of its effects on the integrity of the site has to be carried out. A plan or project can be authorised only after it has been ascertained that it will not have an adverse effect on the integrity of the site. When certain conditions are met (there are no other alternatives and there are imperative reasons of overriding public interest for carrying out the plan or project), the provisions of article 6.4 can be applied and the plan or project may be authorised if all necessary compensatory measures to guarantee the coherence of the Natura 2000 network are undertaken. (References for the recommendation: proceedings of the EU Common Implementation Strategy workshops: 2007 *Workshop on WFD & Hydropower* and 2011 *Workshop on Water Management, Water Framework Directive & Hydropower;* Water Framework (2000/60/EC) and Habitats (92/43/EEC) Directives; EC (2009), **"**Common Implementation Strategy Guidance Document on exemptions to the environmental objectives"; ICPDR (2012, draft) "Guiding Principles on Sustainable Hydropower Development in the Danube Basin")

2. **Consideration of alternatives (variants) at project level and a sound assessment of environmental and social impacts of different alternatives are necessary.**

**JUSTIFICATION:** Project designers should make every effort to avoid negative impacts of hydropower projects by proposing suitable technical solutions and applying a sound site selection process – both from a set of several possible alternatives. Assessment of alternatives (in particular in terms of their environmental impacts) at project level is usually conducted through the EIA procedures, which can help project designers to select the best (least environmentally damaging) among the suitable options. EIA is also important in terms of information disclosure and public participation, as it entails public discussions for the EIA report. Ensuring that credible information on the project is publicly available and

demonstrating that the best option, possible location, design and operating rules have been chosen is very important if the project is to be qualified as sustainable. At the EIA phase, an environmental management plan with adequate mitigation measures[15] is also developed and approved (to be implemented during the construction and operation phases). It is very important that mitigation measures such as fish passages/ fish ladders are designed in parallel with the project to ensure their effectiveness. Conducting a good quality EIA process and integrating its findings in the project design can lead to solutions for sustainable hydropower utilisation.

Social impact[16] assessment is not directly required under Montenegrin legislation as a self-standing process, whereas some aspects of addressing social impacts are covered under the land expropriation and environmental assessments legislation. Policies and practices of International Financial Institutions (such as the WB, IFC and EBRD) should be used as a framework for the identification and assessment of social impacts, and for the definition of adequate compensation measures and social impacts management plans. (References for the recommendation: proceedings of the EU Common Implementation Strategy workshops: 2007 *Workshop on WFD & Hydropower* and 2011 *Workshop on Water Management, Water Framework Directive & Hydropower*; Arcadis (2011), "Hydropower generation in the Context of the EU WFD"; WCD (2000), "Dams and Development: A New Framework for Decision Making"; WWF presentations and recommendations; environmental and social policies of the WB, IFC and EBRD)

3. **Clear information on all costs and benefits of a given hydropower project should be made available**.

**JUSTIFICATION:** Hydropower projects should not be sanctioned solely on the basis of their energy performances and financial viability, but also following an evaluation of all economic aspects and costs incurred by society and the natural environment, weighed against their potential benefits. The costs should not only refer to the project itself but also to the development of necessary additional infrastructure (such as access roads, transmission lines and grid development). The objective would be to approve the projects where there is a net benefit once all economic, social and environmental costs and benefits are factored in. It is also important to know whether all parts of society, including downstream users of ecosystem services, will be better off with than without the project, and to use this information for the approval of projects too. Besides relevance for project approval, clear information on costs and benefits is necessary in order to agree on adequate benefit sharing mechanisms and avoid situations where, for example, local communities that bear most of the social and environmental costs of a given project are not entitled to appropriate benefits. Moreover, an analysis of costs and benefits of the project is necessary to enable a judgment on whether the benefits to the environment and to society from preventing deterioration of status or restoring a water body to good status are outweighed by the benefits of the new modifications (which is one of the criteria of the Article 4.7 of the WFD). (References for the recommendation: proceedings of the EU Common Implementation Strategy workshops: 2007 *Workshop on WFD & Hydropower* and 2011 *Workshop on Water Management, Water*

[15] Measures to avoid or prevent negative or adverse impacts should be prioritised, and where avoidance is not practicable, then minimisation of adverse impacts should be sought. In case avoidance and minimisation are not possible, mitigation and compensation measures should be identified and undertaken.

[16] Social issues that need to be considered include potential land and water use conflicts, characteristics of the project affected community/ ies, socioeconomic status and livelihoods, likelihood of resettlement requirements, labour and workforce capacity, community safety, public health, cultural heritage, etc.

*Framework Directive & Hydropower;* Arcadis (2011), "Hydropower generation in the Context of the EU WFD"; WWF recommendations)

4. **Best available techniques should be applied to infrastructure safety**.

**JUSTIFICATION:** Risks to infrastructure safety include issues such as availability and reliability of water, seismic stability, other natural hazards (including flooding events, the frequency and intensity of which is expected to be on the rise as a consequence of climate change), geotechnical stability and quality of construction materials. In planning for dam and other infrastructure safety, technical standards and best available solutions should be applied throughout project preparation, implementation and operation in order to minimise the risks and manage unavoidable ones. Special attention should be paid to seismic risks and safety and management of dams in cases of high water levels and reaching of the hydrological maximum. The goal is to protect life, property and the environment from the consequences of dam failure and other infrastructure safety risks, and to manage dams in such a way as to avoid exacerbation of flooding risks downstream. Independent reviews and adequate expertise should be ensured in the process. (Reference for the recommendation: IHA Hydropower Sustainability Assessment Protocol; suggestions received through consultations with a wider group of DASHI project stakeholders)

5. **Good governance is needed to avoid corruption and ensure best possible outcomes.**

**JUSTIFICATION:** In the context of project preparation, governance can be defined as a combination of processes and structures that inform, direct, manage and monitor the activities toward completion of project documentation and finalization of tendering procedures needed to begin project implementation. Corporate (investors) and public sector governance are equally important and, from the sustainability point of view, it is necessary that both of them are organised, ensure transparency and compliance, and avoid corruption. Public administrations as well as private sector investors should have sound structures, policies and practices to provide for transparency, integrity and accountability in all the phases of the process and for all the actors in an impartial manner. Sound governance policies and practices are equally important in the following stages – implementation and operation – of the project life cycle. (Reference for the recommendation: IHA (2010), "The Hydropower Sustainability Assessment Protocol")

## Implementation

The implementation stage of the project refers to procurement and construction. Issuing the operating permit at the end of this stage must be contingent on full compliance with regulations and standards and implementation of specific mitigation and compensation measures developed in the planning stage. Fulfilment of all relevant time-bound commitments should also be ensured before commissioning the project. The following recommendations are proposed:

1. **Ensure compliance with relevant regulations, project preparation documentation and agreements.**

**JUSTIFICATION:** Ensuring public trust and confidence requires that governments, investors and regulators meet all commitments made at the planning stage (the same applies to operators once the project starts generating electricity). Compliance with applicable environmental and construction

regulations, criteria, guidelines and project-specific negotiated agreements needs to be ascertained too (in the implementation as well as later, in the operation phase). An appropriate mix of regulatory and non-regulatory instruments, incorporating incentives and sanctions, is needed to make sure all mandatory (legally required) and planned social, environmental and technical measures are implemented. (Reference for the recommendation: WCD (2000), "Dams and Development: A New Framework for Decision Making")

2. **Securing biological continuity, alongside with implementation of other mitigation measures**

**JUSTIFICATION:** Most hydropower projects entail installation of certain barriers that inhibit or prevent free migration of aquatic organisms upstream and downstream and disturb sediment transportation. Both upstream and downstream migrations are of critical importance for water species. By migrating, they avoid unfavourable conditions (e.g. low water levels or drying up of the parts of river courses) and seek adequate feeding or spawning areas. Plans to provide for biological continuity (upstream and downstream migration) at the affected rivers need to be executed in this stage of the project cycle. Possible solutions include fish passes and fish ladders, as well as fish lifts, fish stocking, catch & carry programmes. The selection of the most appropriate solution is the key to its effectiveness.

Fish passages are one of the typical interventions providing for the biological continuity of rivers with developed hydropower. They are structures that allow river organisms to migrate over the barriers installed for the purpose of electricity generation, and are also called fish ladders or fish paths. The dimensions of fish passages need to correspond to the size and type of river stretch where they are built while the gradient should be determined depending on the species that will use them and the available space and type of terrain. These structures are only effective for moderate dam heights (20-30 metres), and their effectiveness is also contingent on the water flow below the barrier. In some cases there are no favourable conditions for the construction of fish passages and other mitigation solutions should be designed and implemented if possible. (References for the recommendation: proceedings of the EU Common Implementation Strategy workshops: 2007 *Workshop on WFD & Hydropower* and 2011 *Workshop on Water Management, Water Framework Directive & Hydropower;* Arcadis (2011), "Hydropower generation in the Context of the EU WFD"; DASHI Working Group materials)

3. **Conduct procurement and construction in line with good practices and planned mitigation measures.**

**JUSTIFICATION:** Project-related procurement refers to services, goods and works. Construction works include a set of activities through which project plans are executed and facilities necessary to generate electricity are installed. In the efforts to secure the development of sustainable hydropower projects, it is important to ensure that procurement processes are conducted in an equitable, transparent and accountable manner, and that construction works are organised in line with good construction practices while necessary environmental and other mitigation measures are implemented. It is important that both procurements and construction works are planned and executed in a way that supports the achievement of project deadlines, guarantees quality and ensures that project costs remain within the planned budget. Other sustainability considerations in the implementation phase include developers' and sub-contractors' environmental, social and ethical performance and promotion of opportunities for local economies. All of the above-mentioned requirements should also apply to the procurement procedures and construction of additional project-related infrastructure (access roads, transmission lines and grid development).

The implementation of environmental management plans in the construction phase is necessary to ensure sustainability requirements are respected at all stages of hydropower project development. The following issues need to be addressed in an appropriate manner (as set out in the pertinent plan):

- chemicals and waste storage and handling,
- water pollution prevention,
- land disturbance,
- noise and dust emissions minimisation,
- health and safety protection,
- maintenance of good community relations,
- possible site zoning for protection of special areas, and others.

(References for the recommendation: IHA (2010), "The Hydropower Sustainability Assessment Protocol"; WWF recommendations)

## Operation

In the operation phase of hydropower projects, compliance with relevant regulations, permit conditions and negotiated agreements needs to be ensured, and adequate monitoring conducted. The following recommendations are made for this phase:

1. **Environmental and social management need to be a constituent part of plants' operation.**

**JUSTIFICATION:** Hydropower projects cannot be qualified as sustainable unless properly developed environmental and social management plans are fully implemented in the operation phase and all the issues identified in the previous stages of project development are addressed in a way that guarantees the best possible outcomes. Where plants have been built prior to the establishment of regulations for design and implementation of environmental mitigation plans[17], such plans need to be developed (in line with relevant water management/ environmental objectives) and efforts need to be made to improve environmental performance and address outstanding social issues in a fair manner. In general, the intent is that negative environmental and social impacts are avoided or minimised whenever possible, or mitigated and compensated when they are unavoidable. Special attention should be paid to the operating rules and procedures in the conditions of pronounced flood risks. (Reference for the recommendation: IHA (2010), "The Hydropower Sustainability Assessment Protocol"; suggestions received through consultations with a wider group of DASHI project stakeholders)

2. **Monitoring and compliance with relevant regulations, designed mitigation measures and agreed commitments** is necessary.

**JUSTIFICATION:** Issues that need to be monitored include, but are not limited to, infrastructure safety, water quality, downstream water flow, reservoir management (when applicable), biodiversity, invasive species, erosion and sedimentation. Based on the monitoring of the plants' performance and changing conditions, periodical adjustments/ improvements need to be proposed referring to operating rules and mitigation measures (improvements are particularly important for old hydropower plants that have been in operation for longer periods of time). Any decision to modify facilities or operating rules should be permitted only after a participatory review of project performance and its impacts. Particular

[17] In Montenegro, the Law on Environmental Impact Assessment (Official Gazette of the Republic of Montenegro 80/05) which requires identification and implementation of mitigation measures came into force on 1 January 2008.

attention should be paid to the monitoring segments which are necessary to ascertain whether key mitigation measures (such as ecological flow provisions, measures to provide biological continuity etc.) are implemented in an adequate manner and are effective. Responsibility for monitoring and compliance rest both with the relevant institutions and plants' operators whereas provision of adequate information and of qualified staff is the key for their fulfilment. Inspections and supervising segments of administration have a leading role in ensuring compliance. To that end, their capacities and ability to perform in the spirit of good governance are crucial. (Reference for the recommendation: IHA (2010), "The Hydropower Sustainability Assessment Protocol")

## Annex 1 – Composition of the DASHI Working Group

1. Rita Barjaktarević, member of the NGO Northern land
2. Danilo Mrdak, professor at the Faculty of Natural Sciences and Mathematics, Department for Biology
3. Aleksandar Perović, President of the NGO Ozon
4. Ivana Bajković, Advisor at the Water Administration
5. Nataša Kovačević, Programme Coordinator of the NGO Green Home
6. Dejan Milovac, Coordinator of the NGO MANS
7. Dejan Milonjić, member of Forum 2010
8. Milica Vukčević, Advisor at the Environmental Protection Agency, Monitoring, Analysis and Reporting Department
9. Tamara Brajović, Advisor at the Environmental Protection Agency, Permits Issuing Department (SEA)
10. Dragana Đukić, Senior Advisor at the Ministry of Agriculture and Rural Development, Water Management Sector
11. Lucija Rakočević, Senior Advisor at the Ministry of Economy, Energy Sector
12. Marina Marković, consultant

## Annex 2 – List of References


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