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ECOSYSTEM APPROACH TO HYDROPOWER: FACILITATING THE IMPLEMENTATION OF EUROPEAN REQUIREMENTS TO DEVELOPMENT OF HYDROPOWER SECTOR IN STATES OF EASTERN EUROPE PARTNERSHIP

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Ecosystem approach to hydropower: facilitating the implementation of European requirements to development of hydropower sector in states of Eastern Europe Partnership

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This brochure presents the project "Ecosystem Approach to Hydropower: Facilitating the Implementation of European Requirements to Development of Hydropower Sector in states of Eastern Europe Partnership", which aims to identify the specific features of the environmental impact assessment of hydropower projects, programs and plans in the four countries of the Eastern Partnership – Azerbaijan, Armenia, Moldova and Ukraine.

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Introduction

This Brochure presents the Project “Ecosyste approach to hydropower: facilitating the implementation of European requirements to development of hydropower sector in states of Eastern Europe Partnership”.

The overall objective of the Project is to facilitate the implementation of the SEA and EIA procedures, stipulated by the horizontal EC Directives and the relevant Conventions, to which the EaP states are parties, for substantiated possibility of implementation of hydropower plans, programs and projects, promotion of ecosystem approach to hydropower development and integrated water resources management.

The ecosystem services of rivers in EaP states are often underestimated that leads to their loss in the events of over-regulation of rivers, primarily for hydropower purposes. The situation worsens during the construction of new hydropower plants without proper environmental assessments of the consequences of such constructions. The latter is due to the imperfect legislation of the EaP states in the field of water management, the weak regulatory and methodological tools for evaluating environmental impacts of plans, programs and projects, lack of transparency of decision-making procedures, low level of general public access to environmental information and understanding its role in decision makingand selective approach to the “rule of law” implementation.

The project aims at identifying the specific features of environmental impact assessment of hydropower projects, programs and plans in four Eastern Partnership countries, for which energy independence issues are acute resulting in their transition to renewable energy generation and the stronger environmental protection. Identification of key weaknesses in national practices and ways to correct them are the subjects of the proposed activity.

The Project provides for the promotion of the work of thematic group 3 in one of the most relevant areas - the introduction of the norms of horizontal environmental legislation in the energy sector. This topic has been in the focus of the national Civil Society Forums (CSFs) for the past few years, and recently it has taken the first position on the relevance of the work of the Working Group 3 (WG-3). The Project envisages the full participation of non-governmental environmental and other organizations of civil society in promoting the European integration of the EaP states by strengthening the dialogue between civil society, national governments and the EU.

The Project will contribute to strengthening the role of the CSFs in the development of the Eastern European partnership and European integration processes

The Project corresponds to the thematic priority of the WG-3 for targeted policies, identification of institutional bottlenecks in the transition to a green and circular economy, as well as strengthening the role of civil society and expanding of public access to environmental information and participation in decision-making in line with Aarhus Convention and EU directives 2011/92/EU, 2001/42/EU, 2003/4/EU, 2003/35/EU.

Objectives of the and tasks ofthe Project

Objectives:

- facilitate improvement of EIA and SEA procedures in EaP by identifying the
- weakness and gaps of existing procedures and propose CSFs support to the improvement;
- promote the ecosystem approach in the hydropower development in EaP states;
- promote transition of the EaP region to integrated river basin management; share best practices in water management cooperation in four EaP states based on river basin principle;
- demonstrate availability of quality methodological resources for EIA and SEA of plans, programs and projects in hydropower sector in four EaP states; further disseminate knowledge among citizens of EaP states on their environmental rights in decision-making.

Tasks:

- overview of the status of implementation of SEA and EIA and public participation in decision making for hydropower plans, programs and projects;
- assessment of the effectiveness of the use of SEA and EIA tools for the implementation of the ecosystem approach to improve the quality of water management;
- highlighting the benefits of the transition to integrated water resources management using river basin principles;
- replication of the Moldovan-Ukrainian model of cooperation in the management of the Dniester basin for the Central Caucasus region;
- methodological support for the use of SEA and EIA in the development of hydropower programs, plans and projects, taking into account the ecosystem approach;
- awareness raising among citizens of the EaP states on their roles and rights in EIA and SEA.

Implementation of these tasks will ensure the achievement of the main goal of the project – an independent and objective assessment of hydropower plans, programs and projects in the spirit of sustainable development. This will strengthen the influence of civil society on the implementation of EU environmental standards in the environmental policies of the EaP states and the viability of the Civil Society Forums of the EaP states.

Project team: Ruslan Havryliuk – project manager; Oksana Tarasova (UA), Ilya Trombitsky (MD), Aram Gabrielyan (AR), Elchin Sultanov (AZ) – national coordinators; Matušek Ivan (Slovakia), Galina Protsiv (UA), Viktor Melnychuk (UA),

Oksana Stankevych-Volosianchuk (UA), Vitalii Sharavara (UA) – experts of project; Tatiana Yelmanova (UA) – project accountant.

Project partners:

1) ***National Ecological Centre of Ukraine (NECU)*** is a non-governmental non-profit organization. NECU is a national level association and has branches in different regions of Ukraine. NECU was created in 1991, at a difficult time in Ukrainian history, when it obtained independence. NECU has main office in Kyiv and 19 branches in regions of Ukraine. Among NECU members are scientists, journalists, teachers and other people who are willing to add their own effort to environmental protection. NECU is working in the next areas: biodiversity conservation, water resources protection, environmentally friendly industrial activity, climate change prevention, sustainable development, environmental policy. NECU is a member of the following associations and networks: WG3 «Environment, Climate Change and Energy Security» Ukrainian national platform of the Eastern Partnership Civil Society Forum, WG5 «Energy, Transport, Environment and Climate Change» EU-Ukraine Civil Society Platform, the Ukrainian NGOs Working Group on Global Climate Change, Ukrainian River Network, Climate Action Network – Europe and CEE Bankwatch Network. *See also NECU website*: www.necu.org.ua

2) ***Eco-TIRAS International Association of River Keepers*** is the nongovernmental not-for-profit association of eco-NGOs of the Dniester River basin established on October 10, 1999 by 11 eco-NGOs from MD (6) and UA (5). Registered as Association in form of public association by the Ministry of Justice of the Rep. of Moldova on January 14, 2000. Activities are dealing with environment, including environmental legislation, integrated water resource management, EIA, biodiversity conservation, climate change adaptation etc., not-for-profit legislation, public participation in environmental decision making. Currently includes 51 ecological NGO. *See also Eco-TIRAS website*: www.eco-tiras.org. In addition, it manages site www.savedniester.org where documents in English dealing with HPP impacts on ecosystems and NGOs campaigns have been published.

3) ***"Khazer" NGO*** was established in 1991. "Khazer" NGO is a member of CAN EECCA and CAN International Network, European ECO Forum, "Armenian Lifelong Learning League", WECF, IPEN (International POPs Elimination Network). Since July 2011, the youth group of the NGO is a member of YEE (Youth and Environment Europe) network. NGO has implemented several projects, including the one with the financial assistance of the CRDF USA ("Developing Climate Change Mitigation and Adaptation Curriculum for Armenian and Georgian Higher Education Institutions with the partnership of Cornell University, Cooperative Extension, Dutchess County"), "Restoration of the wetland ecosystem in the old riverbed of Akhuryan River upper stream" – GEF/UNDP/ SGP, WWF Armenia.

4) ***Azerbaijan ornithological Society*** was found in 1987, presently, it is modern NGO with more 300 members, Board (9 people) and staff (3 people). AOS had implemented more 100 projects in sphere of nature conservation, ecological tourism and ecological public awareness including more 10 projects concerning protection and management of water bodies as important sites for waterfowl, e.g. preparation and

publication of the book " Potential Ramsar sites (Wetlands of International Importance) of Azerbaijan" that included wide field survey of all big wetlands of Azerbaijan, including 5 water reservoirs on Kura and Araz rivers, 2000; "Modern state of Hajigabul Lake" where situation of ecological disaster was described after intensive field survey and meetings with local people; the book concerningHajigabul Lake was published and finally special decree of the President was adopted for restoration of Hajigabul lake and other natural and semi natural lakes in Azerbaijan, etc.

5) ***NGO "Ecosphere"*** was founded in 1999. Mission of the Organization is to protect the local environment through ecological research, education work and advocacy of the rights of the people and environmental protection in the Carpathian region of Ukraine. *Main priorities of activity*: 1) environmental education: educations programs for children, exchange programs for young people, eco camps, ecojournalistic, environmental publications; 2) ecological research, monitoring and management: research and monitoring of freshwater and forest ecosystems, biodiversity conservation, management of protected areas, sustainable forest management and forest certification; 3) sustainable development of local communities: waste governance, energy efficiency and renewable energy, rural and eco-tourism; 4) environmental policy: advocacy company and lobby. Problems of small hydroelectric power stations of the "Ecosphere" NGO are being studied since 2012. Since 2012, holds an advocacy campaign "STOP mass hydropower plants construction on upper mountain rivers of Ukrainian Carpathians". Middle annual budget is about 40000 euro. *See also about ECOSPHERE*: www.ekosphera.org

Ecosystem approach and ecosystem services in the Eastern Partnership countries: why is the ecosystem approach to hydropower development important for the Eastern Partnership countries?

The "Report on the Global Assessment of Biodiversity and Ecosystem Services" published by the United Nations Science and Politics Platform on Biodiversity and Ecosystem Services (IPBES), has shown that Earth's biodiversity has experienced a catastrophic decline over the past half century, unprecedented in human history. About 82 percent of the wild mammalian biomass was lost, while 40 percent of amphibians, almost a third of reef corals, more than a third of marine mammals and 10 percent of all insects are endangered. *Five direct driving forces* of nature change with the greatest relative global impact are identified, in decreasing order: (1) changes in land and sea use; (2) direct exploitation of organisms; (3) climate change; (4) pollution; and (5) invasive alien species.

IPBES Chairman Sir Robert Watson said: "The health of the ecosystems that we and all other species depend on is deteriorating faster than ever. We are destroying the foundations of our economy, livelihoods, food security, health and quality of life around the world." For freshwater ecosystems, policy options and actions include, but are not limited to: more inclusive and equitable water management; better integration of water management and landscape planning at different scales; promotion of practices to reduce soil erosion, sedimentation and surface runoff of pollution; increase in water supply; promotion of investments in water projects with clear criteria for sustainable development; as well as solving the problem of fragmentation of many water policies. (https://www.un.org/sustainabledevelopment/blog/2019/05/nature-declineunprecedented-report). Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental *Science-Policy Platform on Biodiversity and Ecosystem Services*https://www.ipbes.net/sites/default/files/downloads/spm_unedited_advance_for_posting_htn.pdf

With the goal of more than doubling the supply of electricity by 2050 with renewable energy sources that do not destroy terrestrial and river ecosystems and the values they provide, many countries still see hydropower as clean and flexible energy sources. While it is true that some hydropower reservoirs have high greenhouse gas emissions (especially shallow reservoirs in the tropics), hydropower is by far the largest source of low-carbon electricity worldwide. Even with the expected – and urgently needed – significant increase in solar and wind generation, most global forecasts highlight the main role of hydropower in the future structure of renewable energy. However, without careful planning and implementation, hydropower expansion poses serious risks to people and nature.

By flooding valleys, blocking rivers, and changing flows, hydropower can crowd out communities and damage river ecosystems, which provide hundreds of millions of people with food and livelihoods. These influences tend to fall disproportionately to low-income, rural communities and indigenous peoples. A sharp increase in

hydropower risks helps to solve the climate crisis at the cost of many rivers of the world and those features what makes them unique and culturally, socially and economically valuable for so many people:

• Demand for electricity and its generation will always have some negative consequences. Compromises are inevitable

• Energy needs and energy production require that various decision makers see value not only in economic benefits.

• The application of the ecosystem approach and the assessment of ecosystem services in hydropower development will be crucial for achieving the sustainable development goals and a fair compromise between sectoral activities and the value of biodiversity for human survival.

The ecosystem approach is an adaptive management strategy that can be applied to the complex and dynamic nature of ecosystems and counteract the lack of knowledge or understanding of their functioning. Ecosystem processes are often nonlinear, fluctuate in space and time, and are often delayed in time; this discontinuity leads to a high level of uncertainty that can be overcome with the ecosystem approach. Adopting this balanced approach ensures that natural resources and society as a whole are at the center of the decision-making process, providing a more equitable and long-term future.

The 1992 Convention on Biological Diversity (CBD), which entered into force on December 29, 1993, adopted and encourages the application of the ecosystem approach to human activities around the world to achieve *three main goals*: a) conservation of biological diversity; b) sustainable use of components of biological diversity; (c) fair and equitable sharing of benefits arising out of the utilization of genetic resources.

The ecosystem approach is a concept that combines the management of land, water and living resources and is aimed at achieving a balance between three goals: conservation of biodiversity; its sustainable use; and equitable sharing of benefits arising from the use of natural resources. This is the main basis for the implementation of the Convention on Biological Diversity (CBD). The ecosystem approach takes into account that people and cultural diversity are an integral element of most ecosystems. It applies the appropriate scientific methodology, focused on various levels of biological organization, which cover the fundamental structure, processes, functions and interactions between organisms and their environment.

The ecosystem approach is not a formula, but a framework that can be adapted to various issues and situations. The definition of an ecosystem approach is not limited to any particular spatial unit or scale; therefore, it can refer to any environmental unit at any scale. A key feature of the ecosystem approach is that this method is applied to more widely regardless of the state of protection and can be used on many scales, taking into account human interaction. It is an adaptive tool for landscape and seascapes. One of the critical points when applied to the ecosystem approach is the high complexity of interpreting the concept and applying it to specific problem scenarios. The Convention on Biological Diversity continues to produce tools and case studies to assist in the interpretation and applicability of the concept *http://www.biodiversitya-z.org/content/ecosystem-approach.*

It is important to recognize that the ecosystem approach does not provide a comprehensive solution because its application depends on local, provincial, national, regional or global conditions. The ecosystem approach should not be seen as a strategy that crowds out other methods and tools; Where possible, existing strategies and methodologies should be used together to solve complex problems and issues.

By 1998, key aspects of the ecosystem approach were transformed into **12 principles (principles of Malawi):**

1. Management objectives are a matter of public choice.
2. Management should be decentralized to the lowest appropriate level.
3. Ecosystem managers must consider the impact of their activities on related and other ecosystems.
4. Recognizing the potential benefits of sustainable governance,it is necessary to understand the ecosystem in an economic context, for example, taking into account the mitigation of market distortions, harmonizing incentives to promote sustainable use, and accounting for costs and benefits.
5. A key feature of the ecosystem approach is the preservation of the structure and functioning of the ecosystem.
6. The ecosystem approach should be applied within the functional characteristics of ecosystems
7. The ecosystem approach should be applied at an appropriate scale.
8. Given the different time scales and delayed effects that characterize ecosystem processes, ecosystem management objectives should be set for the long term.
9. Managers must recognize that change is inevitable.
10. The ecosystem approach should ensure an appropriate balance between the conservation and use of biodiversity.
11. The ecosystem approach should take into account all forms of relevant information, including scientific, indigenous and local knowledge, innovations and practices.
12. The ecosystem approach should cover all relevant sectors of society and scientific disciplines.

Source: http://www.fao.org/3/Y4773E/y4773e0e.htm

Why is it important to use the ecosystem approach?

Classical conservation approaches, as the only biodiversity management tool, have limitations. The experience of applying the classical approach showed the presence of a number of disadvantages, such as: • Management in a specific place is narrowly specific and does not take into account interconnections with other ecosystems

• Lack of understanding of the relationship between nature and culture;

• Too much emphasis on the characteristics of species (uniqueness, rarity) or on the creation of protected areas

• Too little attention is paid to the fact that most of the world's biological diversity is outside protected areas;

• Inability to integrate or coordinate with other sectoral interests: agriculture, environment, forestry, fisheries, health, planning, etc., including nature conservation.

Nevertheless, this classic approach prevails in the countries of the Eastern Partnership and ecosystem approach is not integrated into the existing system of environmental impact assessments and strategic environmental assessments in Armenia, Azerbaijan, Moldova and Ukraine. To overcome these shortcomings, the ecosystem approach should be applied, in particular for the following reasons:

• The ecosystem concept helps determine the appropriate level of management to achieve the three objectives of the Convention:

• Functioning ecosystems are essential for the survival of people and future generations, as well as for the global environment, as the Convention recognizes the inherent value of biological diversity;

• Biological diversity is inextricably linked to ecosystem processes, functioning and sustainability;

• Understanding ecosystems makes use of them effective and sustainable;

• People often move between ecosystems and often use different ecosystems to meet their needs;

• People are often viewed as external to ecosystems.

The ecosystem approach allows the use of both indigenous and local knowledge, innovations and practices, including traditional management systems and scientific thinking; pay due attention to the assortment of goods, services and information that ecosystems provide to humanity.

Ecosystem Approach and Ecosystem Services in Europe

The concept of ecosystem services has gained a strong political profile over the past 15 years. However, no specific EU policy on ecosystem services management exists. A review of 12 policies shows that overall coherence between existing policies and the concept of ecosystem services is moderate. Policies that show a very high degree of coherence are limited to areas of policy that relate to natural ecosystems, forestry, or agriculture. Given the sectoral nature of most EU policies and the limited possibilities

for revision in the near future, the possibilities for improving coherence are most evident in further integrating the concept of ecosystem services into the implementation of existing EU policies at the national and regional levels. A rapidly institutionalizing concept regarding the relationship between man and nature is the concept of "ecosystem services" (ES), which emphasizes the interdependence of ecosystems and people. The first ideas about the importance of nature as a resource for man were invented in the 1940s. The term ***"ecosystem services"*** was first introduced in **1970** (SCEP, 1970; cf. Mooney et al., 1997). At the beginning of the 21st century the concept of ecosystem services entered the political agenda after several important science and policy projects, such as the *Millennium Ecosystem Assessment* in 2005 (MEA), *the Economics of Ecosystems and Biodiversity* in 2010 (TEEB), and the creation of *the Intergovernmental Expert Group on Biodiversity and Ecosystem Services* (IPBES) in 2012 (Chaudhary et al., 2015; Mace, 2014). Since 2009, a common definition and standardized typology of ecosystem services has been developed in the European Union (EU), namely the *General International Classification of Ecosystem Services* (CICES) (HainesYoung and Potschin, 2011). The EU has commissioned the mapping and assessment of ecosystem services (MAES) http://dx.doi.org/10.1016/j.ecoser.2017.02.01.01. https://www.sciencedirect.com/science/article/pii/S2212041617301018

Ecosystem approach in Armenia, Azerbaijan, Moldova and Ukraine

As parties to the *Convention on Biological Diversity*, Armenia, Azerbaijan, Moldova and Ukraine have developed relevant national strategies and action plans, agreed to implement the ecosystem approach and take into account ecosystem services.

Armenia

In December 2015, Armenia adopted the revised National Strategy and Action Plan for the Conservation, Protection, Reproduction and Use of Biological Diversity and the corresponding Action Plan for 2016–2020 in accordance with target 17 on conservation and sustainable use of biodiversity adopted in Aichi. The document is focused on 5 strategic directions. The strategic directions of national goals and related activities: goals, performers, deadlines, sources of funding and expected results.

Azerbaijan

In Azerbaijan, the revised National Strategy for the Conservation and Sustainable Use of Biodiversity (2017–2020) was approved on October 3, 2016 by the Decree of the President of the Republic of Azerbaijan. It is a national response to fulfillment of obligations undertaken by the Parties in Nagoya. The Ministry of Ecology and Natural Resources is responsible for coordinating the implementation of the Strategy and should inform the President about progress at least once a year. The *main objectives* of the Strategy are: sustainable use of genetic resources; conservation of biodiversity and transfer of benefits to future generations; fight against poverty; maintaining environmental balance; ensuring the transition to a green economy; environmental

education promotion; restoration of endemic and indigenous species of fauna; development of a network of protected areas; and reducing threats to biodiversity*(Order of the Presiden to the Republic of Azerbaijan on Approval of "National Strategy of the Republic of Azerbaijan on Conservation and Sustainable Use of Biodiversityfor 2017-2020" https://www.cbd.int/doc/world/az/az-nbsap-v2-en.pdf).*

The Republic of Moldova

In the Republic of Moldova, the revised National Strategy for Biological Diversity (2015-2020) and its Action Plan were adopted by Government Decision No.274 of May 18, 2015, taking into account the goals of the Strategic Plan for Biodiversity 2011-2020 and its targets adopted in Aichi, The Strategic Plan for the Cartagena Protocol on Biosafety 2011–2020 and the EU Biodiversity Strategy until 2020.The new National Plan contains *five "Specific Goals"* for 2020, which are aimed at: a) ensuring sustainable management and institutional effectiveness; b) reducing the burden on biodiversity; (c) measures to address threats to biodiversity; (d) Taking measures to increase the benefits of natural resources and ecosystem services; and (e) providing scientific support for biodiversity conservation, access to information and education for sustainable development.

Ukraine

In Ukraine, the revised National Plan is based on the *Basic Principles* (Strategy) *of the national environmental policy of Ukraine* until 2020 (approved by law of December 21, 2010) and the *National Environmental Action Plan of Ukraine* for 2011-2015 (Cabinet of Ministers Order of May 25 was approved 2011). Both documents were developed taking into account the *Strategic Plan for Biodiversity* (2011-2020) and its targets adopted by Aichi. The strategy of Ukraine supports the achievement of sustainable development through measures aimed at strengthening the role of environmental management in public administration in order to achieve a balance between the three components (economic, environmental and social) of development.

In these countries, there are large number of laws and regulations related to nature conservation areas, species, biodiversity conservation, etc., but a holistic approach to biodiversity conservation and human-nature interaction is still lacking, in particular regarding sectoral activities with potentially hazardous environmental effects, such as hydropower development.

The ecosystem approach and the concept of ecosystem services are not fully implemented and insufficiently applied in Armenia, Azerbaijan, Moldova and Ukraine, focusing on research of territories and species. The integrated picture and the adequate assessment of ecosystem services have not become functional, as in environmental legislation, strategies and plans of different levels, as in sectoral economic activities, such as hydropower development. The most comprehensive studies of the ecosystem services of wetlands in the Lower Danube, carried out within the framework of the Dniester River Basin Commission, showed that in Ukraine and Moldova there are no

special legislation or methodological practical tools for assessing ecosystem services (or their complete absence).

A screening of the implementation of Malawi principles in Armenia, Azerbaijan, Moldova and Ukraine, carried out within the framework of the project, showed that the practical implementation of the Malawi principle is not consistent with the developed national strategies and action plans due to insufficient funding and the lack of methodologies for assessing ecosystem services. The application of the ecosystem approach to economic activities, including the development of hydropower, is in an uncertain state and is supported mainly through projects funded by international donors in these countries.

Hydropower and ecosystem services

The potential impact of a hydroelectric power station with a dam (**Fig.1**) is manifested in almost all ecosystem services of rivers (**Fig.2**) and is mainly irreversible. The impact of small hydropower plants, although not so noticeable, requires careful planning and assessment of the affected ecosystem services (fishing, aesthetic values, recreation, etc.) to ensure appropriate mitigation measures.

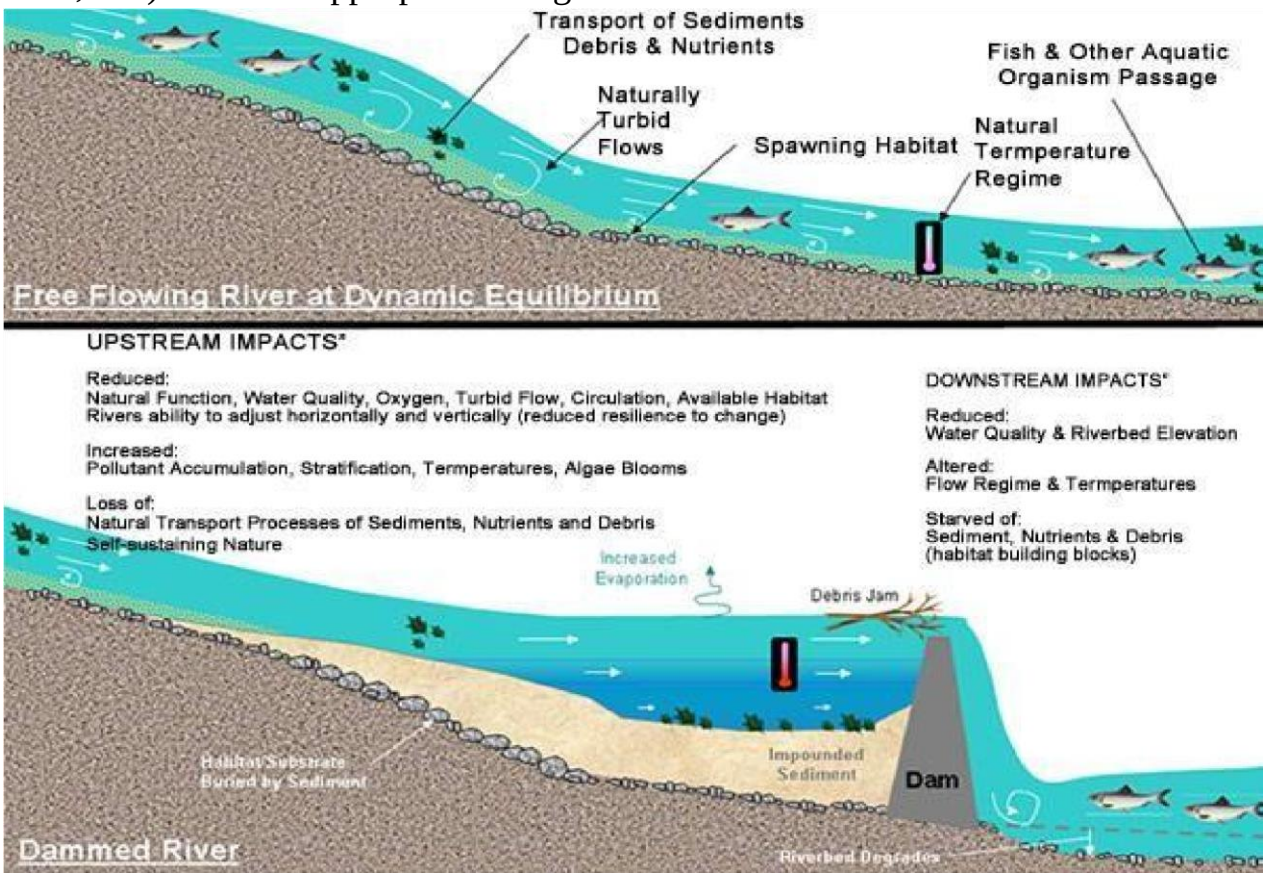

Fig. 1: Potential impact of hydropower facilities and river ecosystems
Source: (www.geo41.com).

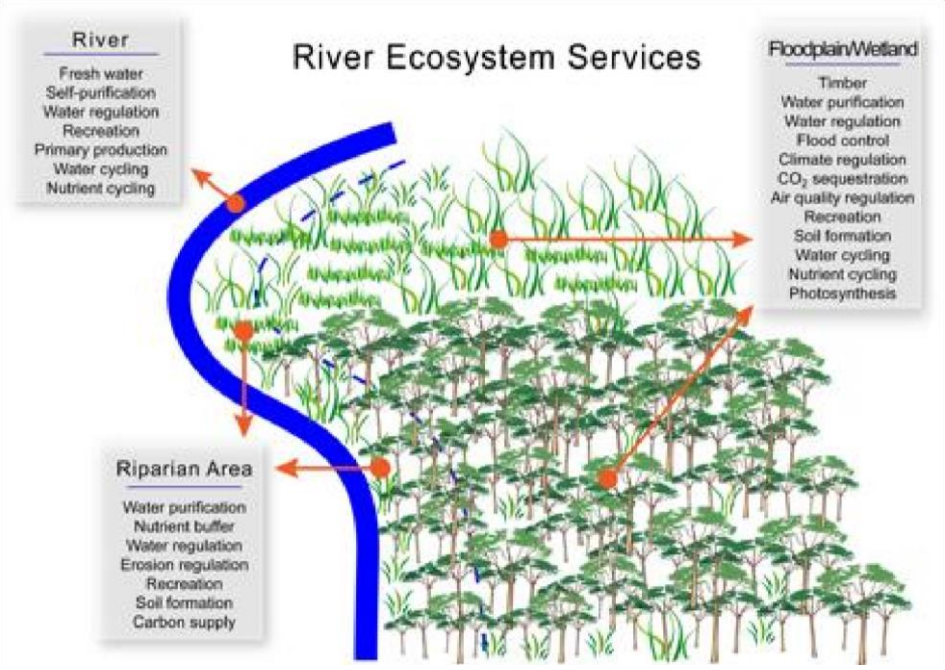

Fig 2. Major ecosystem services provided by rivers, riparian areas and floodplains/wetlands in Europe.

Source: Harrison P.A., Gary W. Luck, G.A. Feld, C.K & M. T. Sykes (2010) Assessment of Ecosystem Services. In: Settele J., Penev. P., Georgiev.T., Grabaum R., Grobelnik V., Hammen V., Klot S., Kotarac M. & I. Kuhn (Eds): Atlas of Biodiversity Risk. Pensoft, Sofia, p. 8-9.

Ecosystem services are sometimes valued in monetary terms for policy and decisionmaking. It is relatively simple to provide services such as water supply and wood supply where market value exists. However, this is more complex and often controversial for many regulatory and support services, for which the direct benefits to people are not so obvious. However, several studies provide values for river and floodplain ecosystem services. The Danube floodplain and wetlands, especially their regulatory role as a nutrient sink, are estimated at 650 million euros per year (Gren et al. 1995). Globally, the total annual cost of $ 4,879 trillion was estimated for wetlands and $ 3,231 trillion for floodplains (including wetlands), or, in general, about 24% of the total annual cost of ecosystem services on Earth (Costanza et al. 1997).

In a study conducted by Chinese researchers, various methods were used to evaluate individual categories and indicators of ecosystem services. This analytical framework was applied to case studies to assess the impact of three hydropower projects on the Jiulong River watershed (Wang et al. 2009). At the same time, they calculated the benefits of hydropower development and compared them. What the study shows:

• Loss of biodiversity and deterioration in water quality were the main negative impacts on ecosystem watershed services caused by hydropower projects;

• The negative impact on watersheds is too great to neglect;

• There is a significant average environmental cost (0.206 yuan / kWh) that cannot be covered by the existing water charges in China;

• Sustainable hydropower requires new methods, such as compensation payments for ecosystem services.

*Source:*https://www.ecologic.eu/sites/files/project/2017/documents/policy_brief_cs1.pdf

Despite the positive examples of the development of ecosystem services markets in individual countries, existing projects to introduce a system of payments for ecosystem services in the world are not enough. There are no ecosystem services markets in Armenia, Azerbaijan, Moldova and Ukraine; the existing payment for water resources is calculated without any consideration of the economic value of ecosystem services.

Evaluation of the ecosystem services of the Lower Dniester Ramsar website was carried out as part of the Ecosystem-Based Adaptation, Climate-Resilience Measures and Institutional Development in the Lower Dniester project with financial support from the Austrian Development Agency (ADA). Based on the results of the studies, the total cost of the estimated 4 groups of ecosystem services was calculated: providing (producing), regulating, biodiversity conservation services and tourism ecosystem services. It amounted to about 192.5 million lei (11.3 million US dollars), or 3.2 thousand lei (about 187 US dollars) per 1 ha of territory. In the structure of ecosystem services, providing services (producing) make up 46%; regulatory - 28%; biodiversity conservation services - 12%; ecosystem tourism services - 14%. It should be noted the special value of the core territories, characterized by a high level of biodiversity. Their share in the total cost of ecosystem services is 76.5%, while they occupy only 20% of the territory of the Ramsar site "Lower Dniester", which indicates the leading role of biodiversity in the provision of ecosystem services. The total cost of estimated ecosystem services per 1 ha of site core territories is 12.2 thousand lei (about 720 US dollars), which is 3.8 times higher than the average on the site. The basis for the territorial assessment of biodiversity was the methodology of *A. Andreev and O. Cazanteva*, which is an original system for assessing key areas of the national ecological network developed in the **ES BIOTICA**. The possibility of using the rating scale was obtained in the study of more than 150 potential and recognized cores of the National Ecological Network (URL:

http://www.bioticamoldova.org/library/CoreAreasAssessment_Guide_ro.pdf; http://www.modernrespub.org/jsrs/pdf/2019/June/Cazanteva%20et%20al.pdf)

A study of the Lower Dniester wetland ecosystem services carried out as part of the GEF / UNDP / OSCE project "Ensuring Transboundary Cooperation and Integrated Water Resources Management in the Dniester River Basin" (unpublished) showed that the ecosystem services provided by the Dniester wetlands on Ukrainian territories that could be identified and evaluated: drinking and irrigation water supply, tourism and recreation, reeds, climate regulation and water treatment, amounted to about 29 million euros per year. This is an extremely small fraction of the benefits that are provided only by the ecosystems indicated in the study. A comprehensive assessment of wetland ecosystem services will be costly. The main *reasons for the underestimation of ecosystem services* identified in this project are:

- environmental inadequacy of traditional economic models;

- poorly developed institutional infrastructure;
- lack of systematic awareness raising among stakeholders and the general public;
- imperfection of the regulatory and methodological base in this area. A similar situation is observed in Armenia and Azerbaijan.

Hydropower in Europe

(source: https://hydropower-europe.eu/about-hydropower-europe/hydropowerenergy/)

In recent years, the European Union, as well as many non-EU countries, including Switzerland, Norway and Turkey, have been proclaiming climate and energy policies aimed at creating affordable, safe and sustainable clean energy systems. To fulfil ambitious commitments to mitigate the effects of climate change, European countries will need to quickly decarbonize their energy sectors and increase the share of renewable energy sources. To this end, in early 2018, the EU Parliament voted to increase its goal in the field of renewable energy for 2040 from 27 to 35 percent. The wider European region, including non-EU countries, added 2.3 GW of installed hydropower in 2017, bringing the total installed hydropower in the region to 249 GW. Despite the drought and low rainfall in most of the continent, in 2017, hydropower generated about 600 TWh of clean electricity. It remains the single largest source of renewable electricity in Europe. As wind and solar energy continues to grow throughout the region, future energy systems will continue to benefit and rely on hydropower network services and active and passive storage capabilities. Currently, many hydropower facilities built in Europe in the 1960s and 1970s need to be rebuilt and modernized with the expected additions related to modernization, smaller projects or modernization of existing infrastructure. The results, published in 2017 on the *Hydropower Master Plan* for the region, highlighted the need for transboundary river approaches, which include the overall hydropower potential, but also focus on shared water services, such as flood mitigation for all stakeholders, if they planned holistically.

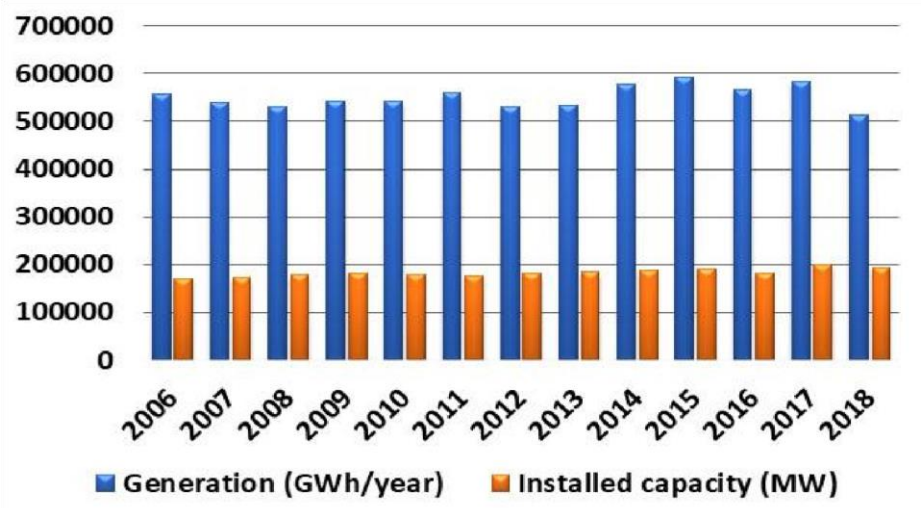

Fig.3: Evolution of annual hydropower generation and installed capacity in Europe since 2006 (according to Hydropower & Dams World Atlas 2018).

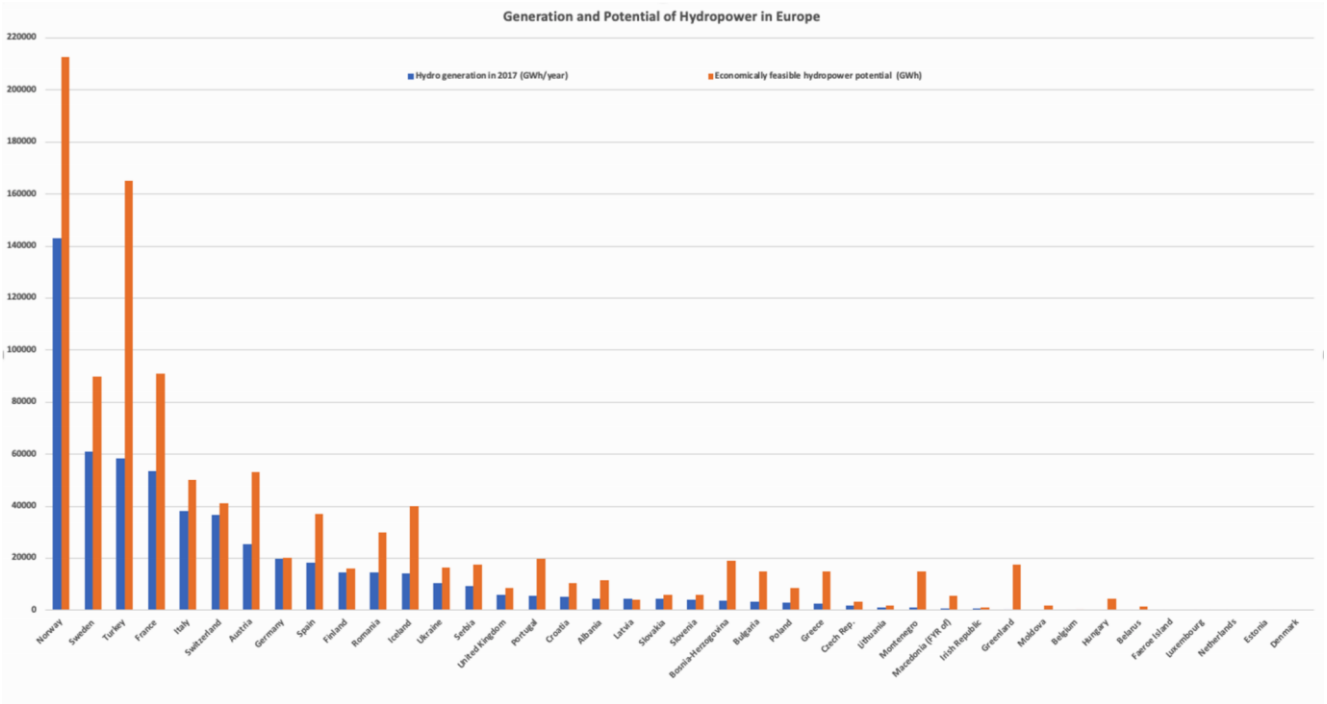

Fig.4: Generation and hydropower potential in Europe.

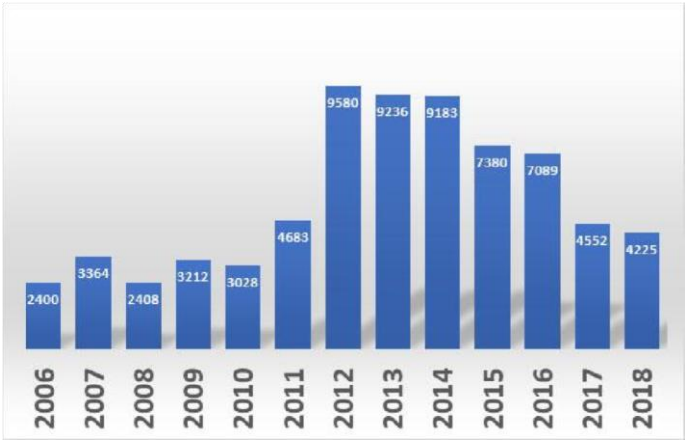

Fig.5: Installed capacity in MW, which has been under construction since 2006 (according to Hydropower & Dams World Atlas 2018).

Hydropower has a long history in Europe and in the first half of the last century made a significant contribution to the development of industry and welfare in most European countries. Today, an average hydrological year produces nearly 600 TWh, which is about 60% of the economically possible hydropower potential in Europe (**Figure 1**). Since 2006, the annual production of hydroelectricity has been stabilizing at about 600 TWh, and the total installed capacity is about 200 Wh. However, it should be noted that the annual hydropower generation depends on the hydrological situation of every year. (**Figure 4)** shows the situation with the use of hydropower and untapped potential in different countries of the European region.

Types of hydropower plants

Electricity in a hydropower plant is obtained from turbines driven by a stream of river water with or without artificial dams forming reservoirs. Hydropower is currently the largest renewable energy source in the world. Hydropower represents the largest share of renewable energy production. In the period from 2005 to 2010, it was the second after wind power for newly built facilities. According to IEA estimates, in 2050 hydropower can produce up to 6,000 terawatt hours, which is about two times more than today. The capacity of the hydropower reservoir and rapid response characteristics are particularly important to meet sudden fluctuations in electricity demand and to coordinate supplies from less flexible sources of electricity and variable renewable sources such as solar (photovoltaic) and wind energy.

In general, hydropower plants can be characterized in accordance with location criteria, total capacity, storage capacity and types of turbines, as shown in (**Figure 6)**.

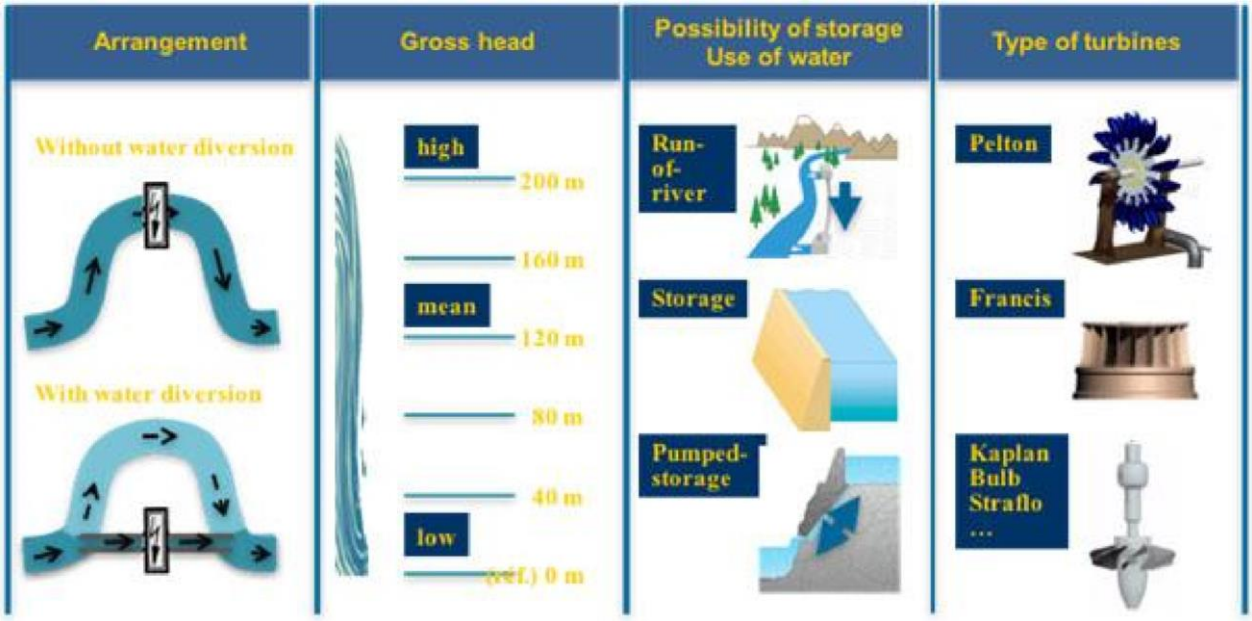

Fig.6 Characterisation of hydropower plants.

Hydropower in Europe and around the world has many advantages, such as:

• Renewable energy sources without direct CO_2 emissions and undeniable energy recovery over the entire life cycle;

• High efficiency, production can be easily adapted to needs (very flexible and timely response to peak energy requirements);

• Domestic energy production, job creation and financial resources in remote areas (taxes and concession fees);

• Improving infrastructure along with the potential for recreational and tourism activities;

• Contribution to flood and drought protection;

• Facilitating shipping on major rivers in Europe.

As seems, hydropower, which has an underutilized potential, has all the characteristics that can serve as an excellent catalyst for a successful energy transition. However, this will require a more flexible, efficient, environmentally and socially

acceptable approach to increase hydropower production, complementing the production of wind and solar energy, in particular:

1. Increased hydropower production through the introduction of new environmentally friendly, multi-purpose hydropower schemes and the use of hidden potential in existing infrastructure.

2. Increasing the flexibility of generating electricity at existing hydropower plants by adapting and optimizing infrastructure and equipment, combined with innovative solutions to mitigate environmental impacts.

3. The increase in water storage through the strengthening of existing dams and the construction of new reservoirs, which should provide not only a flexible energy supply, but also support the supply of food and water and, thus, contribute to NEXUS Water-Energy-Food (Interconnection) and achievement United Nations Sustainable Development Goals.

4. Enhancing flexibility from pumped storage plants by developing and creating innovative mechanisms in conjunction with existing water infrastructure.

5. Climate change will be an important issue for the development of hydropower in Europe.

The impact of climate change will not only change the availability of water resources over time, but also change the behavior of catchment areas due to increased rainfall and increased natural disasters, creating a threat to future hydropower production. It is recognized that reservoirs associated with hydropower plants will have to make an increasing contribution to climate change mitigation.

Hydropower in Armenia

All hydropower plants that produce about 30% of all electricity generated in Armenia are located in the highlands (Vorotan hydropower cascade, consisting of 3 power plants; seven hydropower plants of the “Sevan-Hrazdan cascade”, hydropower plants located on the Hrazdan river and using natural river runoff and irrigation water). As of January 1, 2018, 187 small hydropower plants generated electricity. Their total installed capacity was about 366 MW. In 2017, electricity generated by small hydropower plants amounted to about 862 million kWh, which is about 11% of all electricity generated in Armenia (7777 million kWh).

Although hydropower resources contribute to the development of the country's renewable energy sector and reduce greenhouse gas emissions into the atmosphere, their use poses numerous risks associated with the loss of natural habitat, biodiversity, overuse of water resources, landscape changes, lack of water for irrigation, loss of ecosystem diversity. These risks are especially pronounced in reducing the diversity of fish species, since the design features of some small hydropower plants cannot ensure the free movement of fish in rivers. This is why fish diversity in areas above small hydropower plants decreases fish characteristics. Fish do not have the ability to move up and down the river. The construction of hydropower plants also causes landslides caused by intensive construction, explosion, construction of pipelines and roads. There is also a significant social component. Small hydropower plants cause great tension in the

communities as the community irrigation and drinking water needs partially or completely drained the rivers. From a global perspective, small hydropower plants provide environmental benefits, but they cause direct and indirect adverse environmental impacts at the local and national levels, such as:

- decline in living standarts;
- a decrease in the fish population caused by imperfection of pipes and turbines;
- inaccessibility of spawning grounds for fish due to river fragmentation;
- drying of river banks, etc.

Hydropower in Azerbaijan

Hydropower is the main renewable resource contributing to energy supply in Azerbaijan, and it accounted for 18% of electricity production in 2010. Azerbaijan has about 1000 MW of operating hydropower capacities and an additional 62 MW of planned hydropower capacities. The largest hydroelectric power station is Mingachevir. Its installed capacity is 402 MW and it is located on the Kura River. In addition, there are currently three more hydroelectric power plants in Azerbaijan with an installed capacity of more than 100 MW, each of which is located on the Kura River. Azerbaijan's water resources are located in the following areas:

- the lower reaches of the Kura River with its numerous tributaries;
- Aras river (a tributary of the Kura), which is located on the border;
- Aras River (a tributary of the Kura), which is located on the border;
- a group of streams flowing into the Caspian Sea.

A certain hydropower potential still exists in the country, which has not yet been developed.

According to Azerenergi, this is equivalent to an installed capacity of about 400 MW. Consequently, the hydroelectric potential is quite limited. The construction of hydropower plants plays an important role in addressing issues of national importance, such as flood control, clean electricity production and the creation of new irrigation systems. In the near future, it is planned to build 61 small hydropower plants. Small hydropower plants are often located in settlements located far from power lines and substations of a single energy system. However, this can satisfy the needs of local authorities, which can also help solve other social problems. By the end of 2013, it was planned to complete the construction of 20 small state-financed hydroelectric power stations with a total installed capacity of 86 MW. Azerenerji has prepared a program of new hydropower plants with a total installed capacity of 1.3 GW, including small hydropower plants, although funding has not yet been determined and the feasibility of the site has not been studied. To date, two projects have been launched: Sheki and Mugan HPPs. There are also projects on the irrigation canals of Yukhari-Shirvan and Bash-Mil. The United Nations Development Program (UNDP) supported the

development of small hydropower in Azerbaijan in the format of a project designed for 2007-2010, with a budget of about 1.5 million US dollars provided by Norway. *Source:* https:
//energycharter.org/fileadmin/DocumentsMedia/IDEER/IDEER-Azeryan

Hydropower in Moldova

The Republic of Moldova is almost entirely dependent on imported fuel; dependence on imports is estimated at about 96%. This dependence leads to high energy prices and high debt to foreign suppliers. The lack of domestic capacity for energy production, increasing the energy intensity of the economy and the low level of use of renewable energy sources (solar, wind, hydropower and biomass) are other significant problems for the energy sector of Moldova. *Source*: ENERGY SECTOR OF THE REPUBLIC OF MOLDOVA; Authors (Agency for Innovation and Technology Transfer (AITT)): Ana Chiofu, Igor Plamadala; Organization for the Development of Small and Medium Enterprises (ODIMM): Olga Popa, Sergey Luchian (2014). There are two small hydroelectric power plants in the Republic of Moldova: one in Dubasari (installed capacity 48 MW and 30 MW capacity), and the other in Costesti (installed capacity 16 MW and 10 MW available, jointly with Romania). There are 6 micro-hydroelectric power stations built by private individuals or economic institutions and placed on existing lake storage and drainage systems. Their total installed capacity is 141 kW. Hydropower potential in Moldova is estimated at 3,000 GWh / year, including the potential of large rivers (1,900 GWh / year) and small rivers (1,100 GWh / year).

Hydropower in Ukraine

The potential of hydropower in Ukraine is used at 60%, mainly due to the Dnipro cascade and other large hydropower plants. The remaining potential can be realized by installing new and restoring old capacities of small hydropower plants. In accordance with the existing classification, small hydroelectric power plants (HPS) include hydroelectric power stations with a capacity of 1 to 10 MW, for minihydroelectric power stations – from 200 to 1000 kW, for micro-hydroelectric power stations - no more than 200 kW. As of 2015, Ukraine had 102 MES with a total installed capacity of about 80 MW, which allowed in 2015 to produce 251 million kWh. At the same time, it should be noted that in the 1960s of the last century in Ukraine there were more than 1000 small hydroelectric power stations. Some of them can be restored. Micro-, mini- and small hydropower plants can become a powerful basis for energy supply for all regions of Western Ukraine, and for some regions of Transcarpathian and Chernivtsi regions – a source of full energy supply. Hydropower accounts for 8% of the total installed capacity of energy facilities in Ukraine; new facilities could potentially be located in any region with small or large rivers. In Ukraine, there are more than 22 thousand rivers, but only 110 of them are more than 100 km long, therefore, the main hydropower resources are concentrated on small rivers.

In accordance with the *National Renewable Energy Action Plan* (NREAP), the modernization of existing capacities, the restoration of old small hydropower plants, the

construction and commissioning of new generating capacities for hydropower plants in Ukraine can lead to the generation of electricity: micro- and minihydropower plants - up to 130 GWh / year in 2020 (with a capacity of 55 MWh); small power plants – up to 210 GWh / year in 2020 (with a capacity of 95 MWh); large hydropower plants – up to 12,950 GWh / year in 2020 (with a capacity of 5,200 MWh).

Fully aware of the contribution of hydropower to meeting the energy needs of society, it must be clearly understood that as a result of the construction of hydropower facilities, large areas can be flooded, valuable fish breeding sites may disappear and fertile soils, forests and other ecosystems vital to man and nature may be lost. Disappear irreversibly! Consequently, the further development of hydropower requires the elimination of environmental risks and the application of the ecosystem approach to the development of hydropower, taking into account the economic, social and cultural interests of society, which means ecosystem approach to hydropower development.

Application of the ecosystem approach and ecosystem services to hydropower in Armenia, Azerbaijan, Moldova and Ukraine

Overview of the implementation of the 12 principles of the ecosystem in Armenia, Azerbaijan, Moldova and Ukraine showed that the application of most principles of the ecosystem approach is unsatisfactory, largely due to the rather difficult economic conditions and insufficient funding in these countries. Even the conservation areas and species that receive the most attention are struggling to survive with insufficient funding. The priority in the practice of managing water bodies remains the interests of nature users, rather than maintaining their ecosystem functions.

Mail points of ecosystem approach: benefits of application ecosystem approach include:

- focus on the relationships and processes within ecosystem;
- enhance benefit-sharing;
- carry out management actions at the scale appropriate for the issue being addressed, with decentralization to lowest level, as appropriate;
- use adaptive management practicesappropriate for the issue being addressed, with decentralization to lowest level, as appropriate;
- ensureintersectoral cooperation.

The understanding and knowledge of **relationships and processes within ecosystem**, its resilience and the effects to biodiversity loss (species and genetic levels) and habitat fragmentation, underlying causes of biodiversity loss and determinants of local biological diversity in management are crucial for adequate decision making in any economic sector, including hydropower development. Due to construction of hydropower plants, the river ecosystems fragmentation and change of processes and relationships substantially lowers their resilience. Existing policies in EaP states do not include concept of ecosystem approach, they deals with biodiversity mostly as protected area and species conservation; ecosystem services are not considered in the river basins management plans and any other plans and programs. Poor and weakly informed population prefers to ignore the conservation efforts and usually does not take into

account. The ecosystem management is not properly organized; local and national environmental managers are practically not familiar with concepts, principles and tools of ecosystem approach and services therefore do not promote these concepts or simply ignore.

Benefits provided by biological diversity at the ecosystem level provide the basis of human environmental security and sustainability. The ecosystem approach seeks that the benefits derived from these functions are maintained or restored. In particular, these functions should benefit the stakeholders responsible for their production and management. This requires, inter alia capacity building, especially at the level of local communities managing biological diversity in ecosystems; the proper valuation of ecosystem goods and services; the removal of perverse incentives that devalue ecosystem goods and services; and, consistent with the provisions of the Convention on Biological Diversity, where appropriate, their replacement with local incentives for good management practices.

Despite of some efforts in this direction in EaP, the real impacts of **capacity building** efforts are still mosaic and sporadic, being mainly initiate by the central NGOs or international projects. The quantitative evaluation of ecosystem services is in very beginning aimed at some initial ecosystem services valuation (e.g. wetland ecosystem services of the Lower Dniester), lacks agreed methodologies and necessary data for such valuation. Assessment of impact of hydropower on these services does not exists and is not embedded in the EIA and SEA process of hydropower sectoral development as well as management plans for river basins and water resources. Multiple small hydropower plants built or planed for construction (e.g. Armenia, Ukraine) triggered by the economic incentives (so called "green tariffs") will kill remaining free flowing rivers. National and local management is unfamiliar with benefits of ecosystem approach and are driven by their shorttermeconomic interests.

Practically unique positive example of **adaptive management** practices in Moldova is the improvement of small rivers management by establishing of small river councils composed of local public authorities and NGOs. They try to develop the management plans for the river and implement it. Trainings are part of subbasin committees' activities, usually realizing by NGOs. Adaptive practices have a very limited application (like pieces of water protection zones planted, some forestation efforts, etc.). In Ukraine, the implementation of integrated river basin management as part of approximation to the *European environmental requirements* also implies the possibilities to have and implement management plans for small rivers by local communities. The on-going decentralization process requires the wide educational campaign of local authorizes and communities on ecosystem approach and values of the ecosystem services, existing in these communities, in order to have scientifically justified augments for discussion and a decision-making on any hydropowerfacilities. Poverty of local population, lack of jobs and insufficient local fund for environmental measures, often allow a developer of hydropower projects to receive necessary permissions. This is of particular danger in remote rural communities

As the primary framework of action to be taken under the *CBD Convention*, the ecosystem approach should be fully taken into account in developing and reviewing

national biodiversity strategies and action plans. There is also a need to integrate the ecosystem approach into agriculture, fisheries, forestry and other production systems that have an effect on biodiversity. Management of natural resources, according to the ecosystem approach, calls for increased intersectoral communication and cooperation at a range of levels (government ministries, management agencies, etc.). This may be promoted through, for example, the formation of inter-ministerial bodies within the Government or the creation of networks for sharing information and experience.

In Armenia, approval of *Draft Law on Ecosystem Services* (2015) still pending, In Moldova, the national policy documents in different areas like agriculture, regional development, environment, etc. are not usually well cohere one with other. Thus, the new draft law on National Strategy of Development Moldova 2030 approved by Government on 16/11/2018, notes that from 2010 the forest coverage of Moldova increased by for only 0.1%, but until 2030 will raise for 3,2%, reaching 17% of country territory. Also during next 12 years, the area of fund of protected areas will not increase. Due to contradiction with stakeholder interests, it is almost not applied and inter-sectoral cooperation on ecosystem approach and ecosystem services is evolving slowly. In Ukraine ecosystem approach is mentioned only once in the preamble of the newly adopted Strategy of the State Environmental Policy of Ukraine until 2030. The systematic integration of ecosystem approach in Ukrainian legislation, in particular ecosystem services management, is not developed to the necessary level. The national on-line information system on the environment of Ukraine is being created. It is vitally important to ensure that ecosystem services and other ecosystem approach tools are a part of such system.

Despite its commitment to implementation of *Biodiversity Convention, National Strategies and National Action Plans*, the ecosystem approach and ecosystem services as management tools are practically absent in national legislation and sectoral policies and programs of the EaP countries. Inter-sectoral communication and cooperation in this context is not well developed.

In EaP countries, the ecosystem services of rivers are largely underestimated, which leads to their loss due to:

- excessive inadequate use, mainly for hydropower (e.g. in Armenia);
- construction of new small hydropower plants without a proper environmental assessment of the consequences of such construction;
- insufficient control and lack of monitoring of compliance with environmental standards by existing hydropower plants;
- absence of the necessary scientific research and data for a holistic understanding of ecosystemsof water bodies, coastal territories, landscapes, ground waters,etc;
- poorly considered needs and demands of the local population.

The national workshops in Armenia, Azerbaijan, and Moldovaconducted within the framework of the project *"Ecosystem approach to hydropower: facilitating the implementation of European requirements to development of hydropower sector in states of Eastern Europe Partnership"* in 2019 highlighted the following problems with hydropower development:

1. In most cases, fragmentation of ecosystems and changes in ecosystem processes and relationships significantly reduce their sustainability, which is practically not taken into account by strategies, plans and individual hydropower projects

2. Public policy is usually only partially implemented, mainly for conservation areas and the conservation of species, while the ecosystem approach and economic assessment of ecosystem servicesare not given sufficient attention.

3. An impoverished and poorly informed population prefers to ignore efforts to conserve biodiversity and usually does not take them into account, does not know what ecosystem services are and how much they lose as a result of environmentally unjustified construction of hydropower facilities against the background of short-term benefits from such construction.

4. Ecosystem management is not properly organized, and local and industry leaders are almost unfamiliar with the concepts, principles, and tools of the ecosystem approach and ecosystem services.

5. Despite some efforts in this direction, the real impact for the implementation of the ecosystem approach and ecosystem services is still mosaic and sporadic, and is mainly initiated by central NGOs or international projects.

6. A quantitative assessment of ecosystem services is only emerging in the form of testing of methodologies and some initial assessments of ecosystem services (for example, ecosystem services of the Lower Dniester wetlands).

Introduction of ecosystem approach and determining the economic value of river ecosystem services will allow realistically weigh the potential losses and benefits of hydropower development in decision-making process with full understanding that the following actions are necessary:

1. Consider mandatory implementation of the ecosystem approach, taking into account all 12 principles, enshrined in the 1992 Convention on the Protection of Biodiversity (Rio de Janeiro), at all levels of work with water bodies and, first of all, when assessing the environmental Impacts and creating, and implementing plans for water bodies management.

2. Prohibit the construction of any hydropower facilities on the remaining freely flowing rivers in EaPcountries; create a catalog a freely flowing rivers in Armenia, Azerbaijan, Moldova and Ukraine and make it public.

3. Introduce a mandatory assessment of ecosystem services into river basin management plans and hydropower development plansincluding harmonized assessments and methodological tools for transboundary rivers.

4. Recognize the assessment of ecosystem services as an essential component of the Strategic Environmental Assessment and Environmental Impact Assessment, introduce them in related legislation and develop the necessary methodological tools.

5. Carry out a broad educational program among the population at the local, national and international levels on the values of ecosystems and the cost of losses of the ecosystem services of rivers with the involvement of international and national donors and scientists.

6. Strengthen public influence on decision-making in the field of hydropower development making voice of local communities heard.

7. Develop more effective mechanisms for countries of impact origin, responsible for damage caused to ecosystems of basins of transboundary rivers.

8. Recognize the bilateral Dniester agreements between Ukraine and Moldova as a good example of a positive cooperation in the use of transboundary water resources and take measures to create similar structures between other EaP countries.

The national workshops were conducted by:

- International Association of River Keepers Eco-TIRAS on 26/06/2019, Chisinau, Moldova;
- «KHAZER» Ecological and Cultural NGO on 12/07/2019, Yerevan, Armenia;
- Azerbaijan Ornithological Society, on 26/07/2019, Baku, Azerbaijan;
- National Ecological Centre of Ukraine within the framework of the project *«Ecosystem approach to hydropower: facilitating the implementation of European requirements to development of hydropower sector in states of Eastern Europe Partnership".*

Науково-практичне видання

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Екосистемний підхід до гідроенергетики: сприяння реалізації європейських вимог до розвитку гідроенергетики у країнах Східного партнерства

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The purpose of the project «Ecosystem approach to hydropower: facilitating the implementation of European requirements for development to the development of hydropower in countries of the Eastern Europe Partnership» is to facilitate the implementation of SEA and EIA procedures as foreseen by the horizontal EU directives and the relevant conventions to which the EaP countries are parties, in order to justify the possibility of implementing plans, programs and projects in the field of hydropower, promotion of the ecosystem approach to hydropower development and integrated water resources management.

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