

# **Review of the Main Environmental and Social Impact Assessment (ESIA) for the HPPs on the Shushica**

Based on scientific contributions of the following scientists:

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## **1 BACKGROUND AND MOTIVATION**

This assessment of the Shushica ESIA is focusing only on the environmental aspects of the report, based on the English translation of the original Albanian version. We assessed this ESIA, based on data collected during recent field work on the Shushica as a major tributary within the Vjosa-Aoos river network and with regard to our critical assessment of the planned hydropower plants at the Vjosa at Kalivac and Pocem. Our evaluation refers particularly to our assessment of hydromorphological processes, habitat diversity, vegetation patterns, biodiversity data, an analysis of the groundwater fauna and hydrochemical conditions. The study was carried out in June 2021 and involved a team of 30 scientists from Albania, Austria and Italy.

## **2 KEY FINDINGS regarding the presented ESIA**

- The documentation of the local environment and baseline of the study area are completely inadequate and seriously deficient
- The evaluation procedure of the current status of the study site is misleading and incorrect
- Central environmental threats and impacts are not covered
- The ESIA is based on insufficient data; no quantitative assessments of biodiversity and critical species/populations and the impact of the planned dams on these populations have been carried out
- Downstream effects of the planned HPPs have neither been described nor evaluated
- Mitigation measures are utterly inadequate
- The residual environmental impact doesn't reflect the actual negative impact of the HPP
- Cumulative effects of the chain of dams have not been described.

**The construction of the hydropower plants would have serious and irreversible ecological and economic consequences and would lead to an increase of seismic induced hazards:**

- Ecological degradation of the middle and lower section of the Shushica river, as a major tributary of the unique Vjosa-Aoos river system of European importance

- High economic costs owing to sediment-related problems in the reservoir (e.g., high need for costly maintenance)
- Increased risk due to earthquake-induced landslides and floods
- Long-term negative impacts on the coastline and tourism in this part of Albania.

## LEGAL REQUIREMENTS

As a contracting party to the Energy Community Treaty, Albania is obliged to follow the EIA Directive. According to Article 5 of the EIA Directive, the developer must prepare and submit an environmental impact assessment report. This must include at least:

- (a) a description of the project comprising information on the site, design, size and other relevant features of the project;
- (b) a description of the likely significant effects of the project on the environment;
- (c) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
- (d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;
- (e) a non-technical summary of the information referred to in points (a) to (d); and
- (f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

Further requirements are defined in Annex IV of the EIA Directive.

The Shushica tributary is an essential and valuable part of the Vjosa river system and the impacts of the planned dams are potentially severe. In light of the pan-European importance of the Vjosa river system and Albania's aspirations to become an EU Member State, it is appropriate to also follow other EU Directives and Regulations, such as the "Birds Directive", the Habitats Directive, the Water Framework Directive and the Eel regulation.

In addition, Albania is obliged to respect the Bern Convention and the Espoo Convention. The Eel regulation and Espoo Convention are relevant because of the impact of the recently cancelled Kalivaç project on Eel population also in Greece.

## 4 SUMMARY OF CRITICISMS

**The documentation of the local environment and baseline of the study area are completely inadequate and seriously deficient**

- Not only long-distance migratory fish are affected as stated in the report. Many fish species undertake migration for several purposes as highlighted in a study by Meulenbroek et al. (2018). The high numbers of anadromous, catadromous, and diadromous fish highlight the necessity of functional connectivity from the sea to the upstream river sections and back. Of special significance is the situation of the European eel (*Anguilla anguilla*) (See Meulenbroek et al. 2020).

- Vegetation surveys and mapping is missing (no vegetation tables, no information/map of the locations). The report does not even indicate in which report/data source such surveys can be found.
- The listings and brief descriptions of the vegetation refer primarily to the surrounding area and in this general form have little relevance to the area affected by the power plant.

#### **The evaluation procedure of the current status of the study site is misleading and incorrect**

- A complete evaluation of the actual status based on the vegetation surveys (e.g. number of Red List species, FFH appendix species, protected species etc.) is missing in the report. Crucial endangered species (appendix I) and habitat types (appendix II) are not listed in the report.
- None of the statements in the ESIA concerning impacts are supported by any scientific literature. Expectations about the impacts are based solely on the expertise of a consortium of consultants, who do not disclose their source of information.
- The ESIA report is not addressing the high ecological value of the riverine habitats in its existing state. As clearly demonstrated by Schiemer et al. (2020), the value of the Vjosa River system (including the Shushica) as one of the few remaining reference sites in Europe for dynamic floodplains is outstanding. With the exception of agricultural areas, almost all of the areas affected by impoundment must be designated as FFH habitats (FFH Directive, Annex II) and are of high national and international importance (see Egger et al., 2020).

#### **Central environmental hazards and impacts are not covered**

- There are hardly any serious comments on the fact that the total change of water body type would lead to a total change of the species structure, rapid appearance of non-natives, collapse or disappearance of important species, e.g. the European eel.
- The effects of the dam in terms of sediment transport are not adequately presented. Downstream reduction of sediment transport due to damming will have a series of serious predictable impacts: the full capture of bed load and a high amount of suspended sediment in the reservoir will lead to river bed incision downstream, loss of habitat dynamics, negative effects on the quantity and quality of the groundwater, coastal erosion in the Narta Lagoon. None of these impacts has not been appropriately addressed in the ESIA.
- Negative effects of sedimentation within the reservoir are not addressed in the ESIA report either. Sediments transported to the reservoir by annual floods will lead to a clogging of the bottom outlet, which is against all international technical standards and safety regulations.
- The Vjosa River Basin including the Shushica area is characterised by **high seismic activity**. The ESIA Report does not include a hydrogeological risk assessment and engineering-geological and geophysical studies to evaluate the local seismic response and the seismic amplification factors. These studies are crucial to define the effects of the geological hazards on the stability and the seismic vulnerability of the area of the planned HPP.
- Important further impacts to riparian vegetation downstream of the dam, such as reduction of morphodynamics, no sediment input etc., are not analysed or considered at all.

#### **ESIA is based on insufficient data; no quantitative assessments of species/populations and the impact of the planned Shushica dams on these populations have been carried out**

- Field assessment of habitat typology and biodiversity are missing or utterly insufficient
- Maps and documentation of bank and floodplain specific vegetation units are missing.
- Maps and documentation of the FFH-habitat types are missing.

- There is no comprehensive classification (maps) with regard to nature conservation relevance.
- The comprehensive land cover map only covers the dam area including the surrounding area; the area downstream of the dam is only partially covered. A complete documentation of the entire area influenced by the dam downstream is missing.

#### **Downstream effects (hydropeaking) neither described nor evaluated**

- The Shushica HPPs are planned to produce peak electricity. Therefore, the water will be flushed regularly. This downstream effect is called hydropeaking – a form of flow regulation with frequent, short-term, and artificial flow events. Hydropeaking is one of the worst effects a hydropower scheme can have on a river channel and its biodiversity.
- The hydrological alteration by the HPPs' operation is entirely unclear and not even roughly illustrated. Within the ESIA, a potential drying up of the river is mentioned several times, which would lead to dramatic losses of internationally protected species. Minimum requirements of an EIA comprise the linkage of hydrology during several development phases and the aquatic environment, whereby seasonal aspects have to be clearly described.

#### **Mitigation measures are utterly inadequate**

- Mitigation measures are – if at all - only generally stated. No detailed measures are described. It remains unclear how the mitigation measures will be realized, e.g. modification of sediments, artificial thermal de-stratification, maintenance of egg-laying grounds, fish stocks, etc. International standards require seasonal dynamic hydrological water releases below dams during all development phases.
- The generally formulated mitigation measures in the report are not suitable to reduce or compensate for the permanent loss of riparian habitats in the reservoir and floodplain zone downstream of the dam.
- Within the mitigation measures a "Biodiversity Action Plan (BAP)" is mentioned. The purpose of such a plan is "*to reduce impacts on sensitive biodiversity...*". The generally formulated mitigation measures in the report are not suitable to reduce or compensate for the permanent loss of riparian habitats in the reservoir and floodplain zone downstream of the dam. Also, the mentioned monitoring as well as the further mentioned mitigation measures are not suitable to compensate the permanently destroyed and strongly impacted habitats.
- An EIA must give detailed technical description for the species-specific mitigation measures. A detailed description is a basic requirement for a standard EIA. Specific mitigation measures for vegetation, invertebrate species, amphibian, reptiles, fish (such as a fish bypass, which is not included in the present report) etc., must be provided on species level to prevent biodiversity losses. These are completely lacking.
- There will be negative impacts on all protected sites located upstream and downstream for the above-mentioned reasons. The major impact upstream would be the complete blockage of aquatic migratory fish species. After construction of the proposed dams, an important segment of the permanent river network would no longer be reachable by migratory fish. It remains unclear in the report which precautionary measures are planned during construction and operation.

#### **The residual environmental impact presented in the ESIA doesn't reflect the actual impact of the planned HPPs**

- It must be emphasized that the reservoir is a completely new ecosystem. Within the reservoir, the temperature and discharge regime are completely altered. Fine sedimentation negatively affects most riverine biota, especially macroinvertebrates, leading to a complete turnover of the community and reducing the biodiversity to just a few lacustrine taxa. Biodiversity in littoral habitats suffer regular disturbance, such as artificial water level fluctuations, drawdowns, and floods. By exceeding subtle thresholds, these fluctuations can result in littoral dead zones (Schmutz and Moog 2018).
- The description of predicted impacts on aquatic biodiversity is completely inadequate and unprofessional. The filling of the reservoir leads to highly reduced (if any) flow downstream. This has severe implications for local organisms, such as increased water temperatures, algal growth, reduced water quality, siltation of interstitial habitats. The reduction of the wetted area owing to residual flow is correlated with the loss of biomass downstream. Even short time drying of the river bottom – as stated in the ESIA - can lead to the total extinction of any aquatic species listed in international conventions. The vital question here is where and how far away the nearest populations live and whether repopulation is possible. Plausible and detailed answers must be provided by the operator of the HPP within the ESIA, but has been omitted entirely.
- The major impact of HPPs is a disruption of river continuity. Migratory species are blocked from reaching their spawning habitats, genetic exchange is prevented, resulting in genetic 'island populations'. The genetic impoverishment caused by this isolation decreases the health of the entire population by reducing the possibility of better adaptation through the random genetic mutation of individuals (Schmutz and Sendzimir 2018). The upstream reaches of the river are affected by the dam itself as a migration barrier. It essentially impoverishes migratory species, including catadromous and anadromous fish species like eels, among others. This habitat fragmentation leads to an impoverished aquatic fauna, including aquatic invertebrates, owing to the isolation of populations and reduced genetic exchange (Monaghan et al. 2002; Zwick 1992).
- The ESIA report insinuates that the fauna and flora will adapt to the new conditions. This statement is unprofessional, demonstrating the irresponsibility of the evaluation. Long-term effects will change fauna and flora composition entirely and irreversibly.
- The "residual impacts to riparian vegetation after implementation of the mitigation measures during construction and operation phase are rated as "small", which is incomprehensible and incorrect. Large areas are classified as priority habitats according to the Flora Fauna Habitat Directive. The complete loss of these habitats actually is a major negative impact.
- A genuine expert knowledge states that this high conservation status would be lost and could not be mitigated by any measures.
- The ESIA contains misleading information about possible flood protection by the HPPs. Flood security for the downstream reaches cannot be achieved by dams especially in the case of high flood events. With climate change the probability of high floods will further increase.

#### **Summary of major impacts to be expected:**

##### **Downstream effects:**

Sections downstream of the reservoir will be seriously affected by missing sediments. The Shushica drains about 20% of the Vjosa catchment. Hence, the trapping of sediments in the impounded section will lead to river bed incision but also have an important impact on the Vjosa downstream of the Shushica mouth, especially on the Delta region.

River bed incision downstream the Shushica HPPs will have consequences for the groundwater quality. Water diversion will have an impact on groundwater exchange in total. Stretches with former infiltration of the river into the groundwater may be cut-off. Thus, not only a lowering of the groundwater table but impacts on the distribution might be expected.

The change in hydrology (the Shushica riverbed below the dams will almost be dry for extended parts of the year), the general dampening of the seasonal hydrological pattern, the reduced geomorphological dynamics, and the change in substrate composition will lead to a dramatic effect on the riverine biota and ecosystems below, endangering the high and characteristic biodiversity (see reports of the Science week in June 2021).

**Upstream effects:**

The upstream reaches of the river are affected by the dam itself as a migration barrier. It essentially impoverishes migratory species, like eels. This habitat fragmentation leads also to an impoverished aquatic fauna, including aquatic invertebrates. The genetic impoverishment caused by this isolation decreases the health of the entire population by reduced genetic exchange.

**Reservoir:**

HPPs create new ecosystems with completely altered temperature, oxygen and discharge regimes. Fine sedimentation negatively affects most riverine biota, especially macroinvertebrates, leading to a complete turnover of the community and reducing the biodiversity. Biodiversity will be reduced by artificial water drawdowns, and floods during hydropeaking lead to a large-scale destruction of the semi-terrestrial bank and floodplain habitats.