IGB
Leibniz Institute of Freshwater Ecology
and Inland Fisheries

IGB FEEDBACK ON THE EC CALL FOR EVIDENCE

“Renewable energy projects – permit-granting processes & power-purchase agreements”

Introduction, background and focus

The Leibniz Institute of Freshwater Ecology and Inland Fisheries (IGB) is Germany's largest research centre for freshwaters. Our research findings help to tackle global environmental changes and to develop strategies for sustainable water management – true to our guiding principle "Research for the future of our freshwaters". Based on our research and expertise, we comment on the Call for Evidence on "Renewable energy projects – permit-granting processes & power-purchase agreements". Our general scientific advice focuses on aspects of the permit-granting processes and the potential jeopardy of environmental standards – this part is applicable for the whole sector of renewable energies, while our special focus is on issues of hydropower as a renewable but not environmentally friendly energy source.

Fortunately, climate protection is of high societal and political priority today. The shift to climate-friendly energy sources is urgently needed, also from an ecological point of view. Because the goals of the EU Green Deal aiming at a mitigation of climate change are ambitious, and due to the recent dramatic demonstration of Europe's dependence on the import of fossil energy, an acceleration of the European energy transition seems urgently desirable. Nevertheless, special care has to be taken that measures to accelerate the approval process for renewable energies do not violate key European or national environmental standards. Acceleration measures should rather focus on administrative structures and procedures to save time in project implementation, without weakening environmental standards and rigorous environmental impact assessment of projects. Thus, acceleration should not automatically imply more positive approvals by circumventing or ignoring environmental legislation.

Conflicts of environmental policy goals, i.e. stronger support of renewable energies must not jeopardize nature protection and the respective legislation, because ecosystems provide the functions and ecosystem services that mankind and nature rely on. EU initiatives to accelerate the energy transition thus should not support the use of technologies which evidently harm freshwater ecosystems that play a major role in climate change adaptation and mitigation. It is also important to underline that healthy freshwater systems represent the functional basis for drinking water, a key resource for human existence.

Conflicts between climate protection and biodiversity goals: hydropower as a major problematic case

Besides climate change adaption and mitigation, the protection of biodiversity constitutes one of the greatest global, European and national challenges. There are conflicting goals between climate protection and biodiversity policies, whereby individual renewable energy sources affect biodiversity to varying degrees. This trade-off is particularly acute in the case

of hydropower generation, because inland waters and their floodplains are hotspots of biodiversity – but this rich flora and fauna is under severe threat because of multiple human impacts (Reid et al. 2019, Tickner et al. 2020). Therefore, the European biodiversity strategy aims among others for restoring at least 25,000 km free flowing rivers. Hydroelectricity generation depends on dams – the larger they are the higher the power output – which directly impact on European and National biodiversity strategies as well as on environmental targets of both Habitat Directive (HD) and Water Framework Directive (WFD). Hence, in Europe the large number of about 23,000 hydropower plants indisputably constitutes a major reason why most European member states fail to meet the binding environmental targets in European biodiversity and water protection legislation: 22 years after the entry into force of the WFD, about 60 % of streams and rivers in the EU do not achieve the targeted "good ecological status" (European Environmental Agency 2018). Additionally, the natural hydropower potential will become more seasonally unsteady in climate change (Gøtske & Victoria 2021) and only could be exploited with severe damages to remaining healthy rivers.

Negative impacts of hydropower on aquatic ecosystems and its flora and fauna

In principle, all hydropower plants significantly impair the ecological condition of the streams and rivers they use. While generating renewable electricity, their dams interrupt rivers' discharge and sediment dynamics, i.e. degrade free-flowing rivers and their functioning floodplains with their important functions for biodiversity conservation and natural flood protection. Artificial damming leads to retention of coarse river sediment, warming of water bodies, algae development and mud formation. Retained coarse sediment will then be missing in downstream sections, which also promotes the channel incision of long stretches of streams and rivers. In addition, dammed water bodies emit considerable amounts of methane, a particularly climate-damaging gas, as a result of mud formation (Wilkinson et al. 2019). Therefore, many aquatic animal and plant species are affected by hydropower use, which, unlike many terrestrial ones, cannot leave their current habitat and thus can hardly avoid dangers and stresses.

Fishes are particularly endangered by hydropower and its consequences, especially diadromous, ecological "umbrella species" such as eel, salmon, allis shad, sea trout, houting and sturgeon, but also the riverine Danube salmon. These migratory species represent the complex habitat requirements of the rich flora and fauna of inland waters and floodplains. In their life cycles, these species are often unable to pass the weirs and dams of hydropower plants because suitable and sufficiently large migration facilities for fish to ascend and descend are lacking. In addition, 22% of all passing fish suffer from lethal injuries and kills in turbines, because of inadequate protective devices and lack of safe downstream migration routes at hydropower plants (Radinger et al. 2022). The inaccessibility of important habitats and the high kill rate could lead to their regional extinction. Publicly funded and also volunteer-supported reintroduction efforts and protection programmes for species threatened with extinction are thus thwarted.

To become societally beneficial, the gain by renewable hydroelectricity generation must exceed the ecological costs of biodiversity loss and the societal benefits of natural flood protection and healthy river systems. This is not the case for small hydropower plants, where the low societal benefit of little electricity generation is offset by massive environmental

damage. One example is Germany, where about 7200 out of 8300 hydropower plants (87%) have an installed capacity of 500 kW or less and produced altogether 565 MWh out of in total 5647 MWh (11%) hydroelectricity production in 2020 (Marktstammdatenregister 2022). In Europe, the situation is very similar. Of the about 23,000 hydropower installations recorded in 2011, 91% were small (≤10 MWh annual production) and had generated just 13% of the total electricity production from hydropower (European Commission 2018). Considering the negative ecological effects with the little contribution to electricity generation, the environmental balance of small hydropower plants is clearly very negative. But even at large modern hydropower plants, it can neither be prevented nor compensated that ecologically valuable river habitat is lost far upstream and downstream of the dam.

Precautionary principle: hydropower should not be accelerated or prioritised through the planned EU initiative

To sum this up, hydropower projects should neither be prioritised nor accelerated through the proposed initiative, and their approval processes should be especially precise and carefully follow rules for environmental impact assessments, due to the negative environmental impacts explained above. Otherwise, the European Commission would jeopardize its own climate and environmental goals, and the highly valuable freshwater resource for the European population. The precautionary principle plays a central and major role, because once hydropower infrastructure is established, valuable habitats and populations of rare species can quickly disappear forever. This can already happen within the building phase – hence, an early start of construction without final official approval should not be allowed in any case.

If, despite the existing problems, the European Commission wants to continue the support for hydropower, every single plant – old and new ones – should carefully be examined to see whether they do not conflict with important legal nature conservation goals of European or national significance. Likewise, existing legal environmental standards such as ecological continuity and appropriate minimum flow must be consistently and bindingly observed. The obligatory exemption assessment according to Art. 4 (7) WFD needs to be enforced for all existing and new hydropower plants, carefully evaluating the deterioration of ecological status due to "overriding public interest" or "disproportionate costs" in case of substitution by other renewable energy sources (cf. judgment C-346/14 ECJ). Correspondingly, the EU Taxonomy Regulation (EU Regulation 2020/852) should not be diluted, and hydropower plants that do not meet the requirements for minimum flow, continuity and safe fish passage will be considered unsustainable in accordance with the EC WFD as of January 2023 (European Commission 2021). Approvals of hydropower plants without examination of Art. 4(7) a-d EC WFD are unlawful (ECJ C-529/15 para. 38). For installations that may affect FFH sites or species, the relevant EU guidance must be applied (European Commission 2018).

Scientists recommend acceleration of decommissioning and dismantling

Instead of approval acceleration, the decommissioning and dismantling of small hydropower plants should be promoted. This approach fundamentally simplifies the implementation of restoration measures, also because this enables larger-scale restoration towards restoring 25,000 km free flowing rivers as it is explicitly foreseen in the EU Biodiversity Strategy to 2030. In this way, important ecosystem services of water bodies for the environment and

society, such as natural climate change mitigation including flood protection, stable landscape water balance, self-purification, cooling effect and water-related local recreation, could be restored. This is particularly important in view of the expected consequences of climate change and strengthens the natural resilience of water bodies.

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