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Eel Regulation: Experience & Recommendations by the Hydropower Sector

A Eurelectric response paper

March 2019

Eurelectric represents the interests of the electricity industry in Europe. Our work covers all major issues affecting our sector. Our members represent the electricity industry in over 30 European countries.

We cover the entire industry from electricity generation and markets to distribution networks and customer issues. We also have affiliates active on several other continents and business associates from a wide variety of sectors with a direct interest in the electricity industry.

We stand for

The vision of the European power sector is to enable and sustain:
- A vibrant competitive European economy, reliably powered by clean, carbon-neutral energy
- A smart, energy efficient and truly sustainable society for all citizens of Europe

We are committed to lead a cost-effective energy transition by:

investing in clean power generation and transition-enabling solutions, to reduce emissions and actively pursue efforts to become carbon-neutral well before mid-century, taking into account different starting points and commercial availability of key transition technologies;

transforming the energy system to make it more responsive, resilient and efficient. This includes increased use of renewable energy, digitalisation, demand side response and reinforcement of grids so they can function as platforms and enablers for customers, cities and communities;

accelerating the energy transition in other economic sectors by offering competitive electricity as a transformation tool for transport, heating and industry;

embedding sustainability in all parts of our value chain and take measures to support the transformation of existing assets towards a zero carbon society;

innovating to discover the cutting-edge business models and develop the breakthrough technologies that are indispensable to allow our industry to lead this transition.

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WG Environmental Protection

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KEY MESSAGES

The European energy system is undergoing a significant transformation creating important opportunities and challenges for all stakeholders. The power sector, represented by Eurelectric, is committed to leading the required energy transition and secure cost-effective decarbonisation. Hydropower is one of the key technologies in supporting the European pathway to a decarbonised energy system and achieving global leadership in renewable energy generation.

In the European Union, all hydropower installations and projects, small and large, are subject to strict environmental legislation to ensure their sustainability. The Eel Regulation together with the Water Framework Directive (WFD) are central pieces of legislation for environmental protection and sustainable water management, having significant influence on current operations and future development of hydropower as well as of thermal power plants. Operators are generally committed to the targets of the Eel Regulation as well as those of the WFD and have implemented various environmental measures.

However, Eurelectric recommends considering the following when evaluating the Eel Regulation and assessing its implementation:

- Involve all relevant stakeholders in the further development of the Eel Regulation to ensure a fair division of responsibilities and costs when defining and implementing measures to reach the Eel Regulation's goals.
- Fully recognise the subsidiarity principle and allow the Member States to take into account their specificities when implementing the Eel Regulation. Therefore, propose best practice procedures rather than unspecific standard solutions.
- Consider the linkages between the Eel Regulation and the Water Framework Directive (WFD) and the need for coherence with other central EU policies, especially in the field of climate and energy. Based on this, not only focus on environmental aspects but also acknowledge a holistic approach of the WFD, which is necessary to balance environmental and climate-related, social and economic aspects.
- Review and/or complement the 40% escapement goal including interim (or possibly alternative) targets, milestones or indicators applying them within realistic and appropriately defined timeframes.
- Only implement cost- and ecologically-effective measures to prevent unsatisfactory solutions and unnecessary costs.
- Close the knowledge gap by increasing integrated expertise on all scientific questions arising from the Eel Regulation, concerning eel migration, monitoring as well as appropriate indicators.

Hydropower's contribution to a successful energy transition

The European energy system is undergoing a significant transformation (decarbonisation, security of supply, deployment of renewables and their integration into the market) creating important opportunities and challenges for all stakeholders. Despite all energy efficiency efforts, overall demand for decarbonised electricity is set to be significantly higher in 2050 than today due to the decarbonisation of the heating, cooling, transport and many industrial sectors, which can only be achieved via efficient and smart electrification[1].

Hydropower is a key technology in supporting the European pathway to a decarbonised energy system and achieving global leadership in renewable energy generation. As a renewable and highly sustainable source of electricity, hydropower provides the European power system with stability and valuable flexibility. In addition, hydropower contributes with 38 billion EUR[2] to the EU's GDP and reduces EU's dependency on fossil imports to an extent worth 24 billion EUR. It also brings multiple extra benefits for society in the river basins such as support to irrigation, water supply and flood control.

Hydropower as key technology in the EU's future climate and energy policies

Hydropower is renewable, controllable, flexible as well as storable, and it perfectly fits the future power demands. Thanks to its flexibility, hydropower ideally complements variable sources such as wind and sun (Figure 1).

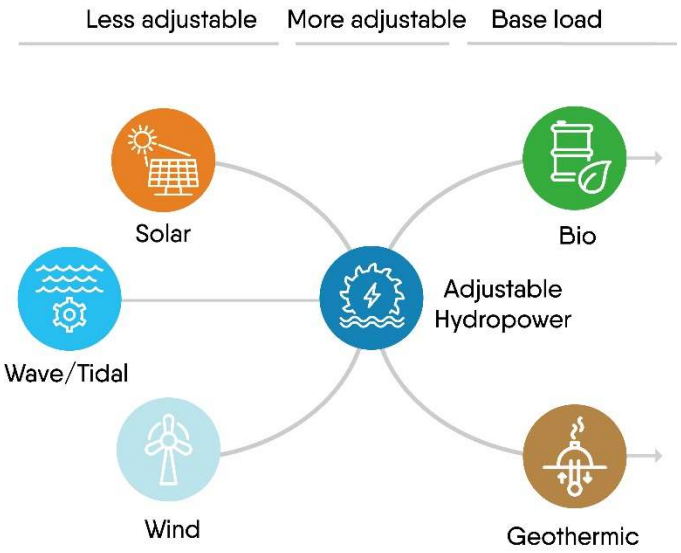

Figure 1: The flexibility of hydropower compared to other renewable sources

Even though today's predictions foresee hydro power generation to remain roughly constant, the importance of hydropower will rise as the deployment of variable renewables (wind and solar) is accelerating (Figure 2).

[1] For example in Germany the decarbonisation of the heat and transport sector could lead to a massive additional demand for renewable electricity. Even in a scenario including ambitious energy efficiency measures could lead to more than a doubled electricity demand, without efficiency measures even quintuple to 3,000 TWh (see HTW 2016: Sektorkopplung durch die Energiewende).

[2] DNV GL 2015: Macroeconomic study on hydropower

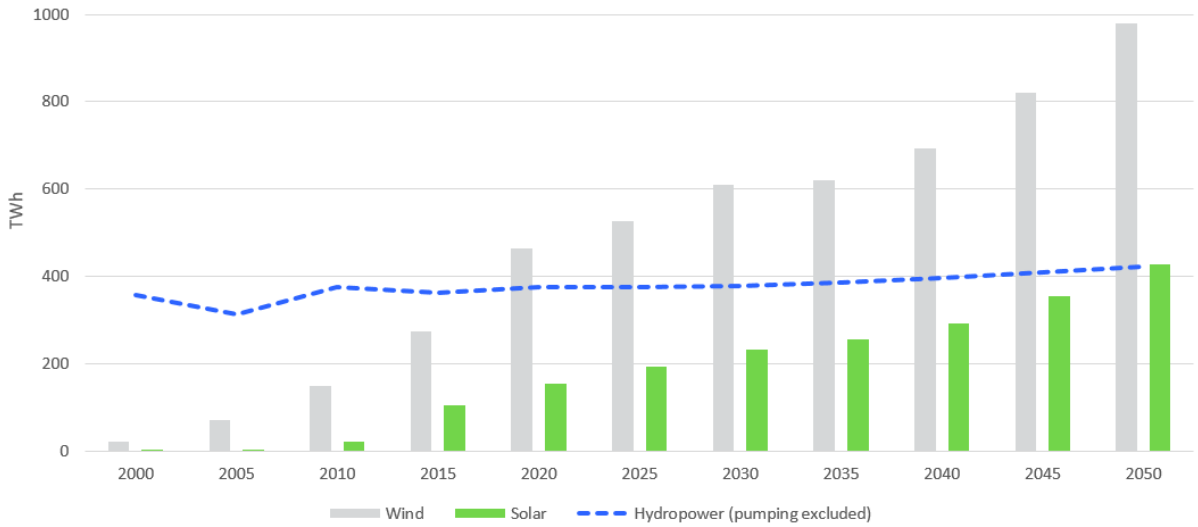

Figure 2: Accelerated deployment of variable renewables: historical and projected net electricity generation in the EU-28[3]

In addition, although other technologies are developing, hydropower remains the most efficient large-scale technology to store electricity over significant periods and to supply consumers on demand.

Furthermore, hydropower serves as reliable and well predictable base-load generation. These services are highly needed to ensure a safe, affordable and stable security of supply for EU citizens and industry.

Today, about 30% of the total gross electricity generated in the EU-28 plus Norway and Switzerland (3.291 TWh) comes from renewable sources (Figure 3).

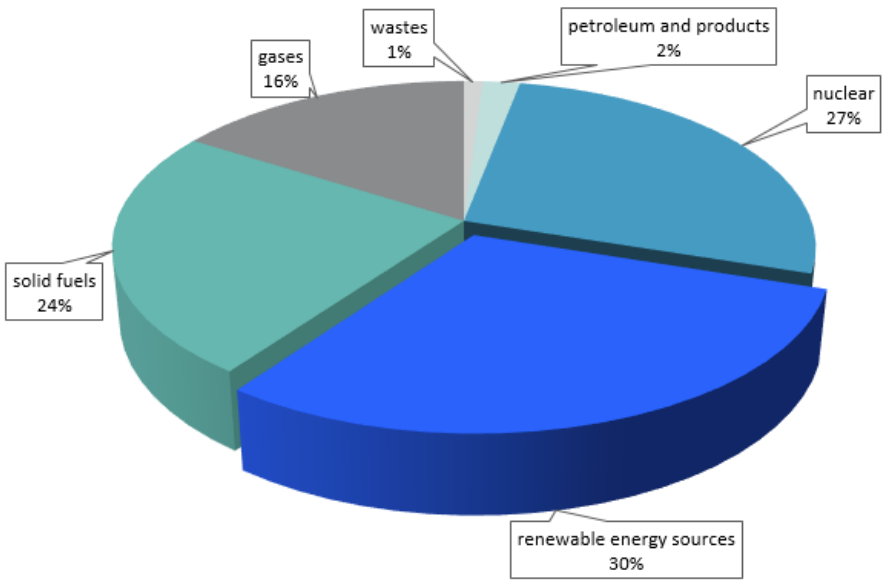

Figure 3: Shares of Gross Electricity Generation in the EU-28 (plus NO and CH) in 2015

[3] EU Reference Scenario 2016 based on PRIMES, GAINS

According to Eurostat data[4] (for 2015), hydropower is the largest source of renewable-based electricity generation in Europe. With a total generation of more than 341 TWh per year (generation of run-of-river and storage plants) equal to about 36% of the total electricity generated from renewable energy sources and 10% of the entire electricity generation in the EU-28, hydropower contributes significantly to achieve the EU targets. Adding the hydropower generation of Norway and Switzerland[5] to the EU-28 values, a total hydro generation of 515 TWh can be reached (excluding 33 TWh generated by pumped storage power plants). This is close to half of the total renewable electricity generation of 1,150 TWh in the EU-28 plus NO and CH (see Figure 4).

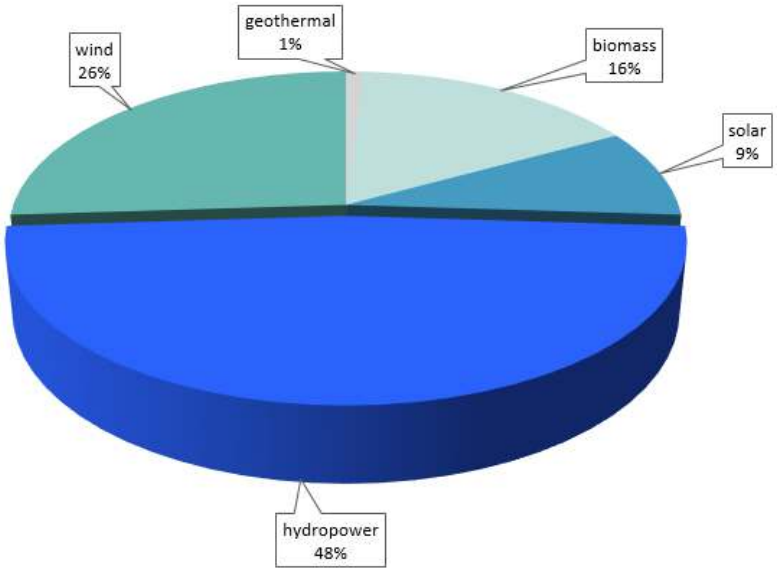

Figure 4: Renewables electricity generation shares in the EU-28 (plus NO and CH) in 2015[6]

However, hydropower generation and its share among all forms of renewable electricity generation vary considerably across the Member States as shown in Figure 5.

[4] EUROSTAT 2018, Energy Overview

[5] Norway and Switzerland are not members of the EU but important partners in the European electricity grid with a high share of renewable generation. Both countries are included in the analysis as Norway has to formally comply with the WFD, and Switzerland has passed national legislation setting similar requirements as the WFD.

[6] Directorate-General for Energy (European Commission) 2017: EU energy in figures - Statistical Pocketbook 2017; ENTSO-E Data; Schweizer Bundesamt für Energie (BFE): Schweizerische Elektrizitätsstatistik 2015.

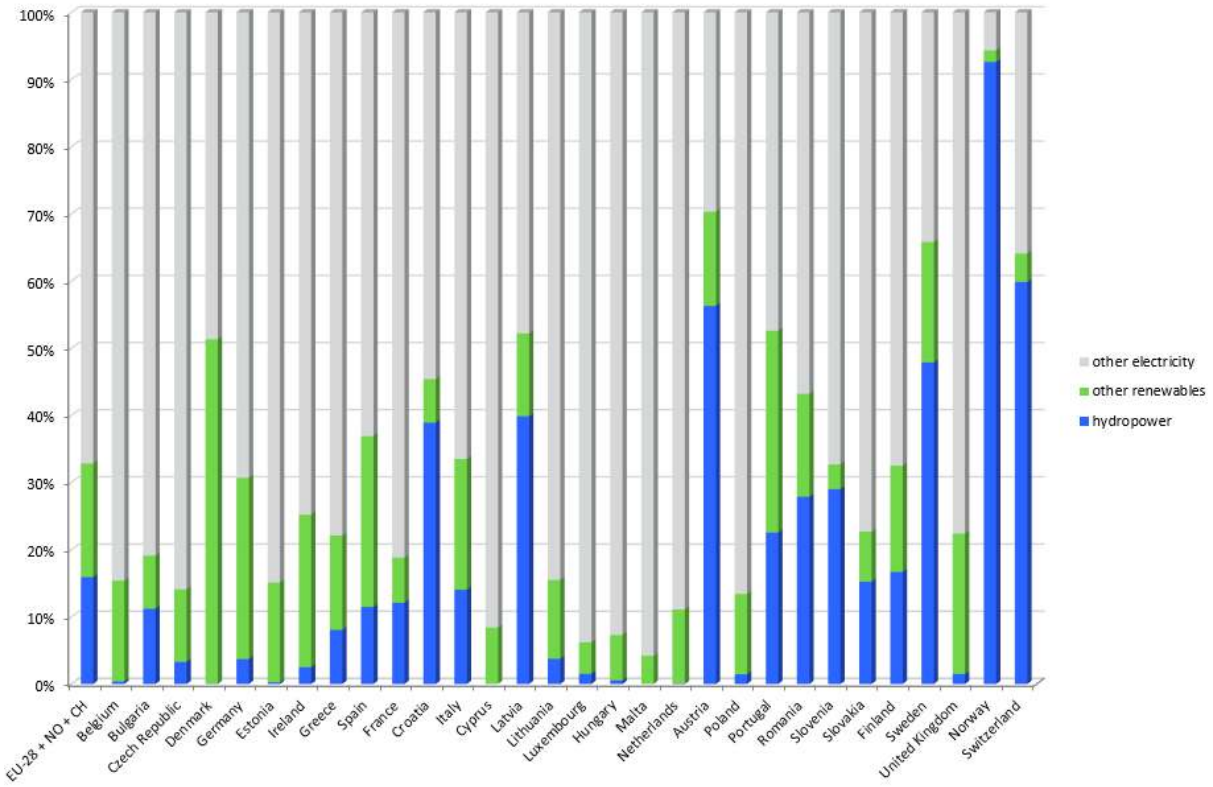

Figure 5: Electricity generation shares of hydropower (pumped storage excluded), other renewables, and other electricity sources, in the EU-28 plus Norway and Switzerland in 2015[7]

Hydropower as a renewable provider of all system services

A higher share of wind and solar power generation increases the need for ancillary services that contribute to maintaining secure and stable grids. In this context, hydropower is able to deliver:

- back-up and reserve capacity
- quick-start and black start capability
- regulation and frequency response
- voltage support to control reactive power
- inertia

In addition, hydropower provides significant amount of balancing power helping the efficient integration of variable renewables such as wind and solar power.

Hydropower as a cost-efficient source of low carbon energy

Hydropower is one of the most competitive sources of low carbon electricity with a lifecycle of 80 years and even longer. Despite low operational costs, the high investment for the construction of hydropower infrastructure requires a clear and stable regulatory framework.

Hydropower generation contributes significantly to the efforts to reduce GHG emissions. Indeed, hydropower technology avoids more than 180 Mio t of CO2 emissions per year equal to 15% of the total CO2 emissions in the EU-28 power sector[8]. According to the IPCC Special Report on

[7] Eurostat 2018; Schweizer Bundesamt für Energie (BFE) 201

[8] DNV GL 2015: Macroeconomic study on hydropower

Renewable Energy Sources and Climate Change Mitigation, hydropower has the smallest carbon lifecycle footprint of all electricity generation technologies[9].

Hydropower is able to deliver additional new renewable generation as well as to provide supplementary flexibility and storage capabilities to achieve renewable targets by upgrading and optimising the existing facilities and by building new plants. The technically feasible hydropower potential[10] in the EU-28 plus Norway and Switzerland has been estimated to reach approximately 1,000 TWh/year[11].

Hydropower as a provider of multiple benefits

Hydropower offers benefits to society such as drinking water supply, flood protection, irrigation, navigation and recreation.

Water supply, wastewater management, flood control and hydropower facilities have influenced the original state of watercourses for centuries and have changed them to "man-made" nature. In many cases, rich ecosystems have been (re-)created through careful local management around these hydropower infrastructures. Very often, the habitats close to and around hydropower infrastructures are well-known for their biodiversity and are home to protected species. In many cases, these ecosystems have been even designated as nature protection areas including Natura 2000 status.

The Eel Regulation in light of hydropower

Hydropower is a key technology in supporting the European pathway to a decarbonised energy system and achieving global leadership in renewable energy generation. As a renewable and highly sustainable source of electricity hydropower provides the European power system with stability and valuable flexibility.

Hydropower is constantly interacting with the environment. Hydropower operators spend significant resources to mitigate the impact on the river basins throughout Europe. Legislation and policies for environmental protection and sustainable water management have a significant influence on the current operations and future development of hydropower. In this context, it has to be highlighted that measures proposed by the Eel Regulation can affect hydropower and lead to generation or flexibility losses. Hydropower is affected by the Eel Regulation mainly due to the provisions in Article 2, where it is stated that

- An Eel Management Plan may contain, but is not limited to, temporary switching-off of hydro-electric power turbines (Article 2, para 8)
- Within an Eel Management Plan, each Member State shall implement appropriate measures as soon as possible to reduce the eel mortality caused by factors outside the fishery, including hydroelectric turbines, pumps or predators, unless this is not necessary to attain the objective of the plan (Article 2, para 10).

The main effects on electricity generation plants result from measures established in Eel Management Plans aimed at reducing or eliminating the potential influence of operation on eel migration or contribution to anthropogenic sources of mortality. These effects are not limited to hydropower installation, but equally (and importantly) apply to thermal power plants as well, for example affecting cooling water intakes.

[9] IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation: http://www.ipcc.ch/pdf/special-reports/srren/SRREN_Full_Report.pdf

[10] The technically feasible hydropower potential includes the already realised as well as the additionally technically feasible potential.

[11] Hydropower & Dams World Atlas 2017

We therefore believe that Article 2 (10) of the Eel Regulation could be reviewed to expand on the meaning of 'appropriate' and 'reduce' when considered in the context of multiple sources of influence on eel migration and mortality. This would help to avoid circumstances, in which the Member States may feel required to use excessively costly measures when a similar effect on the eel population could be obtained much more efficiently elsewhere (for example through fisheries restrictions).

Further consideration is needed regarding how the modelling of estimated escapement is applied. Based on previous work in 2013, there was still a high level of uncertainty on these escapement models. This is particularly important in the Member States with multiple small and very different Eel Management Plan areas.

The Eel Regulation is closely linked to the Water Framework Directive (WFD)[12] as, in particular, Eel Management Plans should cover river basins defined in accordance with Directive 2000/60/EC. The goals of the Eel Regulation should also be linked to the main purpose of the WFD, namely to "promote sustainable water use" (Art. 1, WFD). This means that besides environmental objectives, there is also a need to take into account economic development, as well as to acknowledge social effects, as well as geographic and climatic conditions. Based on this, it is necessary to strike a balance between environmental, climate and socio-economic goals.

Consequently, the implementation of measures under the Eel Regulation should not unduly hamper the operation of existing hydropower plants, or impose obstacles to upgrading or developing of new hydropower. Most hydropower plants have been in place for decades and serve as a crucial backbone both for the power system and for water management. Ensuring the further operation of these existing assets should be a priority for long-term climate protection and sustainable water management planning.

The extent of potential impacts and costs of measures also become clear from a current study[13] on the sustainability of European eel management commissioned by the PECH committee of the European Parliament:

"The putative costs to mitigate hydropower mortalities exceed the loss of revenues for a total closure of fisheries in Europe by far. In France alone, the impact of a seasonal shut down of hydropower facilities for 10 weeks on the aggregated revenue would range from EUR 127 million to EUR 634 million at a total loss in power generation from 1.5 to 7.7 Terawatt-hours (TWh). The possible costs of constructing upstream and downstream migration facilities are estimated to range between EUR 1,051 million to 3,110 million. This is 1.7 to 4.9 times as costly as a 10-week seasonal closure of the affected hydropower facilities, which means that migration facilities would be more cost effective after a two to five-year period. For Spain, losses are in the same range as in France, while for Greece and Germany losses were lower."

[12] Please consult also the Eurelectric experience report on the Water Framework Directive, publicly available on the Eurelectric website https://cdn.eurelectric.org/media/3113/wfd_experiences__recommendations_report-2018-030-0285-01-e-h-EC6C0086.pdf

[13] Hanel, R 2019, Research for PECH Committee – Environmental, social and economic sustainability of European eel management, European Parliament, Policy Department for Structural and Cohesion Policies, Brussels

Hydropower's experience with the Eel Regulation

The long-term objective of Eel Management Plans is to permit with high probability the escapement of silver eel biomass to the sea of at least 40 % relative to the best estimate of escapement that would have existed if no anthropogenic influences had impacted the stock (Eel Regulation, Art. 2 (4)).

As this objective has been set with reference to a theoretical scenario of no anthropogenic impacts, it is not measurable and not compatible with reaching the EU priorities on renewables, climate and flood protection.

Given the long-term nature of any potential recovery of eel populations measured by the 40% escapement target, more consideration is needed on the use of interim (alternative?) targets, milestones or indicators applying within realistic and appropriately defined timeframes.

Hydropower companies are generally committed to the targets of the Eel Regulation and have implemented various measures to facilitate eel migration, such as:

- Adaptations of turbine operation during eel migration ("eel-friendly operation")
- Turbine stops during eel migration
- Ameliorations of the hydraulic design in order to facilitate fish passage through turbines and pumps
- Introduction of fish guiding systems (such as bypass channels, rake systems)
- Site-specific eel management (including eel monitoring and operational adaptations)

In this context, it has to be highlighted that the implementation of measures or operation mechanisms can lead to significant losses of renewable generation and valuable flexibility within the power system – also accompanied by corresponding economic losses to operators.

It is crucial that the measures to be set are based on proven scientific results, with cost-benefit analysis (CBA) at the centre of the decision. Eurelectric recommends taking the diverse national conditions (resulting in different constraints on hydropower) into account when developing, evaluating and setting specific measures.

There should be confidence that a given measure would be effective in closing the gap to the escapement target within an Eel Management Plan. More dialogue between the Member States with regard to the implementation of the Eel Regulation and the effectiveness of measures should be promoted through the regulatory framework in order to facilitate identification of most effective measures.

The cost-efficiency and benefits of implementation measures under the Eel Regulation should be evaluated and also taken into account in the estimated overall costs in the Programme of Measures (PoM) under the Water Framework Directive. This shall also include the generation losses and maintenance costs of measures.

Cost- as well as ecological effectiveness can be guaranteed, if projects and measures are assessed site-specifically, considering the fact that there might be cases where facilitating fish migration, i.e. including eel migration will not make sense at all:

- where fish migration is (was) prevented due to other (natural) barriers;
- where no suitable habitats can be found or created up-/downstream;
- where no water type specific habitats can be realised;
- at dams, where no significant ecological improvements are expected;
- where a separation of species makes sense and is also preferred for environmental reasons, such as the protection of specific populations from disease or displacement;

- in case autochthonous populations exist above the barrier to migration;
- where the migration of neozoa has to be prevented.

Best practice examples of eel management

The following best practice examples showcase various initiatives and projects aimed to facilitate and improve eel migration at hydropower sites. It has to be pointed out that all presented solutions are site specific, and it might not be effective to implement a (type of) measure in a different context.

1. The Eel Protection Initiative by the German Federal State of Rhineland Palatinate and RWE Power[14] and Eel Protection Initiative Saar, Germany

   Back in 1995, an agreement on the joint Moselle Eel Protection Initiative was reached between the Federal State of Rhineland Palatinate, the fisheries authority of the river Moselle, and RWE Power as the operator of the hydroelectric power stations. Within the framework of this agreement and in cooperation with scientific institutes, possible ways are being investigated to minimise damage to fish and to strengthen the eel stocks in the river Moselle while taking into account economic aspects.

   The Eel Protection Initiative is financed by RWE Power through the provision of the annual amount of 220,000 EUR. Half of the funds are made available to the Federal State of Rhineland Palatinate as compensation for fishing-related measures, such as replenishing fish stocks. The other half is allocated to measures and projects to protect the eels, of which around 2/3 has been used for bringing eels into the Rhine and around 1/3 for scientific investigations and studies. Working on the advice of expert institutes, both partners of the Eel Protection Initiative decide jointly on the appropriate use of the funds.

   As an immediate measure, migrating eels have been caught in a targeted manner by professional fishing operators assigned by the Eel Protection Initiative since 1997 and then carefully transported to Linz on the river Rhine. From there, the eels can continue their migration into the delta area of the Rhine without having to pass hydroelectric power stations. Thanks to this method, around 10,000-15,000 eels reach the river Rhine every year without suffering any damage.

   The development of knowledge about eel biology and the geographic and temporal migratory behaviour of eels is the focus of the research work conducted by the Eel Protection Initiative.

   Through a combination of fish-friendly turbine management and transporting adult eels to the Rhine, the Eel Protection Initiative hopes to create sufficient eel protection in the area surrounding the hydroelectric power stations. However, this can only represent a small contribution towards the comprehensive protection of eels in Germany and Europe.

   The Eel Protection Initiative on the river Saar in Germany is financially supported by innogy SE and operates closely with the Eel Protection Initiative on the Moselle outlined above.

[14] The Eel Protection Initiative, February 2013, brochure

The fishing federation Saar operates a trap and transport system of glass eels. Sexually mature eels are released to the Rhine river. Consequently, they can continue their spawning migration without being hindered by obstacles such as dams or weirs.

In addition, eels are stocked year on year to support the population.

2. Innovative turbine management by Statkraft and Uniper, Germany protects endangered eels on the Weser, Werra, Fulda and Main

   As an environmental modernisation of the renewable energy plants, Statkraft has developed a special turbine management system to protect eels. Statkraft‘s hydropower plants on the rivers Weser, Werra and Fulda in the north of Germany fulfil the technical requirements (turbine design, rounds per minute and height of fall) to carry out an eel-friendly turbine and weir management.

   The early warning system Migromat® is situated at the hydropower plants Wahnhausen, Werrawerk, Petershagen and Langwedel. The Migromat® activates the turbine management that enables a high survival rate for silver eel when they pass through the turbines on the Weser. The eight run-of-river plants Wahnhausen, Werrawerk, Petershagen, Schlüsselburg, Landesbergen, Drakenburg, Dörverden and Langwedel are all integrated in the turbine management scheme.

   The waterflow through the plant’s landside turbine is reduced and diverted to the other turbines where the blades are opened as widely as possible, so the creatures can pass through the power plant and continue their journey. If necessary, one gate can be lowered as well. Plant productivity does decrease during the process, but this is Statkraft’s contribution to safeguard the eel population.

   Statkraft has developed and implemented a concept facilitating eels’ return migration to their spawning grounds in the Sargasso Sea, voluntarily cutting back power generation during migration times. The legal foundations for these targeted fish protection efforts are formed by the European Water Framework Directive, the EU Eel Regulation and the German Water Resources Act. Statkraft’s innovative system is the first technical solution of its kind in Germany, earning the company the Second Prize in the 2012 German-Norwegian Business Awards.

   Similarly, Uniper is using the Migromat® system at its hydropower installations along the river Main in central Germany.

3. KRAFTTAG ÅL - measures and knowledge to protect the European Eel, Sweden

   The Krafttag ål programme was carried out through the cooperation of several hydropower companies and the Swedish Agency for Marine and Water. In 2010 six hydropower companies and the Swedish Board of Fisheries agreed on the memorandum of understanding. The programme Krafttag ål commenced in 2011 with the objective of transforming the memorandum of understanding into actions to positively affect eel stocks. The stakeholders in the programme were Fortum Sverige AB, Holmen Energi AB, Karlstads Energi AB, Skellefteå Kraft AB, Sollefteåforsens AB, Statkraft Sverige AB, Sydkraft Hydropower AB, Tekniska Verken i Linköping AB, Umeå Energi AB, Vattenfall AB, Vattenfall Indalsäven AB and the Swedish Agency for Marine and Water.

   The Krafttag ål programme concentrated on two parts: on measures and on research. Two types of measures were conducted. The first was the trap and transport of silver eel.

The second was the stocking of imported glass eel on the Swedish west coast. Between 2015 and 2017 about 47 000 downstream migrating eels were transported past hydro power plants in four rivers. The eels were caught in lakes, transported and released downstream from the hydropower plants close to the sea. This trap and transport was carried out in the Göta, Motala, Ätran and Lagan rivers. 1.2 million imported quarantined glass eels were released on the Swedish west coast. The programme's goal on hydropower related measures was achieved in 2015 and 2016. The goal included an estimate of the silver eel population as a result of glass eel stocking, and was reached by 2016 and 2017.

Concerning the research part, seven R&D projects resulted in new knowledge on eel migration, adaptive hydropower management and the use of low sloping intake racks. The full-text reports from the research projects can be downloaded from Energiforsk's website[15].

4. Evaluation of design criteria for fish passage solutions by Vattenfall –, Sweden

   At Vattenfall's R&D laboratory in Älvkarleby, a flume for a full-scale testing of fish migration solutions has been built. The flume has two parallel sections (length 25 m, width 4 m, and depth 2 m) with a flow capacity up to 16 m^3/s and velocity up to 2 m/s. At this site, Vattenfall investigates the efficiency of existing and new downstream passage solutions for fish, e.g. different trash rack bar spacing, rack angels, rack orientation, nets, or bubble curtains. Tests for downstream migration of eel are carried out. The aim of these tests is to get an overview of the effectiveness of various solutions under different circumstances.

5. Contribution to the French Eel Joint Research and development program (EDF, France)

   Within a period of three years, the French "Eels and Installations" research and development programme led to eighteen research actions to optimise the design and management of hydroelectric installations with a view to protecting the eel.
   EDF's financial, scientific and technical involvement contributed significantly to the success of this program, which also involved the well-known French institutes AFB (ex ONEMA), ADEME, the ministry in charge of environment and other French hydropower producers.
   In November 2011, a seminar brought together nearly 160 scientists, water managers, associations, and hydroelectricity producers. This event helped to share the flagship actions in favour of eel migration, a wide range of tools, paving the way to a concerted and ambitious response to the challenges of the restoration of the species. A detailed report on the outcomes of the event is available online[16].

6. EU Horizon 2020 Project FIThydro[17]

   FIThydro addresses the decision support in commissioning and operating hydropower plants (HPP) by use of existing and innovative technologies. It concentrates on mitigation measures and strategies to develop cost-efficient environmental solutions and on strategies to avoid individual fish damage and enhancing population developments. Therefore HPPS all over Europe are involved as test sites. The facilities for upstream and

[15] https://www.energiforsk.se/program/krafttag-al/
[16] http://oatao.univ-toulouse.fr/11426/1/baran_11426.pdf
[17] https://www.fithydro.eu/

downstream migration are evaluated, different bypass systems including their use as habitats and the influence of sediment on habitat.
In addition existing tools and devices will be enhanced during the project and will be used in the experimental set-ups in the laboratories and at the test sites for e.g. detection of fish or prediction of behaviour. This includes sensor fish, different solutions for migration as e.g. trash rack variations, different fish tracking systems, but also numerical models as habitat and population model or virtual fish swimming path model.

The insights of EU-Horizon 2020 FIThydro can be used for new assessment as well as management approaches aiming at low generation losses together with an effective eel migration.

Our continuous commitment

For years, Eurelectric members have shown their continuous commitment to research and development (R&D) in order to improve the scientific basis for the definition of measures to achieve the objectives of the Eel Regulation.

So far, considerable progress has been made regarding the increase of scientific knowledge. This is also due to quantitatively and qualitatively valuable input from hydropower companies. Moreover, R&D has been playing a central role in the optimisation of cost-efficient measures. Undoubtedly, there is still a need for additional research, e.g. on eel migration, the effectiveness of measures or on the suitability of chosen indicators. Further scientific work is therefore needed to determine the efficiency of those measures but also to develop innovative solutions.
In some cases, the intended aim of measures has not been achieved due to poorly engineered solutions or the lack of technically and scientifically proven methods. Nevertheless, Eurelectric members remain committed to further R&D, which will require significant resources, as well as considerable financial contributions from hydropower companies.

Based on this research and long-term experience, Eurelectric and its members are looking forward to engaging in the discussions on future EU water and fisheries policies. Comprehensive policy coordination is needed to achieve environmental, energy and climate targets efficiently. Given the Eel Regulation and the complex interlinked relationship with the WFD, we call on the Commission to involve Eurelectric together with its members in the development of future EU water and fishery policies as experienced stakeholders, fully committed to sustainable resource management.

Eurelectric pursues in all its activities the application of the following sustainable development values:

Economic Development

- Growth, added-value, efficiency

Environmental Leadership

- Commitment, innovation, pro-activeness

Social Responsibility

- Transparency, ethics, accountability

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