



HYDROPOWER FIT FOR 55

How the European powerhouse can help deliver EU climate targets

THE 55% GHG REDUCTION TARGET RELIES ON DECARBONISED ELECTRICITY WITH MORE RENEWABLES: HYDRO, WIND & SOLAR

- By 2030, renewable sources of energy will have to cover **63–67% of power generation** to reach the 55% emission reduction target (European Commission, 2020).
- Wind deployment needs to grow by a factor of 2 and solar by a factor of 3 (Eurelectric Power Barometer, 2020).
- Moreover, additional hydropower generation (plus 10%) and 40% more hydro pumped storage capacity are needed (European Commission impact assessment on the 2030 target, 2020).



HYDRO FACILITIES FOR DIFFERENT NEEDS

Run of river

- Very high level of guaranteed capacity
- Limited, hourly/daily storage capacity
- subject to seasonal river flows

105 GW
344 TWh*

Reservoir storage

- Store water in a reservoir until periods of demand/load.
- Weekly, monthly, seasonal storage

46 GW
26 TWh*

Pumped storage

- The water passes between two reservoir at different heights, pumped up by turbines
- From daily/ intraday system services to seasonal load shifting



WHAT MAKES HYDROPOWER SO UNIQUE

It's not only about quantity



Hydro accounts for 40% of European renewables*

97%

of storage in the EU is provided by hydro

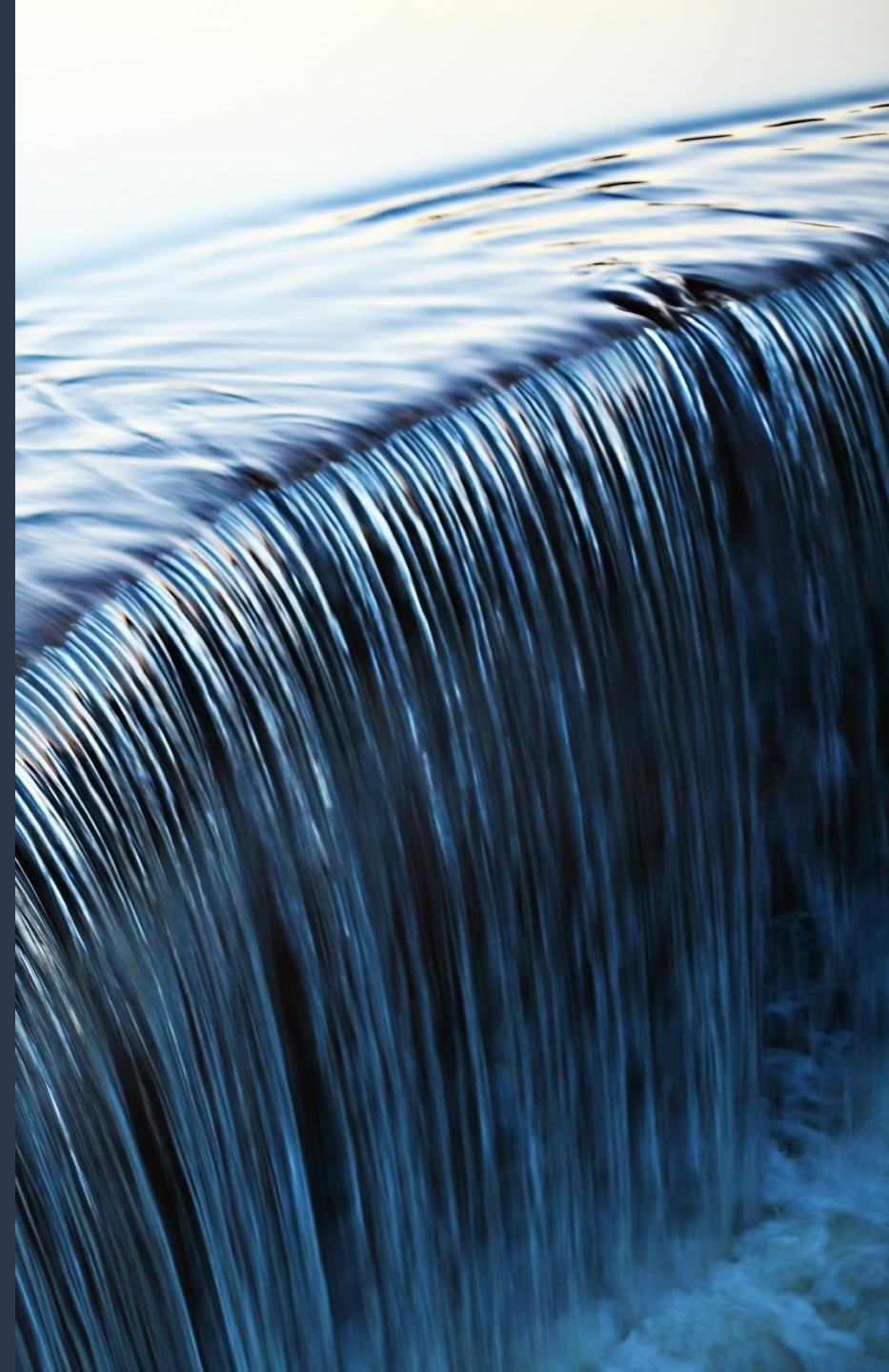
But also about quality



Hydro complements variable RES by offering flexibility and storage at any moment



It is crucial for a resilient energy system. The more RES, the higher the system value of hydro**



THE HYDROPOWER INVESTMENT GAP UNTIL 2030

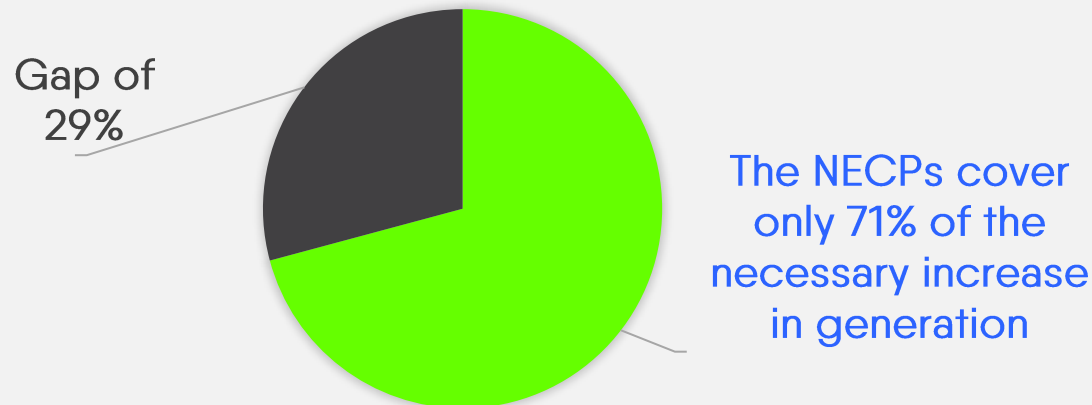
European Commission:

- + 33 TWh of additional hydropower generation and
- + 18–20 GW of additional hydro pumped storage and mixed hydro capacity are needed to reach 2030 targets

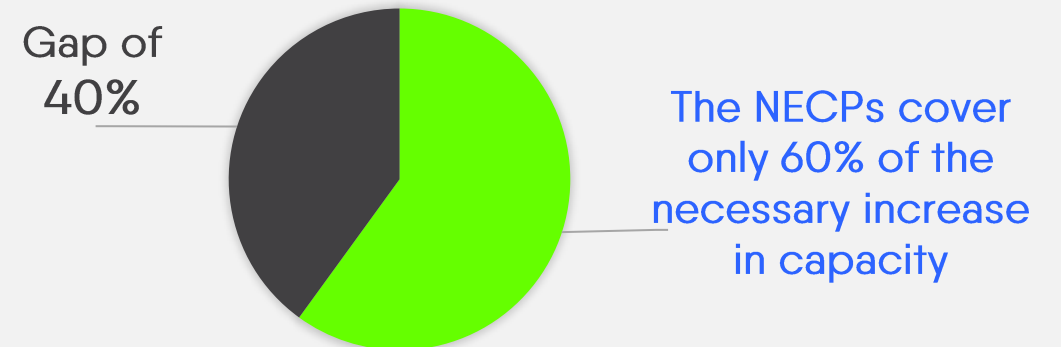
Compared with National Energy and Climate plans:

- Gap of 29% for generation
- Gap of 40% in installed capacity

HYDROPOWER GENERATION* GAP



CAPACITY** GAP OF HYDRO PUMPED STORAGE



EU POLICIES THAT CAN ENABLE HYDROPOWER TO DELIVER ON 2030 CLIMATE TARGET

Water Framework Directive

Striking the right balance between the protection of local ecosystems and the need for flexible hydropower generation is fundamental for decarbonisation.



Biodiversity Strategy

Hydropower can mitigate possible adverse effects on ecosystems and win-win solutions do occur where rich ecosystems and habitats for endangered species exist because of hydropower.



The Taxonomy Regulation

Recognizing the role of hydro in the delegated acts of the Taxonomy Regulation is essential for climate adaptation and mitigation, in order to close the investment gap.



Clean Energy Package

A swift implementation of the CEP, in particular its flexibility and permitting provisions, is paramount for a power system fit for 55.



55%

A SMART AND SITE-SPECIFIC IMPLEMENTATION OF THE WFD FIT FOR 55

Water Framework Directive (WFD)

Aims to protect the aquatic systems; all water bodies shall reach good ecological status or potential by 2027. It was declared fit for purpose (2019) and Member States can use guidelines to implement it.

Room for manoeuvre

Member States can choose how to apply the WFD, taking into account that the characteristics of the water bodies vary a lot country by country and within their territory.

For the WFD to be fit for 55

When applying the WFD it is important to keep in mind the value that hydro power plays in system stability, flexibility and storage, all key element for a decarbonised power system.

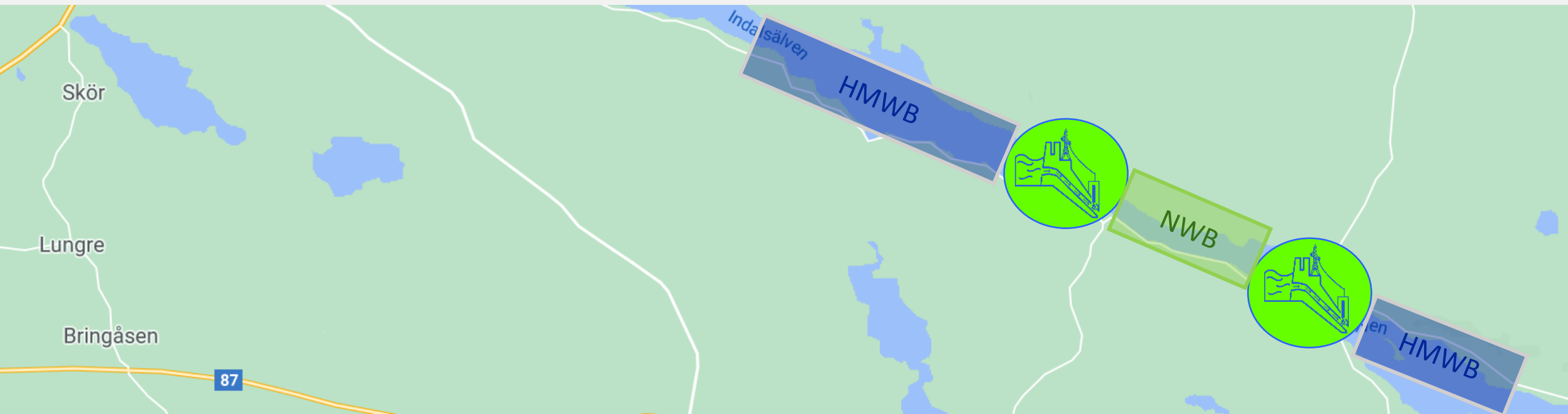
A smart implementation of WFD

contains site specific, informed cost-benefit analysis, based on reliable scientific data that takes into account the specificities of each case, balancing the pros and cons for local ecosystems and the generation, flexibility and storage needs.

55%

A SMART IMPLEMENTATION IS NEEDED: INDAL RIVER IN SWEDEN

- The Water Framework Directive (WFD) distinguishes between **Natural Water Bodies** (NWB) and **Heavily Modified Water Bodies** (HMWB). The Indal river contains both types, see picture
- If the Natural Water Body part of the river had to reach good ecological status according to the WFD, this would seriously affect the Heavily Modified Water Body parts as well, hampering the ability of the entire river to be a source of flexibility for the power system
- The full storage capacity without constraints today is 4,9 TWh and the installed production capacity is 2 GW. The real impact of this conflict of interest is yet to be assessed.



A BIODIVERSITY STRATEGY THAT CONSIDERS THE NEED FOR HIGHER EMISSIONS REDUCTION

A new EU biodiversity strategy

Aims at putting EU biodiversity on a recovery path towards 2030. It establishes a larger EU-wide network of protected areas on land and at sea. It restores 25k km free-flowing rivers and provides new guidance to restore ecological flows and review permits for water.

Hydro power and biodiversity can co-exist

Hydropower can have adverse effects on ecosystems but it can also create N2000 and other habitats for endangered species. The sector is investing large sums in mitigation measures – where economically & geographically feasible. New/modern plants are fish-friendly.

Climate change is a major threat to biodiversity

Climate change is one of the 5 major factor contributing to biodiversity loss*. Hydropower is enabling the energy transition, contributing to the fight against climate change.

Obsolete dams should be removed

Hydro dams form a very small proportion of river barriers in Europe and are not obsolete as they generate renewable energy and provide the flexibility needed to reach the climate targets.

55%

LAKE KIANTAJARVI IN FINLAND BECAME HOME TO 105 BIRD SPECIES

- Together with 5 other regulated lakes, Kiantajarvi gives annual storage and enables flexibility for 17 hydro power plants (total capacity 2500 GWh).
- The changing amplitude - linked to water regulation for hydro production - has created flood plain areas along the shoreline of the lake, giving home to 105 bird species.
- On the north shores of the lake, Kokkosuo area was included in the Natura 2000 network. Without the regulation for hydropower generation, the Natura 2000 site would not exist.



HYDROPOWER IS A KEY ALLY TO DELIVER ON THE OBJECTIVES OF EU TAXONOMY

EU taxonomy and its first delegated act

define the technical screening criteria to determine if an economic activity can contribute substantially to climate objectives, while not causing any significant harm to a set of environmental objectives.

The delegated acts should consider

that hydro plants have one of the lowest carbon footprints and the best energy efficiency of all generation technologies; They play a crucial role in integrated water management, key to adapting to climate change (drought mitigation, drinking water, irrigation, etc.)

The wrong investment signals

can substantially impact the ability of the hydro sector to provide the necessary level of carbon free electricity needed to meet the 55% target, as well as on its role for storage, flexibility and mitigation of climate change.

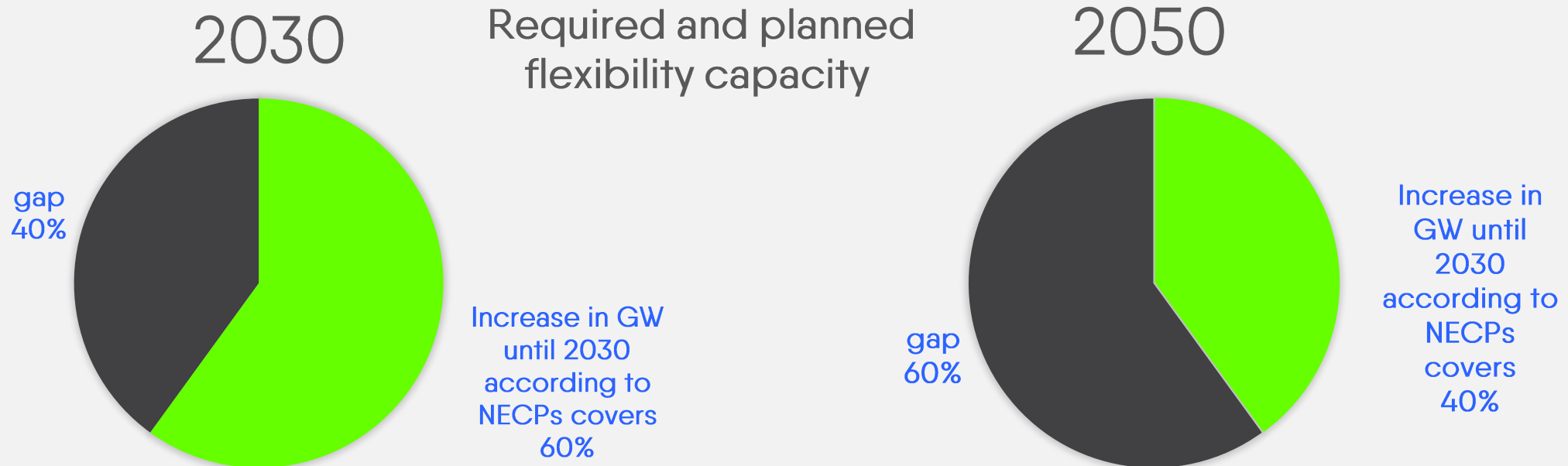
Hydropower does not cause significant harm

Hydropower already conducts actions to avoid, reduce and mitigate impacts on biodiversity. By satisfying WFD requirements, hydropower does not cause significant harm to taxonomy objectives.

55%

THE HYDRO INVESTMENT GAP CAN GET WORSE BETWEEN 2030 AND 2050

- The aim of the EU Taxonomy is to steer private investments to those activities that will help reaching the climate targets
- A well calibrated taxonomy can be a powerful tool to attract those investments towards hydropower generation which is necessary for a decarbonizing power system
- Those investments are crucial from now on until 2030 to fill in the investment gap in hydro capacity that is already there. If not addressed, this gap will become bigger by 2050 as the need for flexibility will continue to grow.



IMPLEMENTING THE FLEXIBILITY & PERMITTING RULES OF THE CEP IS KEY

A follow-up of the Clean Energy Package

The CEP provides clear rules for enabling flexibility and storage in the power market. The Renewable directive proposed simpler permitting rules as well as a fast-track process for refurbishment of existing RES sites.

A swift implementation is needed

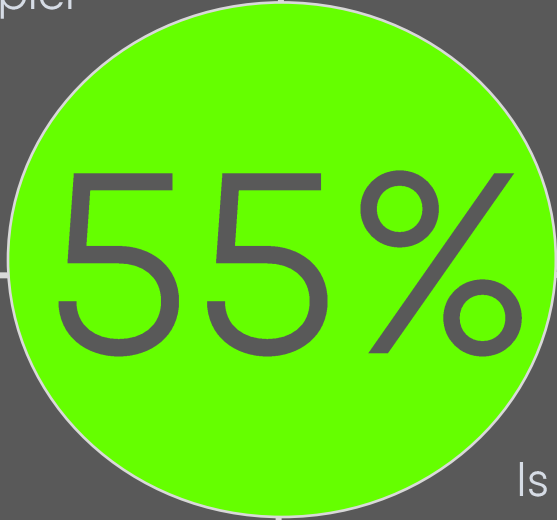
The delay in implementing the market rules necessary for enabling flexibility and storage and the difficulties that generators encounter with the national permitting rules are making hydro power projects very difficult to even start.

Hydropower is paramount for a resilient EU energy system

as was demonstrated on 8th of January 2021 when hydropower assets helped prevent a black-out all over Europe.

The revised Renewables Directive

Is a great occasion for creating a category for storage projects to have their own permitting path or for ensuring a coordinated spatial planning and permitting process for generation sites, grids and the related project infrastructure.



55%

PERMITTING FOR HYDRO POWER PLANTS IN THE SAVA RIVER, SLOVENIA

Example of long permitting procedures:

- HPP Brežice (lower Sava river): in 2006 the initiative to start the procedure for the preparation of the National Spatial Plan for HPP Brežice is launched, the necessary building permit was obtained in 2014, the construction was finalised within 3 years, the operating licence was obtained in 2017.
- HPP Mokrice (lower Sava river): in 2006 the initiative to start the procedure for the preparation of the National Detailed Site Plan for HPP Mokrice is launched, a respective building permit has not yet been obtained.

A new revised legislation in the field of spatial planning, construction and renewables is under preparation, which will bring more certainty to investors by shortening and easing necessary permitting and spatial planning procedures, as well as redefining responsibilities and representation of all parties involved in these procedures.

This is important, since a concession agreement for 10–12 new large run-off river HPPs on the middle Sava river was signed in October 2020. This will represent 1TWh of additional electricity from renewable sources in Slovenia.



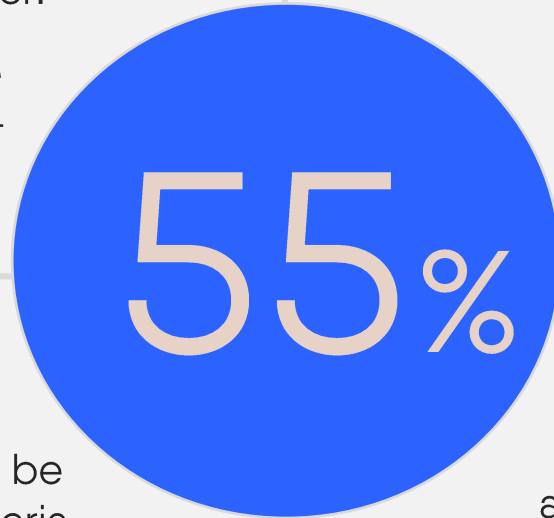
KEY POLICY RECOMMENDATIONS

Water Framework directive

- 1 The EC to encourage a smart and adaptive implementation of the WFD, recognizing the role of power generation and the flexibility and storage value of hydropower.
- 2 The EC SCG and CIS groups should provide guidance on implementation based on cost-benefit analysis, taking into account hydropower.

The Taxonomy regulation

- 7 The principle of technology neutrality should be upheld, i.e. the same technical screening criteria should be applied to all RES.
- 8 References should be made to existing EU law as in the case of wind power.



Biodiversity Strategy

- 3 The EC to encourage a targeted and site specific implementation of the strategy, weighing in the added value that hydro generation, flexibility, storage provides and to ensure alignment with WFD.
- 4 Take into account that hydropower dams are not obsolete. Applying the same rules is disproportionately detrimental for hydropower.

Clean Energy Package

- 5 Streamline the permitting process for storage assets: a clear and specific permitting process is necessary.
- 6 Implement rules necessary for enabling a well developed flexibility market.