



## **Call for experts for a rapid analysis of hydropower potential compared to wind and solar - Terms of reference**

WWF, in cooperation with RiverWatch, Euronatur, and Geota, recently published [the first ever inventory of hydropower plants](#) in Europe. The study shows rivers to be saturated with hydropower dams and thousands more planned, greatly harming freshwater ecosystems, leaving riverbeds, deltas and river banks dry, and depriving entire communities with sources of revenues, recreation and well-being. This is despite EU rules which should restrict the number of new hydropower plants.

As a result, WWF is looking to assess how alternative renewable energy sources could be used to support Europe moving towards net-zero emissions, in accordance with the ambitions of the European Green Deal, without sacrificing Europe's freshwater biodiversity.

### **Objectives and methodology**

The analysis aims at evaluating the potential for solar and wind energy production in Europe, and comparing that with both the potential from planned or possible future hydropower and with future electricity demand under a scenario reaching climate neutrality. The analysis should be based on existing data, including the [recent inventory published in November 2019](#) and should be broken down by size of hydropower plant (i.e. small, medium and large plant) and type (pumped storage vs. run-of-river or traditional plant). It should assess the (possibly negative) difference between the current share of hydropower in the electricity mix, and the minimum share of hydropower that is needed to reach 100% RE in Europe and zero net emissions by 2040.

The analysis should present both aggregated data at European level (distinguishing between EU and Europe including the Balkans, Ukraine, EEA countries, Switzerland, Turkey), and data by country.

Delivery on the above described work will largely require desktop research work, synthesizing information available from institutions, think-tank and research institutes' websites, online

publications, and as needed interviews with key experts (eg IEA) and other materials. All data needs to be clearly sourced.

### Additional elements to address:

- Relative scale and value of planned and potential future hydropower in balancing the grid, compared to the scale and value of the potential from alternative approaches, such as demand side response, inter-connection and storage (including in battery electric vehicles, district heating etc.) combined with variable wind and solar. The study should provide answers to the question “how significant is hydropower to balancing the grid in a climate neutral scenario where solar and wind provide the majority of energy supply?”
- Trends in technological changes e.g. demand-response, batteries or hydrogen for storage, or possibly more grid connections with north Africa. If those alternatives were chosen, by how much would that decrease the minimum share of hydropower needed to reach 100% renewables of zero net emissions, and how much would it cost (taking into account decreasing costs of these technologies)?
- Consideration of the balance between hydropower needs across the EU/ Europe, and availability of hydropower.
- Consideration of other alternative energy sources: is a decrease in the role for hydropower compatible with a decrease in biomass as well?
- Trends in future costs of renewable energy alternatives (wind, solar) as compared with hydropower
- Near-term (e.g. 10-year) emissions impacts of hydropower construction as a result of concrete and steel production, road construction, deforestation, methane emissions from reservoirs, etc
- Future trends in energy demand, electricity grid development, sector integration/coupling and energy markets
- Trends in weather conditions in coming decades that could affect hydropower plants, solar and wind production, such as drought and water scarcity (including as a result of abstraction) impacts on hydropower production.
- Decarbonisation scenarios: for instance, power generation in the EU needs to at least double to decarbonise the heating and transport sectors, or according to some studies<sup>1</sup> more than triple: what would be the relative contribution of hydropower/new hydropower to power generation in such scenarios as compared with wind and solar?
- Consideration of low impact solar and wind potential<sup>2</sup> (e.g. using degraded lands rather than virgin lands).

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<sup>1</sup> [https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2019-11-26\\_cc\\_40-2019\\_ghg\\_neutral\\_eu2050\\_0.pdf](https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2019-11-26_cc_40-2019_ghg_neutral_eu2050_0.pdf)

<sup>2</sup> Low impact solar and wind are defined in the WWF and TNC report “[Connected and Flowing](#)”

## Deliverables & proposed timeline

- By end January 2020 – Appointment of consultant/signature of contract
- By February 2020 – Preliminary draft outline and data gathering
- By March 2020 - Delivery of preliminary analysis and discussion, allowing for at least one round of comments and feedback from WWF.
- By April 2020 – Delivery of final analysis.

Budget: 20,000 €, VAT inclusive to be paid in two instalments, 50% each.

### To apply

Interested applicants may submit their proposal stating their fit and availability for this position, together with all-inclusive-fee and CV to [recruitments@wwf.eu](mailto:recruitments@wwf.eu), no later than **23 January 2020**.

**Closing date: 23 January 2020 Midnight CET**