

XFLEX HYDRO

PRESS RELEASE

Building a resilient, renewable power system with innovative hydropower technology

10 December 2019 - A major new energy innovation project to demonstrate how smart hydropower technologies can deliver a low-carbon, reliable and resilient power system was launched today.

The €18 million initiative was announced by the European Commission and a consortium of 19 partners at the United Nations climate change conference (COP25) in Madrid, Spain. It will show how innovative and flexible hydropower systems can help countries across the world meet their renewable energy targets.

The XFLEX HYDRO (Hydropower Extending Power System Flexibility) project is a four-year initiative by leading utilities, equipment manufacturers, universities, research centres and consultancies. It will demonstrate how modern hydropower plants can provide the vital power grid services required by variable renewables such as wind and solar power.

The launch comes after a major UN Emissions Gap Report looking at ways to reduce global carbon emissions said that greater power system flexibility was "key" to integrating larger shares of variable renewable energy into the power supply.

The XFLEX HYDRO technologies to be tested are enhanced variable- and fixed-speed turbine systems, smart controls and a battery-turbine hybrid, each of which will be demonstrated at hydropower plant sites across Europe.

The project will conclude in 2023 by delivering a roadmap to increase adoption of the technologies across the hydropower fleet, with policy and market recommendations for governments, regulators and industry.

The initiative has received funding from the European Union's Horizon 2020 research and innovation programme. It aims to help the EU achieve a target of achieving 32% of energy from renewable sources by 2030.

Project partners:



The Hydropower Extending Power System Flexibility (XFLEX HYDRO) project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 857832.

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European Commission:

Mr Patrick Child, Deputy Director-General for the European Commission's Directorate-General Research and Innovation, commented: "Combining the excellence and expertise of 19 partners from across Europe, the XFLEX HYDRO project will test innovative solutions based on renewable energy sources that will provide greater flexibility and sustainability to the energy system. The project aims to increase hydropower's potential in terms of plant efficiency, thereby boosting electrical power systems and enabling plant and system operators to operate more successfully in electricity markets. This can make an impactful contribution to European renewable energy objectives and policies."

EPFL:

Professor François Avellan of EPFL, the research institute and university leading the project, stated: "Across Europe countries are embracing large-scale electricity generation from renewables such as solar and wind power and shifting away from conventional fossil fuels for electricity generation. The growth in variable renewables is changing how power grids operate, with potential impacts on the stability and security on the whole power grid. This places unprecedented challenges on the hydropower sector to provide flexible and reliable services to the grid.

"The technologies demonstrated by the XFLEX HYDRO project will help hydropower to consolidate its critical role to support the integration of variable renewables into the power grid. This will ensure hydropower operators can maximise their performance and access future energy markets," he added.

International Hydropower Association:

Eddie Rich, Chief Executive of the International Hydropower Association (IHA), which is responsible for XFLEX HYDRO project communications, said: "We need to decarbonise the power sector, and fast, if we are to limit the devastating impacts of climate change. Last month's UN Emissions Gap Report is a stark reminder that we need hydropower to boost the contribution of variable renewables like wind and solar. The XFLEX HYDRO initiative represents a clear commitment by the European Commission, leading organisations from the hydropower sector and academia to invest in new and innovative hydropower technologies."

Notes to Editors:

The XFLEX HYDRO (Hydropower Extending Power System Flexibility) project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 857832.

The project will be launched at the 25th UN Climate Change Conference in Madrid, Spain, on 10 December 2019. The climate conference brings together governments and representatives from business, academia and civil society. To request an invitation to the launch please contact will.henley@hydropower.org.

Over the next four years, XFLEX HYDRO innovations and technologies will be demonstrated at the following European hydropower plant sites: Z'Mutt in Switzerland, Grand Maison and Vogelgrün in France, and Frades 2, Alqueva, Alto Lindoso and Caniçada in Portugal.

The UN Emissions Gap Report, stating that power system flexibility is key to integrating larger shares of variable renewable energy into the power supply, was published by the United Nations Environment Programme on 26 November 2019.

Find out more at www.xflexhydro.net



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EPFL - Ecole polytechnique fédérale de Lausanne (EPFL), based in Lausanne, Switzerland, is one of Europe's most vibrant and cosmopolitan science and technology institutions. EPFL is the project leader responsible for scientific supervision and developing a new smart power plant supervisor system technology through the XFLEX HYDRO project.

Alpiq - Alpiq is a leading Swiss energy services provider and electricity producer in Europe. It produces each year in Switzerland 4,200 GWh of electricity from hydropower. In the project, Alpiq leads the demonstrator at Z'Mutt, in Switzerland, which involves the renewal of Unit 5 of the pump station of Z'Mutt to test new operation modes in variable speed using a full-size frequency converter.

Andritz AT - ANDRITZ HYDRO GmbH is a global supplier of electromechanical systems and services for hydropower plants. The company is a leader in the world market for hydraulic power generation. The HYDRO division is the largest business area of ANDRITZ AG headquartered in Graz, Austria. ANDRITZ AT contributes to the demonstration in the Vogelgrün power plant focusing on optimised control of the hydraulic system in combination with a battery.

Andritz CH – ANDRITZ HYDRO AG is the Swiss subsidiary of ANDRITZ HYDRO GmbH in Switzerland. It contributes to the demonstration at the Vogelgrün power plant, focusing on generating a digital twin of the plant, developing a generic method for data based, real-time assessment of wear and tear and to optimise a specific predictive maintenance module for hydraulic system equipment manufacturers in combination with a battery.

ARMINES – ARMINES is a private non-profit research and technological organisation performing research contractual activities and academic research training. The project activities of ARMINES are primarily focused on implementing advanced control strategies and forecasting tools, and in the coordinated control of battery energy storage systems and hydropower plants.

CEA - CEA (Commissariat à l'énergie atomique et aux énergies alternatives) is a French public body and the country's largest technology research and development provider, whose role is to transfer this know-how to the industry. CEA is responsible for the battery storage system that is hybridised with the hydropower turbine in the Vogelgrün power plant.

EDF - EDF Group is the world's leading electricity company, particularly well established in Europe. The EDF Hydro Division largely contributes to the 98% CO₂ free electricity in France, with a yearly average generation of 43.5TWh with its 600+ dams and 400 power plants. EDF is responsible for two demonstrations in the project: at Grand Maison and Vogelgrün power plants.

EDP CNET - EDP Centre for New Energy Technologies (EDP CNET) is a subsidiary of the EDP Group with the mission to create value through collaborative R&D in the energy sector. EDP CNET is responsible for two demonstrations within XFLEX (Alqueva and Alto Lindoso power plant in Portugal), and leads the definition of business use cases for the provision of flexibility services in the power system.

EDP P - EDP Gestão da Produção da Energia, S.A has some 1,000 workers, with an installed capacity of 10 GW, 6.7 GW of which is hydropower (approximately 2.5 GW of which with pumping capacity). As a key utility partner and major hydro operator, EDP P provides the perspective of a large-scale storage investor/owner and is responsible for the Frades 2 demonstrator in Portugal.

GE HYDRO - GE Renewable Energy is a €9 billion business with an innovative spirit and entrepreneurial mindset, bringing together one of the broadest energy products and digital services portfolios in the



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renewable energy industry. GE Hydro leads the development of solutions to extend flexibility services on three demonstrators: Grand Maison, Alqueva and Alto Lindoso power plants.

HES SO - HES SO is the largest university of applied sciences in Switzerland and the second largest higher education institution of the country, with more than 21,000 students and 25 schools located in 7 cantons. The hydroelectric research group of HES SO is in charge of the modelling, numerical analysis and prototype measurements in several demonstrators.

IHA - The International Hydropower Association (IHA) is a non-profit membership organisation committed to advancing sustainable hydropower by building and sharing knowledge on its role in renewable energy systems, responsible freshwater management and climate change solutions. IHA is responsible for XFLEX HYDRO project communications.

INESC TEC - INESC TEC is a private non-profit institution having as associates the University of Porto, INESC and the Polytechnic Institute of Porto. INESC TEC leads the development and population of the hydro flexibility matrix, as well as the development of system integration studies and models for the technologies and solutions to attain the enhanced flexibility range.

PVE - Power Vision Engineering is a spin-off company of the Ecole polytechnique fédérale de Lausanne, EPFL, founded in 2007, providing software solutions and expertise in the field of hydropower plant transient and dynamic behaviour. PVE contributes to the modelling and simulation of hydraulic and hydroelectric systems and is a supplier of the HydroClone innovative Real-Time Simulation Monitoring (RTSM) system.

SuperGrid Institute - SuperGrid Institute is an independent research and innovation centre that works to facilitate the wide-scale integration of renewable resources into the electrical grid. The Institute is responsible for illustrating the impact of the flexible technologies and is developing a tool (Flexbot) to demonstrate their economic benefits. Its real-time hydraulic test platform will also be used to demonstrate the effectiveness of new flexible solutions.

UPC - Universitat Politècnica de Catalunya is a public institution dedicated to higher education and research, specialised in the fields of architecture, engineering and technology. UPC is responsible for the field tests and the installation of the monitoring system in the demonstrators.

USTUTT – The University of Stuttgart is composed of 10 faculties covering technical fields, natural sciences as well as social sciences with a total of 22,600 students and 3,150 researchers. USTUTT is responsible for the unsteady numerical flow field simulations to determine unsteady dynamic loads on pump-turbine components.

Voith Hydro - The Voith Group is a global technology company. With its broad portfolio of systems, products, services and digital applications, the Voith Group sets standards in the markets of energy, oil and gas, paper, raw materials and transport and automotive. The Group Division Hydro experts focus on the development and implementation of additional solutions to make the Frades 2 demonstrator even more efficient and to increase its performance range as well as to optimise its maintenance in order to strengthen its supportive role for the flexibility of the power system.

ZABALA - ZABALA is a Spanish SME with wide experience in supporting organisations in the management of their research, technology development and innovation activities. ZABALA participates in the definition of the business development plan for all knowledge created in the project and establishing an IPR strategy for the protection of intellectual property.



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