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PRESS RELEASE: FLEXnCONFU Horizon 2020 project launch

FLEXnCONFU - *FLEX*ibilize combined cycle power plant through *Power-to-X* solutions using non-*CON*ventional *FU*els is a research project funded by Horizon2020 EU's research and innovation programme (GA 884157), with the goal to develop and demonstrate innovative, economically viable and replicable Power-to-X-to-Power (P2X2P) solutions that combines all available options for the effective and flexible use of surplus power from renewable energies to levelling the power plant load by converting electricity into hydrogen or ammonia prior to converting it back to power. This will enable the design and operation of an integrated power plant layout that can un-tap additional Combined Cycle (CC) flexibility.

The project, with a total budget of 12.6 million euros and duration of 48 months (1 April 2020 – 31 March 2024), brings together the entire supply chain of the centralised power generation.

In order to achieve the EU 2030 and 2050 Climate and Energy goals, a high penetration of renewable energy sources (RES) into the grid is required, as well as the use of alternative carbon-free fuels in already existing dispatchable centralised power plants. Combined Cycle Gas Turbine (CCGT) plants will be a crucial technology with the required flexibility to compensate the intermittency of the RES. The injection of alternative fuels (i.e. hydrogen (H₂) and ammonia (NH₃)) will help the required “fuel switch” the EU is facing, drastically reducing CO/CO₂/HC emissions, which are more difficult to manage in comparison to NO_x. The P2X solutions, which are currently widely studied coupled with RES, could help the CC to levelling their load and reducing its environmental impact. Hence, developing proper technologies and solutions to couple P2X2P systems with gas turbines (GTs) is mandatory.

FLEXnCONFU, covering the whole value chain, is a pioneer “demonstration to market” project which will contribute to the valorisation of European GT and Power-to-Gas scientific and technological competencies, and to the creation of a clean hydrogen/ammonia society. Within FLEXnCONFU project, to level the CC load, the electricity production could be converted in H₂ or NH₃ as carbon free fuels via P2X2P application, in turn to be locally re-used in the same power plant to respond to varying demand. This solution will be demonstrated up to the Technology Readiness Level (TRL) 6 deploying a Power-to-Ammonia system in a relevant environment (a micro gas turbine operating in a smart grid context, Savona lab) and up to TRL 7 installing a power-to-hydrogen system in a real operational environment (EDP's Ribatejo power plant). To exploit the potential of NH₃ combustion in reducing CO₂ emission, combustion tests up to 100% NH₃ will be performed in a heavy duty representative GT combustion system (Cardiff University combustion lab). The new FLEXnCONFU layout will unlock the current situation of low operating-hours CCGT power plants by providing secure back-up and improving CCs flexibility as well as overall efficiency, allowing a smoother operation and reducing air pollutant emissions. The FLEXnCONFU system can be coupled to both combined heat and power CC and natural gas CC as well as to an integrated coal gasification combined cycle, guaranteeing a wide replicability potential and a cleaner EU fossil based power plant fleet.

The consortium with 21 partner organisations from 10 countries (Italy, Portugal, UK, Spain, France, Greece, Germany, Belgium, Sweden and the Netherlands), is led by RINA Consulting. The consortium is well-balanced in terms of involvement of industrial and SME partners: RINA Consulting (Italy), EDP Gestão da Produção de Energia (Portugal), Centre for New Energy Technologies (NEW R&D) (Portugal), Baker Hughes (Italy), MAS Advanced Technologies for Power And Energy (Greece), Hydrogenics (part of the Cummins family) (Belgium), Proton Ventures (the Netherlands), Tirreno Power (Italy), ENGIE Laborelec (Belgium), ICI Caldaie (Italy); academic and research institutions:

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EU's Horizon 2020 research and innovation Programme Grant Agreement: No. 884157

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Centre for Research & Technology Hellas - (CERTH) (Greece), Fundación CIRCE - Centro De Investigación de Recursos Y Consumos Energéticos (Spain), Università di Genova (Italy), Cardiff University (UK), Technische Universität Darmstadt (Germany), Université catholique de Louvain (Belgium), KTH Royal Institute of Technology (Sweden), Commissariat A L Energie Atomique Et Aux Energies Alternatives (France), Eindhoven University of Technology (the Netherlands), Université D'Orléans (France); association: European Turbine Network (Belgium).

Furthermore, a FLEXnCONFU Users Group, consisting of end-user organisations and experts in the field, will be created and led by ETN to follow the development of the project in order to ensure a high awareness and replicability in the market.

Project Details

Project Grant Agreement: 884157

Start Date: 01/04/2020

Project Duration: 48 months

Grant Agreement: 884157

Project Budget: €12,555,440.00

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