



LC-SC3-NZE-4-2019

FLEXNCONFU

Full Title: Flexibilize combined cycle power plant through power-to-X solutions using non-Conventional Fuels

Aim:

FLEXnCONFU will develop innovative, economical, viable and replicable power-to-X-to-power solutions to be integrated into existing and new power plants. The project will enable power plants to level their loads and un-tap their flexibility by converting electricity into hydrogen or ammonia that can be reused in the same power plant to respond to varying grid demand and also reduce their environmental impact.

Concept:

The use of alternative carbon-free fuels in existing power plants and a high penetration of renewable energy sources into the power transmission grid are required in order to meet the European Union 2030 and 2050 climate and energy goals. Combined-Cycle Gas Turbine (CCGT) plants are a crucial technology that can provide the required flexibility to compensate for the intermittency of renewable energy sources. Within the FLEXnCONFU project, excess electricity produced will be converted in carbon-free fuels (H₂ or NH₃) via P2X2P applications to level the power plant load. In turn, these carbon-free fuels will be locally re-used in the same power plant to respond to varying demand. A 1MW scale power-to-hydrogen-to-power system will be integrated in a real operational environment in Portugal at EDP's Ribatejo power plant. Meanwhile, in the Savona Smart Microgrid laboratory in Italy, a small-scale power-to-ammonia-to-power solution will be coupled with a micro gas turbine (mGT) modified to burn ammonia. The new FLEXnCONFU layout will unlock the current situation of low operating hours CCGT power plants by providing secure back-up and improving their flexibility and overall

efficiency. It will also allow smoother operations,
while reducing air pollutant emissions.

Start date:

01/04/2020

End date:

31/03/2024