"QualyGridS"
Standardized Qualifying tests of electrolysers for grid services

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In a closer and closer future where renewable energies show themselves as the best option to pave the way towards decarbonisation and the reduction of emissions, the electricity system will need to modify the way it acts and adapt to the increase in the percentage of energy production that wind and solar power will represent.

The transmission system operator of each country (TSO) bases its operation, among other aspects, on maintaining the equilibrium between power generation and consumption. In this new scenario, alkaline and PEM electrolysers, followed by Solid Oxide electrolysers will become an additional mechanism to use while managing the system as they are capable of adapting their operation in a broad range just by changing their electrical consumption.

Currently electrolysers' manufacturers test their systems under possible scenarios expected in this next horizon. Today the test protocols are still not unanimously accepted and the harmonization of testing protocols for water electrolysis performing electrical grid services is now mandatory. The development of such broadly agreed protocols for the low temperature technologies is therefore the aim of the FCH JU Project "QualyGridS". The first step consists of analyzing the European requirements for testing grid services. An assessment of TSO's requirements for providing grid services e.g. Frequency Containment Reserve (FCR), Frequency Regulation Reserve (FRR), Replacement Reserve (RR), for several countries in European Union, Switzerland and Norway has been carried out. Additionally, a detailed description of the critical technical characteristics of AWE under high dynamic operation has also been implemented.

In this work, for the first time, we show standardized testing methodology for alkaline water electrolysis technology when it comes to check its capacity to meet TSO requirements. Several grid services protocols from diverse European countries are addressed in order to compare the performance of the AWE technology under different cases. The design of a compact testing methodology with the minimum testing procedures determined to provide a grid service in terms of response, stability and robustness will be also discussed. Finally with the elaborated conditions a techno-economic analysis will be performed to identify promising business models and simulate reference business cases.

The project authors thanks the FCH JU i.e. the European Commission for funding the project "QualyGridS" and also all project partners and collaborators for the excellent cooperation.