

Smart energy solutions with hydrogen options

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We are in an era where everything is now requested to be smart. Here are some examples, such as, smart materials smart devices, smartphones, smart grid, and smart metering. In regards to energy portfolio, we need to make it in line with these under smart energy solutions. With the developed cutting-edge technologies and artificial intelligence applications, we need to change the course of action in dealing with energy matters by covering the entire energy spectrum under five categories, namely, energy fundamentals and concepts, energy materials, energy production, energy conversion, and energy management. It is important to highlight the importance of a recent event. On 17 January 2017 a total of thirteen leading energy, transport and industry companies in the World Economic Forum in Davos (Switzerland) have launched a global initiative, so-called: Hydrogen Council, to voice a united vision and long-term ambition for hydrogen to foster the energy transition. It has aimed to join the global efforts in promoting hydrogen to help meet climate goals. This is a clear indication that smart solutions is not possible without hydrogen options. This keynote presentation focuses on introducing and highlighting smart energy solutions under the portfolio pertaining to exergization, greenization, renewabilization, hydrogenization, integration, multigeneration, storagization and intelligization. Each one of these plays a critical role within the smart energy portfolio and becomes key for a more sustainable future. This presentation also focuses on the newly developed smart energy systems by combining both renewable energy sources and hydrogen energy systems to provide more efficient, more cost effective, more environmentally benign and more sustainable solutions for implementation. Furthermore, a wide range of integrated systems is presented to illustrate the feasibility and importance such a coupling to overcome several technical issues. Moreover, numerous case studies and project results are presented to highlight the importance of sustainable hydrogen production methods for carbon-free economy.