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Hydrogen energy storage can use the electricity grid to benefit multiple energy sectors

Additional submitted attachment is included below.

June 21, 2017

Dear CEC,

ITM Power would like to bring the following information to the attention of all parties involved and interested in this topic.

In Europe there have been a couple of very pertinent publications which very clearly represent the benefits of hydrogen energy storage (HES) and Power to Gas (P2G) technology. ITM Power and the wider membership of the California Hydrogen business Council (CHBC) feel very strongly that California needs to start to implementing the inclusion of this technology in order to be ready for the fast approaching needs of large scale energy storage on the California electricity network. California curtailed 85GWhrs of energy in March 2017 – that is enough to produce fuel for 90,000,000 miles of zero emission driving using fuel cell electric vehicles.

It is clear that if California wishes to decarbonize its gas and fuel networks to any significant degree a variety of technologies will be needed. Electricity stored in batteries alone is not able to address the long term, massive volume and seasonal energy storage that will be required in order to meet with the states 50+% renewable goals. Hydrogen produced from excess electrical energy needs to be part of the mix due to its unique ability to handle massive volumes of energy and seamlessly transfer energy between the electricity, heat, gas and transportation sectors.

ITM Power urges the EPIC funding program to set aside funds to allow for the deployment and demonstration of commercial scale multi-megawatt hydrogen production systems to assist in balancing the grid and reducing the curtailment of renewable electricity in California.

The following key documents highlight the benefits of hydrogen and point out the support that the technology is gaining from Europe and other areas of the world.

- 1) http://ease-storage.eu/wp-content/uploads/2017/05/2017.05.15_EASE-Recommendations-PtG-PtL_final.pdf

This document concludes that hydrogen energy storage and power to gas/power to liquids is an essential technology to help reach future renewable goals for the energy and fuel sectors.

A few key statements from the document:

“It is the **only** energy storage option available to store large amounts of energy seasonally and provide it on-demand to different sectors and applications”

“Green Hydrogen has a 91% lower carbon footprint compared to hydrogen from steam methane reforming (SMR) of natural gas”

“Sector specific market and regulatory frameworks need to be further developed and barriers need to be overcome where they exist in order to tap the full potential of these technologies.”

“Promoting sectoral integration by reducing the barriers between the different energy and economic systems”

- 2) <http://www.cedec.com/files/default/2017-06-13-joint-statement-renewable-gas-in-the-recast-of-the-renewable-energy-directive.pdf>

This document is written by a group of gas sector stakeholders in Europe. It concludes renewable gas should encompass a wide range of sources and not be restricted – we need them all if we are going to reach our climate and air quality goals.

Europe gets the benefits – why are we struggling to accept the same in CA?

A few key sentences:

“Renewable gas comes in the form of biogas, biomethane, green hydrogen, and synthetic methane (syngas)”

“renewable gases from many technologies and sources are in constant evolution, and **the definition should remain updated, and adequately open in view of future advances.**”

“There is also a need to **acknowledge the integrating nature of renewable gas, through ‘sectoral integration’**. Silo thinking needs to be avoided in energy system planning, and defining integration in this respect would be helpful. Sectoral integration lies in a holistic system approach which strives to link infrastructures and services in the electricity, gas, heating & cooling and transport sectors, where the use and conversion of all energy carriers plays a key role.”

- 3) <http://profadvanwijk.com/wp-content/uploads/2017/04/NIB-BP-EN-DEF-webversie.pdf>

Another key document that was published recently is from Holland where they are targeting a hydrogen economy based on renewable energy storage. A few key sentences:

“It is necessary for the realization of the Paris climate goals, as well as to make the economy stronger and greener.”

“Such a radical change towards a carbon emission free economy by 2050 requires a mentality shift toward embracing the need for radical transformations in the energy system because incremental changes alone will not be sufficient.”

“The most important projects to kick start the green hydrogen economy are the large-scale production of green hydrogen from green energy”

Kind regards,



Steve Jones

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