

DOCKETED

Docket Number:	17-IEPR-01
Project Title:	General/Scope
TN #:	215575
Document Title:	Advanced Power and Energy Program Comments on 17-IEPR-01
Description:	N/A
Filer:	System
Organization:	University of California, Irvine
Submitter Role:	Public
Submission Date:	1/25/2017 3:34:49 PM
Docketed Date:	1/25/2017

Comment Received From: Jack Brouwer

Submitted On: 1/25/2017

Docket Number: 17-IEPR-01

Advanced Power and Energy Program Comments on 17-IEPR-01

Additional submitted attachment is included below.



Advanced Power and Energy Program
The Henry Samueli School of Engineering

Irvine, CA 92697-3550
(949) 824-5950
FAX (949) 824-7423

January 25, 2017

California Energy Commission
1516 Ninth Street
Sacramento, California 95814

RE: Docket # 17-IEPR-01, TN #: 215256: Notice of Request for Public Comments on the Scoping Order for the 2017 Integrated Energy Policy Report

To Whom it May Concern:

The 2017 Scoping Order document includes the important task of exploring “electricity system operational issues as the state further reduces its greenhouse gas emissions by integrating increasing amounts of variable renewable resources and electrifying the transportation sector” within its scope. Several important technologies for addressing these system operational issues are subsequently named or described, which include market mechanisms, “transmission planning, curtailment of over-generation, enhanced ramping capability from conventional and renewable generation (the ability to rapidly increase or reduce generation depending on system needs), demand response, time-of-use retail rates, and storage, including Vehicle to Grid.”

Unfortunately, the list of technologies provided did not include nor seem to allow consideration and analysis of the very important technical contributions that “power-to-gas” and “hydrogen energy storage” technologies can provide. Several international organizations and governments that are considering extensive use of renewable power have identified power-to-gas (P2G) and hydrogen energy storage (HES) as essential to meeting goals of deep decarbonization and high use of renewable resources in power, energy and transportation applications. P2G and HES offer unique features that make them amenable to cost-effective massive and long duration energy storage together with enabling zero emissions transportation with rapid fueling, long-range and large payload capabilities that are superior to any other zero greenhouse gas and criteria pollutant emissions technology.

The Advanced Power and Energy Program (APEP) of the University of California, Irvine (UCI) has conducted research on P2G and HES for more than a decade and has been able to recently (starting in October of 2016) demonstrate the production of renewable hydrogen followed by injection into a campus natural gas line to produce zero carbon emissions power in their central power plant for the first time in the U.S. We urge the California Energy Commission to seriously consider and evaluate P2G and HES as technologies that may well contribute to electricity system operational issues and the successful integration of increasing amounts of variable renewable

resources. We urge the California Energy Commission to host workshops and conduct analyses to thoroughly evaluate P2G and HES technologies for inclusion in the 2017 Integrated Energy Policy Report.

Sincerely,

A handwritten signature in black ink, appearing to read "Jack Brouwer". The signature is fluid and cursive, with a long horizontal flourish extending to the right.

Jack Brouwer, Ph.D., Chief Technology Officer
Advanced Power and Energy Program
Associate Professor, Mechanical and Aerospace Engineering