

Innovative Power-to-Gas Technologies for the Energy Transition

Final Conference of the STORE&GO EU Research Project at KIT



The demonstration plant at Troia, Italy, combines a new type of microreactor for methanation with an innovative liquefaction plant. The CO₂ needed is extracted from ambient air. (Photo: Domenico Grossi)

On the way towards climate neutrality, power-to-gas technologies are essential components. Within the STORE&GO project, researchers from all over Europe successfully implemented different processes for the production of synthetic natural gas (SNG) from renewable electricity. From three pilot plants, SNG was fed into the local natural gas grids or liquefied for use as mobile energy carrier. In addition, the team analyzed economic advantages of power-to-gas (PtG) technologies and developed the corresponding regulatory recommendations. The project results will now be presented at the final conference at Karlsruhe Institute of Technology (KIT) on February 17 and 18, 2020.

By 2050, Europe is to be turned into the first climate-neutral continent. To reach this long-term objective, it is not sufficient to establish power supply based on renewable resources. Also mobility, heat production, and all other industrial processes will have to be made CO₂-neutral. "Even in most optimistic scenarios, the degree of electrification reaches a maximum of 60 percent of energy consumption only. This



KIT Energy Center: Having future in mind

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Further information and material on STORE&GO at:
<https://www.storeandgo.info/>

means that a large fraction of our energy consumption will have to be covered by energy carriers other than electricity, e.g. methane. These energy carriers, however, will be produced in a climate-neutral way,” says Professor Thomas Kolb, Head of KIT’s Engler-Bunte Institute (EBI). “Within the STORE&GO project, we proved on three demonstration sites that the corresponding technologies now are mature and available for wide use.”

Test of Various Reactor Concepts and Regulatory Approaches

Within the STORE&GO EU research project, PtG demonstration plants for the production of SNG from hydrogen were built and operated on the three sites of Falkenhagen (Germany), Solothurn (Switzerland), and Troia (Italy). This hydrogen was produced from renewable electricity by classical electrolysis processes. For methanation, three different types of reactors were applied: Microorganisms, a novel reactor with microstructures, and a KIT-developed honeycomb reactor for scalable series application. As a CO₂ source is needed for the conversion of hydrogen into SNG, different concepts were tested, including direct air capture (DAC), where CO₂ is directly extracted from ambient air. During the project, all sites produced highly pure SNG that was fed into the local natural gas grids or processed to liquefied gas. Apart from the different conversion concepts, the potential of using PtG technologies in the existing grid were demonstrated. With the gigantic storage capacity of the European gas grid, fluctuations of wind or solar energy production can be balanced.

Apart from technologies, STORE&GO also covered the different regulatory regimes of the three countries and potential market models. “It is not sufficient to just make available a new efficient technology,” says Dr. Frank Graf (EBI), project coordinator of STORE&GO. “We determined production costs of methane from green electricity and developed recommendations as to how and where these technologies can now be used. Aspects of supply security were analyzed as were incentives for private investments in the PtG infrastructure.” To cover all these issues, the STORE&GO consortium consists of a variety of members ranging from research institutions and large industrial companies to innovative small companies.

More information: https://www.storeandgo.info/fileadmin/dateien/STORE_GO_Power-to-Gas_Roadmap.pdf

Program: Final STORE&GO Conference

*On February 17, 2020, from 12.00 to 18.00 hrs and
on February 18, 2020, from 9.00 to 14.00 hrs*

*at the Engler-Bunte Institute, Campus South of KIT, building 40.50,
Engler-Bunte-Ring 1b.*

The conference language will be English.

Monday, February 17, 2020

- 13.00 hrs** Welcome
- 13.30 hrs** STORE&GO: Investigating power-to-gas on EU level
- 14.00 hrs** Three examples for PtG real-life demonstration
- 15.00 hrs** State-of-the-art PtG technologies
- 16.30 hrs** Technology assessment

Tuesday, February 18, 2020

- 09.00 hrs** Integration of PtG in the energy system
- 10.00 hrs** Relevance of PtG for Europe
- 11.30 hrs** The societal impact of PtG
- 13.00 hrs** An outlook for PtG
- 14.00 hrs** Closing remarks

For the program, click:

http://ceb.ebi.kit.edu/download/STOREandGO_conference_program.pdf

Information on registration:

Participants can register at <http://ceb.ebi.kit.edu/english/2527.php>.

Representatives of the media are requested to register by email to presse@kit.edu.

More about the KIT Energy Center: <http://www.energy.kit.edu>

**Being “The Research University in the Helmholtz-Association,”
KIT creates and imparts knowledge for the society and the environment. It is the objective to make significant contributions to**

the global challenges in the fields of energy, mobility and information. For this, about 9,300 employees cooperate in a broad range of disciplines in natural sciences, engineering sciences, economics, and the humanities and social sciences. KIT prepares its 24,400 students for responsible tasks in society, industry, and science by offering research-based study programs. Innovation efforts at KIT build a bridge between important scientific findings and their application for the benefit of society, economic prosperity, and the preservation of our natural basis of life. KIT is one of the German universities of excellence.

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