Energy, everywhere.

Investing in a secure future:

Renewable & low-carbon infrastructure

Budapest, 7th April 2022

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Some key statements 1

Gases will be a part of future supply

- E.g. Austria: Today's gas demand 90TWh – 2040`s gas demand estimated at 90TWh, but obviously of different composition – despite efficiency gains because of electricity usage; most domestic potential in biogas: 20- 40 TWh, rest needs importing, probably via EHB components, because of low potential for excess green electricity; AT has H_2 cooperation with UAE.

If gas is here to stay, so will gas infrastructure

- Transition will be selective over the next 10- 15 years, with distribution and transmission partly in competition, *dependent on*: place of green gas production, place of excess electricity, redundancy of pipes caused by switch to heat pumps (distribution) or potentially turning away from previous supply sources (transmission), acceptance of blending vs. separation of H_2 and methane or transitional systems; connection to storage. Ripping-out pipes at once or forbidding green gases for heating will probably not help.

What can help ?

- Building up supply of green electricity for H_2 and biogas capacity needs quick implementation and a lot of subsidies – but as we know 'politics is the art of the possible'

Some key statements 2

What can help ?

- Light separation of H_2 and CH_4 activities – Gas market and H_2 package proposals should be challenged- let there be sandbox projects or e.g. renewable energy generation for TSO own use
- International cooperation between countries – to a certain extent ‘alien’ to our system

Who will invest ?

- Just look at the current projects and their participants:
- German IPCEI projects: ‘Let a 100 flowers blossom’
  - *Production*: Utilities; Engineering c.; Chemical c.; port operators
  - *Infrastructure*: TSOs and storage c.
  - *Industrial use*: Cement c.; renewable c.; steel c.; refiners; chemical c.
  - *Mobility*: car and truck c.; fuell cell c.; aeroplane c.; port operators, AT: Zillertal Railway and food retailer

Will taxonomy matter ?

- It depends

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Backup

Some Austrian projects

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Energy Model Region WIVA P&G

“Wasserstoffinitiative Vorzeigeregion Austria Power & Gas”

3 Scope:

- GREEN ENERGY:
  - feed-in and feed-out of green H_2 from the existing gas grid
  - build local energy hubs based on green H_2
  - Power to Gas/Liquid and Liquid to Power & Heat
- GREEN MOBILITY:
  - H_2 fuel cell systems for affordable FC-electric vehicles
  - H_2 fuel cell for electrified heavy-duty transport
  - H_2 infrastructure and CO_2-free logistics
- GREEN INDUSTRY:
  - H_2 in industrial processes
  - new technology for the use of H_2

WIVA P&G Energy Model Region

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Projects

C2PAT - Carbon2ProductAustria:

- Creating a novel carbon cycle value chain spanning the energy, cement and chemical industrial sectors.
- Vision: Complete use of CO_2 from Austria's largest cement factory for the production of renewable products in 2030.
- **Green H_2 (Verbund) + CO_2 (Lafarge) → "renewable" plastics (OMV/Borealis)**
- Status quo: Refinement of the technical concept and project development for 1st demo plant.

IPCEI Green Hydrogen @ Blue Danube:

- The goal is to create a **trans-European green H_2 value chain** (production, transportation & user).
- The 1st phase focuses on the production and use of H_2 in Austria & Bavaria.
- The 2nd phase of the project will focus on the production of green H_2 from renewable electricity in south-eastern Europe. This H_2 will then be transported via the Danube & the gas grid, to H_2 users in Austria & Germany.

Source: https://www.ots.at/presseaussendung/OTS_20200624_OTS0180/lafarge-omv-verbund-und-borealis-starten-eine-sektoruebergreifende-zusammenarbeit-anhang & www.hydrogenious.net/index.php/de/references-2/blue_danube/

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Projects

IPCEI H2EU+Store:

- Green H_2 production in Ukraine, H_2 transport via Ukraine-SKO-AUT-GE, H_2 storage in Austria and H_2 end-customer market supply.
- Currently, an in-depth feasibility study and the conceptual design of a first PV project with an electrolysis capacity of 50 - 100 MW near Lviv is underway, as well as considerations for subsequent upscaling.

IPCEI H2EART (H_2 to Europe - Austrian Regional Turntable)

Backbone infrastructure instead of only backup infrastructure in the future:

- conversion of parts of our network for H_2 transport.
- establishing Baumgarten as a future H_2 hub of Central Europe
- direct lines to H_2 consumers (e.g. Voest Linz & Donawitz, refining)

Source: https://www.rag-austria.at/forschung-innovation/h2eu-store.html

Projects

Prestudy „Power2Gas4Austria“:

- a grid-serving 50 MW P2G plant to operate according to the tolling model.
- Status: Preliminary technical analysis evaluating the conversion of green surplus electricity into H_2 and dimensioning the feed-in parameters for the gas grid completed..

Demo4Grid

- Tyrolean food retailer has commissioned an electrolysis plant for the production of green H_2.
- The 3.2 MW plant relies on alkaline pressure electrolysis and is said to be Europe's largest single-stack electrolysis plant (costs are about 13 million euros).
- The plant receives the green electricity from the energy supplier Tiwag.

HotFlex

- VERBUND is building a pilot plant at the thermal power plant site in Mellach, Austria, which can be operated both as an electrolyser and as a fuel cell (SOEC/SOFC).
- Graz University of Technology and the German cleantech specialist Sunfire evaluate the use of climate-neutral H_2 in power plant operation as a substitute for natural gas.

Source: https://www.demo4grid.eu/ & https://www.verbund.com/de-at/geschaeftskunden/industrie/gruener-wasserstoff

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Thank you

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