

WIENER WASSERSTOFF GMBH H2 SECTOR INTEGRATION

19.10.2021

DI Mag. Gudrun Senk

Managing Director Wiener Wasserstoff GmbH

Hydrogen is a key player for sector integration

- Hydrogen will play a **key role in the energy transition**

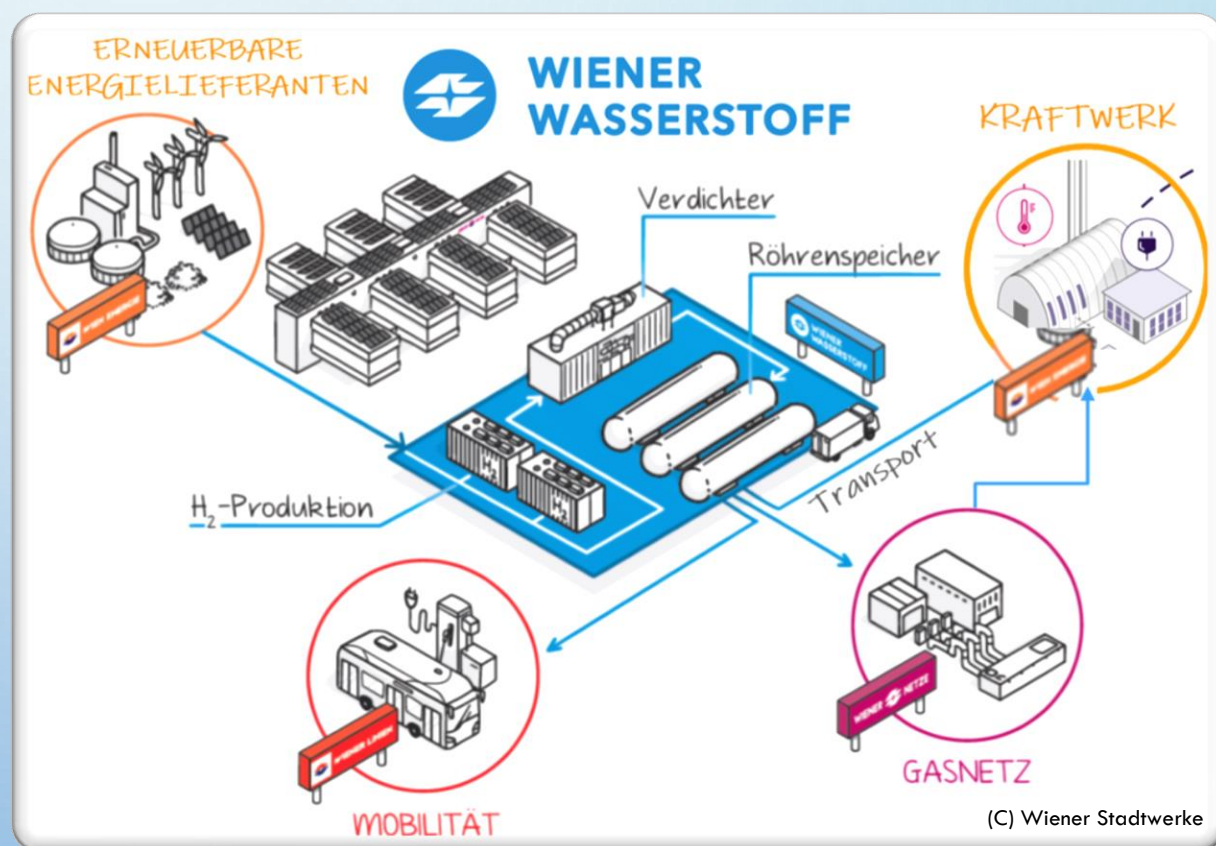
Increase in renewable energy production demands storage capacity.

- Hydrogen can be used in **all sectors of energy usage**

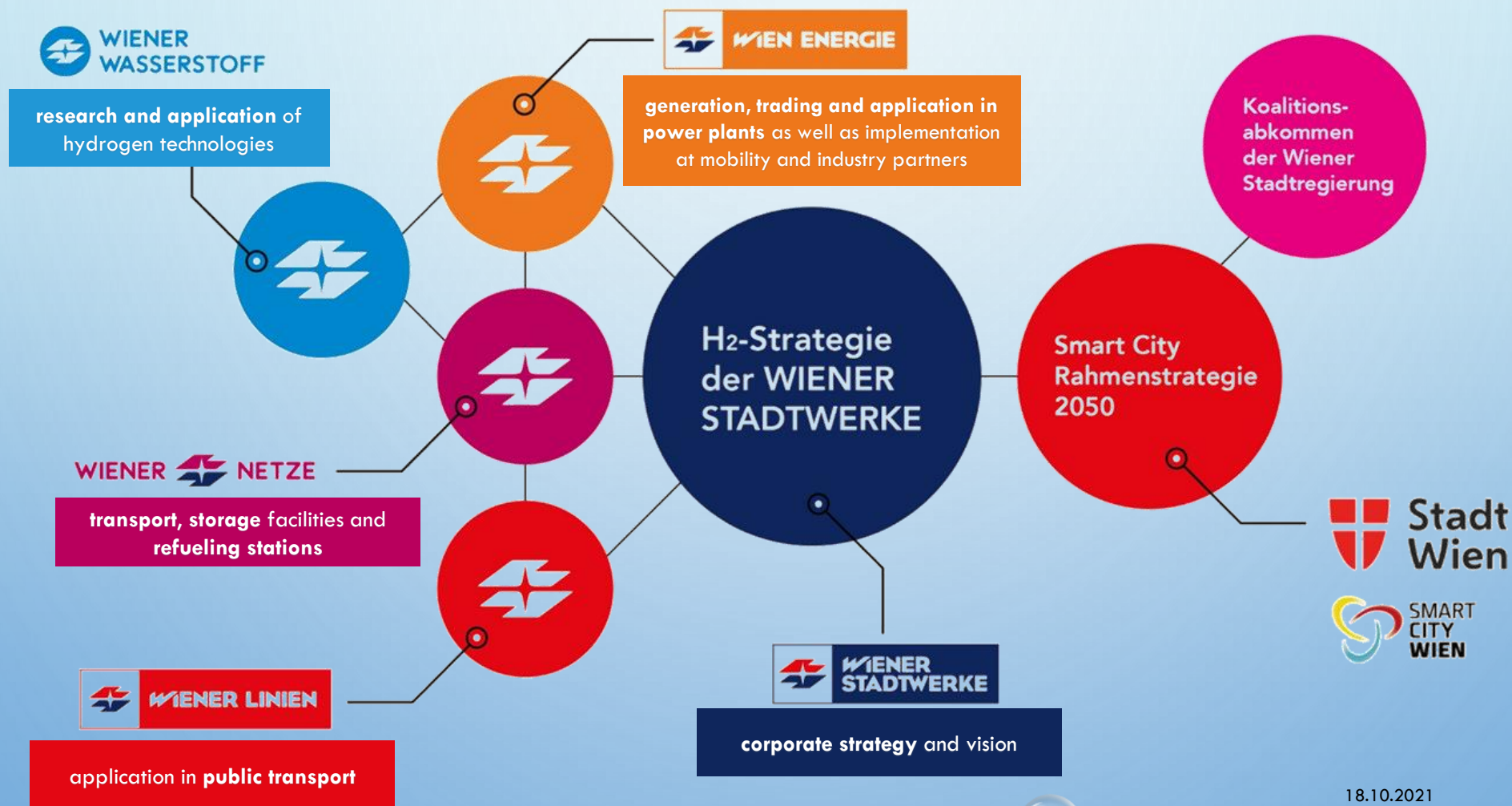
Mobility, electricity, heating etc.

- Hydrogen usage helps to **decarbonize our economy** and lives

Without a loss of **comfort**.



Wiener Wasserstoff GmbH was founded to use synergies of a fully integrated municipal utility



Public bus transport is the first use case for H2 in Vienna

First H2 **fueling station** in Austria for Buses and heavy vehicles, **first regular H2 bus line** in operation

Leopoldau

2021

Construction of **2nd fuelling station and Electrolyzer** for green Hydrogen

Simmering

2022

2023

From 2023: **Continuous replacement** of fossile busses **with H2 busses**



HYDROGEN FOR A GREENER FUTURE.

Gudrun.Senk@wienerwasserstoff.at

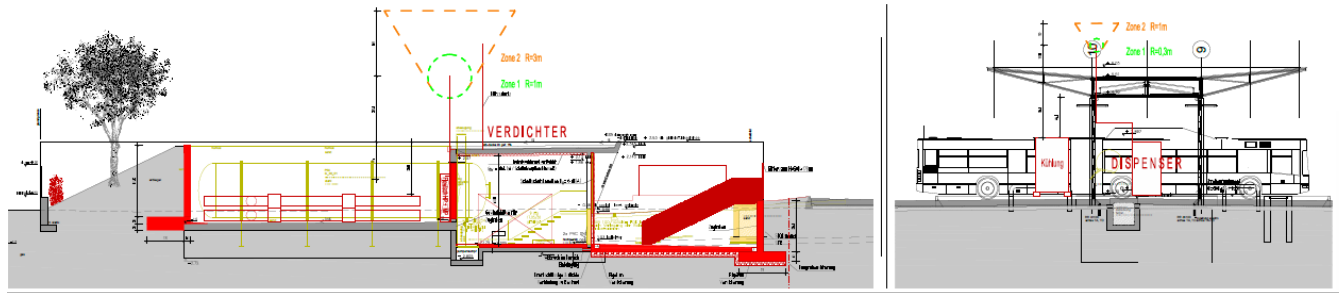
Helmut.Meixner@wienerwasserstoff.at

Back up

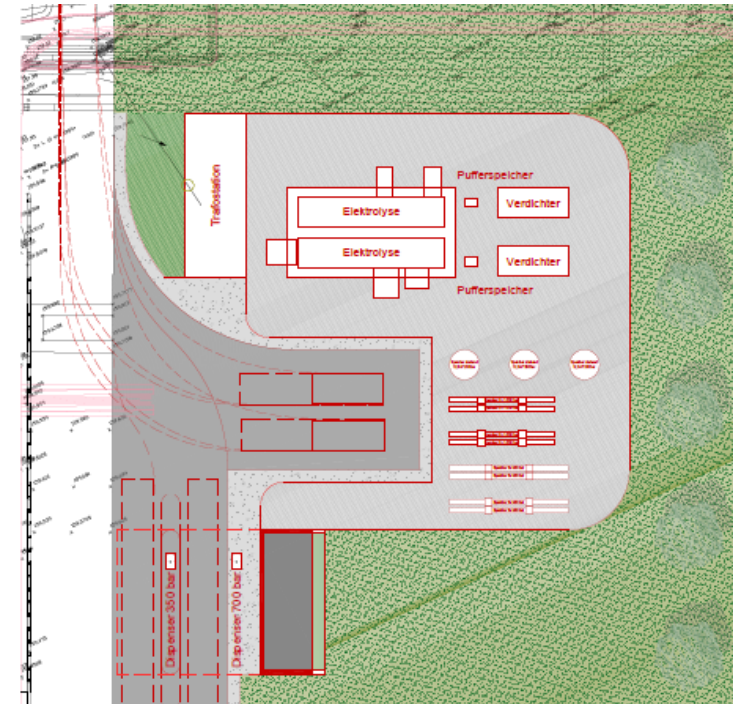


WWG – technical concept

Location Leopoldau



Location SIMMERING



The hydrogen is generated via an electrolysis (PEM) system and buffered in various intermediate storage units (storage 200 bar / 500 bar / 900 bar) via the compressor.

On the one hand, the H₂ is directly forwarded via the storage tank for the use of gas preheating and for the H₂ feed into the gas network.

On the other hand, the trailer is filled via the tank terminal for the H₂ supply of Leopoldau with regard to gas preheating and H₂ feed in the gas network as well as supply for the bus service Wiener Linien.

Pre-installation of tank infrastructure Leopoldau to secure operation for further H2 buses (testing case)

– Nov. 2021 – Okt. 2021

- ✓ planning & administrative procedures
- ✓ procurement of tank infrastructure
- construction of tank infrastructure
- H2 tank infrastructure set up and go live

– Nov.2020 – März 2021
– Nov.2020 – April 2021
– April.2021 – Okt. 2021
– Nov.2021

WWG - main project (generation, storage, transport, network)

– Feb. 2021 - Okt. 2023

- planning
- administrative precedures
- procurement of system components & trades
- structural implementation
- H2 generation test operation
- H2 generation go live

– Feb.2021 – März 2022
– Aug.2021 – Juni 2022
– Sept.2021 – Sept 2022
– Juni 2022 – Sept 2023
– Juni.2023 – Okt 2023
– Okt.2023

Strategy and fields of action of the city of Vienna

Austria's climate neutrality – Vienna as a pioneer



Austria aims to be climate neutral by 2040

Austria's required electricity volume shall be covered 100% nationally balanced from renewable energy sources in balance by 2030, whereas domestic gas consumption is to be CO₂-neutral in balance by 2040. From today's perspective, part of the energy of the substituted gas will most likely be provided by hydrogen, however, legal framework conditions are still lacking. An "Austrian Hydrogen Strategy" is currently under development. Up-to-date policies of subsidies are defined within the framework of the Renewable Energy Act (EAG-Erneuerbaren-Ausbau-Gesetzes).

Smart City Vienna Framework Strategy 2050

The hydrogen strategy of WIENER STADTWERKE actively contributes to the realization of the Smart City Framework Strategy 2050. The implementation of the hydrogen strategy promotes the guidelines of the transformation of the city of Vienna into the Smart City Wien. In particular, the focus is set on the guiding principle of maximizing resource conservation and the ambitious aim of becoming Innovation Leader by 2030. The hydrogen strategy addresses numerous domains of the framework strategy, especially energy supply, mobility and transport as well as economy and science.

Coalition treaty of the Vienna city government

In the city government's coalition treaty, Vienna became the first federal state of Austria to profess its commitment to climate neutrality in 2040. Hydrogen is assigned a leading role of realizing Vienna as a 'climate model city' and is therefore actively supported by the city's government. In the coalition agreement hydrogen is explicitly quoted and is being highly considered for climate-friendly transport and smart mobility. WIENER STADTWERKE intends to become a role model in these and various other spheres of action and make a significant contribution to Vienna's climate neutrality with its hydrogen strategy.

**WIENER STADTWERKE as
the designer of the strategy
and the guiding principles
of the City of Vienna!**



- The WWG - Wiener Wasserstoff GmbH [Vienna Hydrogen company] positions the WSTW Group in Vienna and the Eastern Region on the subject of hydrogen in mobility, space heating and industry. The WWG is an applied research project for feeding H₂ into the gas distribution network of Wiener Netze and uses synergies for the H₂ supply of Wiener Linien buses. The following requirements are met.
 - Pre-installation - statutory order admixture
 - Practical testing of the technical possibilities
 - Collection of operational experience
 - Create requirements for „greening the gas“
 - Evaluation of the modeling of the network with regard to calorific value tracking (Austrian Standard GO110)
 - Securing H₂ supply for H₂ mobility of Wiener Linien
 - Development and integration of the hydrogen value chain in the WSTW Group

Hydrogen – energy source of the future

We want to seize our opportunity!



Corporate strategy and vision

The corporate strategy of WIENER STADTWERKE centers all its actions on the Smart City Framework Strategy 2050 and is dedicated to climate protection and energy efficiency to maximize reduction in CO₂. With its hydrogen strategy, WIENER STADTWERKE lives up to its economic, social and ecological responsibility. Numerous companies of the Wiener Stadtwerke along the entire value chain are involved in realizing this hydrogen strategy, which in turn reflects the group's vision of a networked and holistic collaboration.

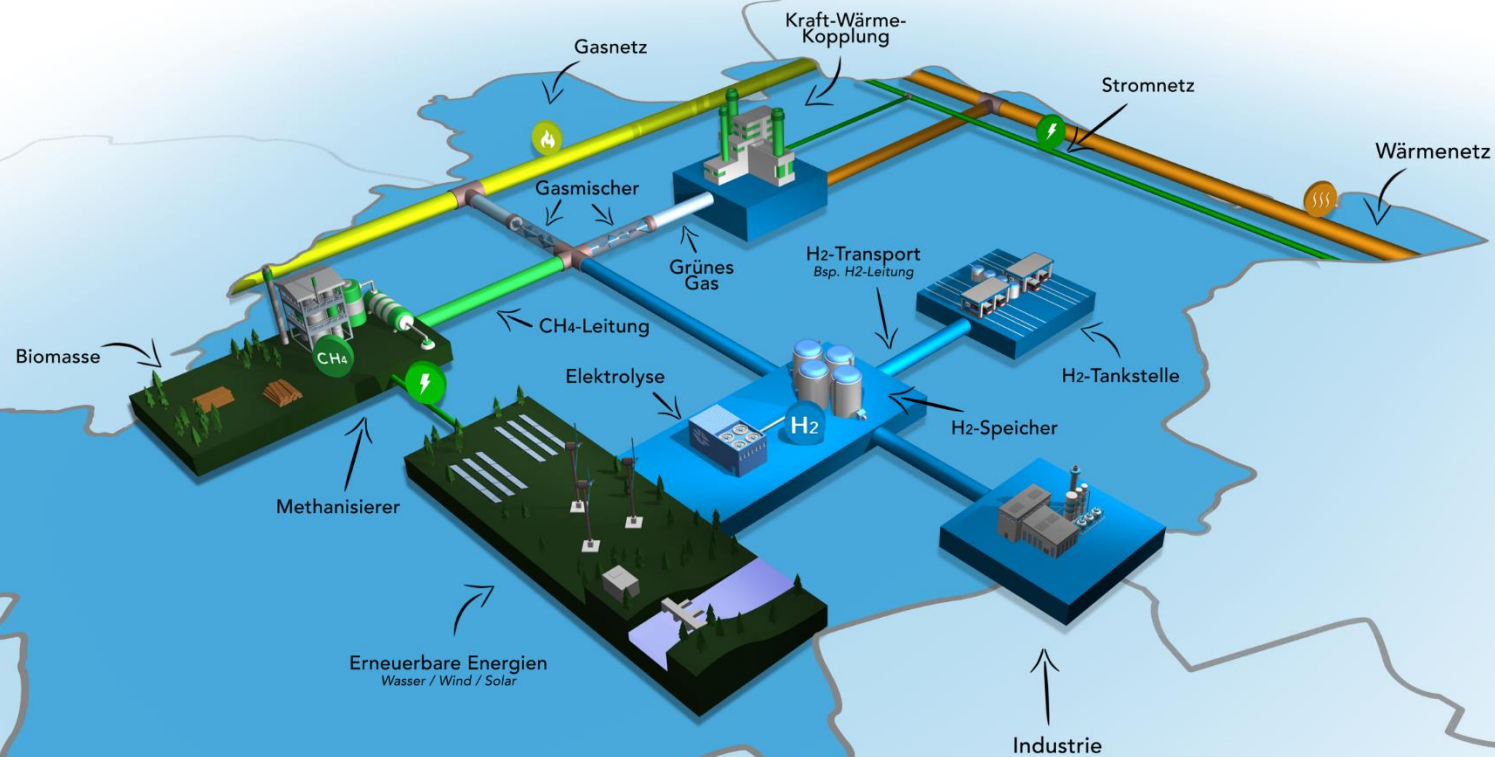
Hydrogen – energy source of the future: clean, efficient and safe

Hydrogen has, due to its chemical characteristics as an energy storage medium and increasing renewable electricity production, an eminent role to play in attaining Austria's climate targets. For ecological reasons, WIENER STADTWERKE relies on the production and use of renewable hydrogen by dint of electrolysis. This energy generation technology is industry standard. In the medium to long term, new technologies (high-temperature pyrolysis and electrolysis, as well as plasmalysis) can be developed. These processes have the potential to significantly reduce the production costs of hydrogen in the future. In some of these techniques, when biogas is used, it is possible to fix the carbon in form of solid carbon black before being emitted into the atmosphere ('Vienna carbon cycle').

WIENER STADTWERKE is in the position to manage the entire renewable hydrogen value chain and integrate it into the energy system of a metropolitan area in order to foster its decarbonization.



The Hydrogen strategy of Wiener Stadtwerke



Vision from 2025 to 2040



Our flagship projects until 2024!



- Commissioning of the first hydrogen refueling station for buses, commercial vehicles and passenger cars in Leopoldau as well as conversion of the first bus line (39A) to hydrogen
- 2024: resolution on the conversion of the WIENER LINIEN bus fleet to hydrogen.



- Commissioning of the first hydrogen refueling station for buses, commercial vehicles and passenger cars in Leopoldau
- Design and construction of an electrolysis at Smart Campus WIENER NETZE in Simmering



- Blending of hydrogen in network level 2 and 3
- Conversion of gas preheating to 20% hydrogen
- Integrated tracking of calorific value feasible with the project „GO110“
- Analysis of existing gas pipelines for hydrogen suitability and testing of hydrogen quality (ÖVGW)



- Resolution on conversion and field test of CHP gas turbines for hydrogen compatibility
- Testing and construction of pilot plants for new H₂/CH₄-generation technologies (Greening the Gas)
- Resolution on the construction of continuing electrolysis plants

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