INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

IPHE Country Update October: Austria

Name	Peter Raimann
Contact Information	peter.raimann@energyagency.at, +43 664 965 9248
Covered Period	Update 04/23-10/23

1. New Initiatives, Programs, and Policies on Hydrogen and Fuel Cells

Updated national energy- and climate plan (to be submitted 06/2024)
The national energy- and climate plans (NECP), firstly introduced by the European Union in 2018, shall encourage member states to stick with the union's energy and climates targets for 2030. The member states have to report their strategies regarding energy efficiency, renewables, greenhouse gas emissions reductions, interconnections and research/innovations approaches. Based on the first developed plans, submitted in 2018, the member states have to report about their progress every 2 years. The Austrian government will submit the next update in June 2024. In the latest version, for the 2024 update, the Austrian government confess once more to the hydrogen goals, articulated in the hydrogen strategy:

- 1 GW installed electrolysis capacity until 2030
- Substitution of 80% fossil produced hydrogen in the industry by green hydrogen till 2030 (104,800t)
- Strategic development of hydrogen infrastructure
- Enabling green hydrogen import and creation of the corresponding infrastructure

CO_2-taxation (in force since 10/01/2022)
The Austrian government introduced a CO_2 taxation, in effect since 1 October 2022. Beginning with 30 € per ton emitted CO_2, the price will be increased annually to 55 € per ton in 2025. Especially companies, which import or produce fossil fuels, will have to pay this taxation in addition to the already existing mineral oil tax. The tax will help to accomplish the true costs of fossil fuels and therefore benefits sustainable energy resources as well as renewable hydrogen.

2. Hydrogen and Fuel Cell R&D Update

No updates

3. Demonstration, Deployments, and Workforce Developments Update

Underground Sun Storage (USS) 2030 (project duration 2021-2025)
Demonstration project for seasonal geological hydrogen storage will come into service in April 2023. Lead by RAG Austria AF, the first geological hydrogen storage facility is tested in the Upper Austrian municipality Gampern. Former natural gas reservoirs are used to be injected by sustainable produced hydrogen. Based on predecessor projects, USS 2030 aims to store 100% hydrogen gas under real-life conditions. The storage capacity will be 4.2 GWh.

INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

Cooperation Partners: RAG Austria AG, Axiom Angewandte Prozesstechnik GmbH, Energie AG Oberösterreich, Energieinstitut an der Johannes-Kepler-Universität Linz, EVN AG, HyCentA Research GmbH, K1-MET GmbH, Technische Universität Wien, Universität für Bodenkultur Wien, VERBUND, Verein WIVA P&G und voestalpine Stahl GmbH

Project Coordinator: Stefan Bauer stephan.bauer@rag-austria.at

Funding: Klima- und Energie Fonds (executed by Foschungs Förderungsgesellschaft)

Renewable Gasfield (official opening 05/09/2023)
Renewable Gasfield is the first public production site for green hydrogen with an annual capacity of 168 tons. Solar energy (6800 m^2 PV-area, 800 kW) is used as input for the facilitiy's electrolyzer (Polymeric Electrolyte Membrane). The produced hydrogen either gets stored for mobility applications or fed into a methanation reactor for raw bio gas. The site' s capacity will be extended to 300 tons of annual green hydrogen production till 2030. The investment volume has been 10.5 million euros.

Cooperation Partner: Energie Steiermark, Montanuniversität Leoben, HyCentA Research GmbH, Energieinstitut an der JKU Linz, WIVA P&G, Energienetze Steiermark, Energieagentur Steiermark, Amt der Steiermärkischen Landesregierung, A15 – Fachabteilung Energie und Wohnbau

Project Coordinator: DI Klaus Neumann klaus.neumann@e-steiermark.com

Funding: Klima- und Energiefonds, Forschungs Förderungsgesellschaft, Kredit Public Consulting

Hydrogen tests on gas turbines (start of testing 07/13/2023)
Tests for hydrogen driven gas turbines start in Vienna. The aim is to operate, a commercially used, CHP-plant by a hydrogen-natural gas-mixture, while gradually increasing the share of hydrogen. Finally, 15 percent by volume will be reached for the turbine's gas mixture. It enables a CO_2 reduction of 33.000 tons annually. These are the first hydrogen tests for a commercially used CHP-Plant at that power level worldwide (350 MW Heat, 395 MW Power). 10 million euros were invested of which 2.6 million were funded by the Climate- and Energy fund.

Cooperation Partner: Wien Energie GmbH, Verbund AG, SIEMENS Energy, RheinEnergie. Contact Person: Lisa Grohs lisa.grohs@wienenergie.at

HotFLEX (project duration 2020-2023)
HotFLEX is a demonstration project for a revertible electrolyzer, which can switch into a fuel cell working mode. The facility operates as high-temperature, solid-oxid cell with 150 kW rated power and 40 Nm^3/h hydrogen output. The separate working modes enable the cell to function as energy storage. The hydrogen produced in periods of sustainable energy overproduction can later on used to compensate underproduction.

Cooperation Partner: Verbund AG, TU Graz.

Contact Person: Peter Eiler peter.eiler@verbund.com

Collector Ost (project duration 2023-2027)
The project "Collector Ost" is part of the "H2 Roadmap till 2050", which aims to establish a separate hydrogen distribution system in Austria. The pipeline will connect substantial electrolyzers, situated in the northern part of Burgenland, with the refinery Mannswörth and the 21st district of Vienna in order to supply the Austrian capital with hydrogen. The planning phase is scheduled to be done by 2024 and by 2027 the facility shall be established and in operation.

Cooperation Partner: Austrian Gas Grid Management AG (subsidiary of Gas Connect Austria), Netz NÖ, Netz Burgenland, Wiener Netze

Project Coordinator: Günther Pöckl

PanHy (completion until 2030)
Pioneer facility for establishing a hydrogen production infrastructure in the northern part of Burgenland. As first step, 60 MW electrolysis power is planned to be built by 2027. Until 2030 the capacity shall be gradually extended to 300 MW, which represents 40,000t/a hydrogen output. The needed electricity will be supplied by the neighboring wind parks of Zurndorf. Furthermore, it's the first feed in point for the planned gas distribution pipeline "Collector Ost", described above.

Cooperation Partner: Verbund, Netz Burgenland, Netz NÖ, Wiener Netz

Contact Person: Peter Eiler peter.eiler@verbund.com

4. Events and Solicitations

International Vienna Energy&Climate Forum 11/02/2023 – 11/03/2023
Hofburg International Centre

Wiva P&G Jahresveranstaltung (=annual forum) 11/27/2023 – 11/29/2023
Linz

3rd international sustainable Energy conference 04/10/2023 – 04/11/2023
Messecongress Graz

European Energy Efficiency Conference 03/07/2024 – 03/08/2024
Stadthalle Wels

5. Investments: Government and Collaborative Hydrogen and Fuel Cell Funding

No updates

6. Regulations, Codes & Standards, and Safety Update

No updates

Summary Country Update [10 2023]: [Austria]

Transportation	Target Number	Current Status	Partnerships, Strategic Approach	Support Mechanism
Fuel Cell Vehicles[1]	No target	62	Austria's 2030 Mobility Master Plan, Austria's Hydrogen Strategy	• Subsidy for purchase (Promotion campaign “e-mobility”)
FC Bus	8	8	Austria's 2030 Mobility Master Plan, Austria's Hydrogen Strategy	• Subsidy for purchase (“EBIN” funding programme)
Fuel Cell Trucks[2]	No target	1	Austria's 2030 Mobility Master Plan, Austria's Hydrogen Strategy	• Subsidy for purchase (“ENIN” funding programme)
Forklifts	No target	unknown	Austria's 2030 Mobility Master Plan, Austria's Hydrogen Strategy	No support policy
H_2 Refueling Stations	**Target Number**	**Current Status**	**Partnerships, Strategic Approach**	**Support Mechanism**
70 MPa On-Site Production	No target	-	Austria's 2030 Mobility Master Plan, Austria's Hydrogen Strategy, Alternative Fuels Infrastructure Regulation (AFIR)	• EBIN and ENIN funding programme (CAPEX)
70 MPa Delivered	No target	4	Austria's 2030 Mobility Master Plan, Austria's Hydrogen Strategy, Alternative Fuels Infrastructure Regulation (AFIR)	• EBIN and ENIN funding programme (CAPEX)
35 MPa On-Site Production	No target	-	Austria's 2030 Mobility Master Plan, Austria's Hydrogen Strategy, Alternative Fuels Infrastructure Regulation (AFIR)	• EBIN and ENIN funding programme (CAPEX)

[1] Includes Fuel Cell Electric Vehicles with Range Extenders

[2] As above

35 MPa Delivered	No target	2	Austria's 2030 Mobility Master Plan, Austria's Hydrogen Strategy, Alternative Fuels Infrastructure Regulation (AFIR)	• EBIN and ENIN funding programme (CAPEX)
Stationary	**Target Number[3]**	**Current Status**	**Partnerships, Strategic Approach**	**Support Mechanism**
Small[4]			Austria's Hydrogen Strategy	
Medium[5]		-	Austria's Hydrogen Strategy	
Large[6]		-	Austria's Hydrogen Strategy	
District Grid[7]		-	Austria's Hydrogen Strategy	
Regional Grid[8]		-	Austria's Hydrogen Strategy	
Telecom backup		-	Austria's Hydrogen Strategy	
H_2 Production	**Target[9]**	**Current Status**	**Partnerships, Strategic Approach**	**Support Mechanism**
Fossil Fuels[10]		0		
Water Electrolysis[11]	4 TWh		Austria's Hydrogen Strategy	

[3] Targets can be units installed and/or total installed capacity in the size range indicated
[4] <5 kW (e.g., Residential Use)
[5] 5kW – 400 kW (e.g., Distributed Residential Use)
[6] 0.3MW – 10 MW (e.g., Industrial Use)
[7] 1MW – 30 MW (e.g., Grid Stability, Ancillary Services)
[8] 30MW plus (e.g., Grid Storage and Systems Management)
[9] Target can be by quantity (Nm^3, kg, t) and by percentage of total production; also, reference to efficiency capabilities can be a target
[10] Hydrogen produced by reforming processes
[11] Please indicate if targets relate to a specific technology (PEM, Alkaline, SOEC)

(PEM, Alkaline, SOEC)				
By-product H_2				
Energy Storage from Renewables	**Target[12]**	**Current Status**	**Partnership, Strategic Approach**	**Support Mechanism**
Installed Electrolyser Capacity	1 GW (2030)	10 MW	Austria's Hydrogen Strategy	Renewable Expansion Act (EAG)
Power to Power[13] Capacity				
Power to Gas[14] Capacity				

[12] Can be expressed in MW of Installed Capacity to use the electricity from renewable energy generation, and Annual MWh of stored energy capacity
[13] Operator has an obligation to return the electricity stored through the use of hydrogen back to electricity
[14] Operator has the opportunity to provide the stored energy in the form of hydrogen back to the energy system through multiple channels (e.g., merchant product, enriched natural gas, synthetic methane for transportation, heating, electricity)