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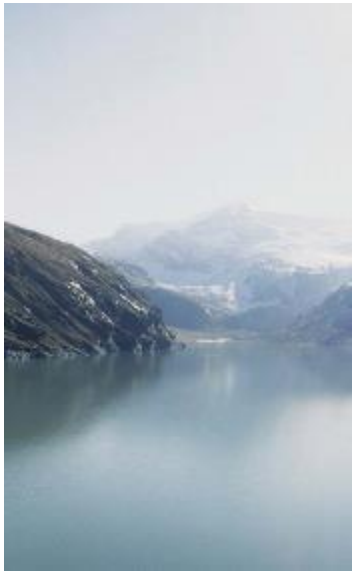
Green Hydrogen @ Blue Danube
Important Project of Common European Interest (IPCEI)



Rudolf Zauner

4.12.2019

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Austria's Climate and Energy Strategy

Austria's climate and energy strategy **#mission 2030**

- **100% renewable electricity by 2030**
- **Hydrogen strategy** as part of the national energy and climate plan

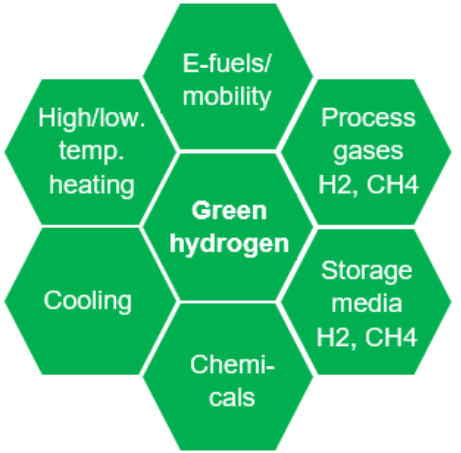
EU long-term strategy: **Deep decarbonisation by 2050**

Green hydrogen can be used as a

- process gas
- energy carrier
- storage medium

Green hydrogen can

- contribute to the decarbonisation objectives of the EU and its Member States: "Deep decarbonisation" by 2050
- increase the flexibility in the energy system
- provide additional storage options for increasingly renewable and volatile electricity systems (seasonal shifting of energy)



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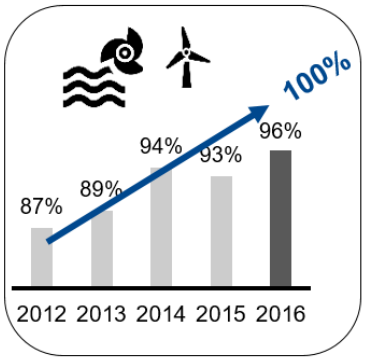
VERBUND: More than Green Electricity

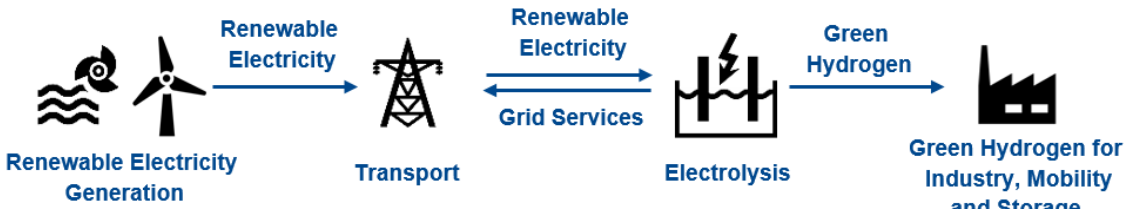
Green Electricity



- **21 pumped storage plants** (3,260 MW)
- **693 million m³ storage volume** (1,800 GWh)

- Largest provider of **grid and balancing services** in Austria

Green Hydrogen



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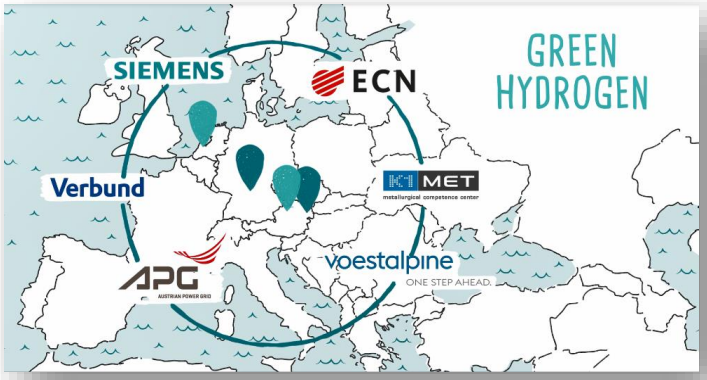
Installation and Operation of an Electrolysis System at the Steel Production Site in Linz, Austria



http://www.h2future-project.eu

Key Data

- **6 MW PEM electrolyser**
- **Start of pilot plant operation** in 2019
- **Pilot tests** and **demonstration** until 2021

Source: voestalpine

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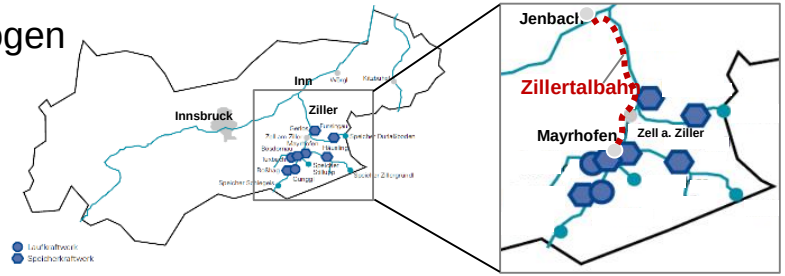
Hydrogen-Operated Narrow Gauge Railway




Source: ZVB

- World's first hydrogen-operated narrow gauge railway in Zillertal valley (www.zillertal.at)
- Green hydrogen supply from VERBUND's local hydroelectric power stations
- Extension to green hydrogen-powered coach and bus service (skiing resort) under evaluation
- Early business case for sector coupling using green hydrogen

Slogan: "Trains operating on crystal-clear water from the Zillertal valley"



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IPCEI – Important Project of Common European Interest

- European Commission: Identify strategic value chains in Europe for the European Council (EU industrial policy)
- Out of 42 topics hydrogen has been identified as one of six strategic value chains
- IPCEI as instrument for first industrial deployment
  - Funding comes from Member States
  - The IPCEI can be aided up to 100% of the funding gap
  - Other criteria apply (contribution to Union objectives, creation of spill-over effects etc.)
  - IPCEI Hydrogen: Coordinated by Hydrogen Europe and DG GROW


Green Hydrogen @ Blue Danube

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The Concept

Produce **green hydrogen on a large scale**
off-grid in South-East Europe using wind and solar energy

Transport hydrogen via the River Danube to hydrogen users
in countries of the **Interreg Danube Transnational region**

Set up the necessary hydrogen infrastructure
in the participating member states along
TEN-T core corridors

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The Benefits

- ✓ Contribute to achieve **climate objectives of Member States**
- ✓ Reduce dependence on fossil energy imports: **renewables made in Europe**
- ✓ Increase **security of energy supply:** increased flexibility and resilience
- ✓ **Strengthen key European industry sectors, create jobs** and **spill-over effects**

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The Players

Shipyard for hydrogen vessels

Transport carrier provider
(H2 to LOHC or e-fuel)

Danube transportation company

Hydrogen producer
Electrolyser manufacturer

Reconversion provider (LOHC to H2)
Hydrogen supplier and rail back-up

Industrial partners: iron and steel,
refinery, chemical and fertiliser industry

PV & wind producer
PV & wind manufacturer

Refuelling station manufacturer and operator

Electricity provider

Fleet operator and truck manufacturer

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The Region

Participating countries in the Interreg Danube Transnational Programme

Supported by the Secretariat of the Danube Commission

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The Facts

2,000 MW off-grid wind and solar **energy production**

1,800 MW electrolysis for **hydrogen production**

40 hydrogen **transport barges**

80,000 tonnes of hydrogen for **industry, power + mobility hubs (500 trucks / 100 HRS) along the Danube**

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In a Nutshell

Use the **Danube waterway** for cost-efficient and sustainable transport of hydrogen in the Danube region

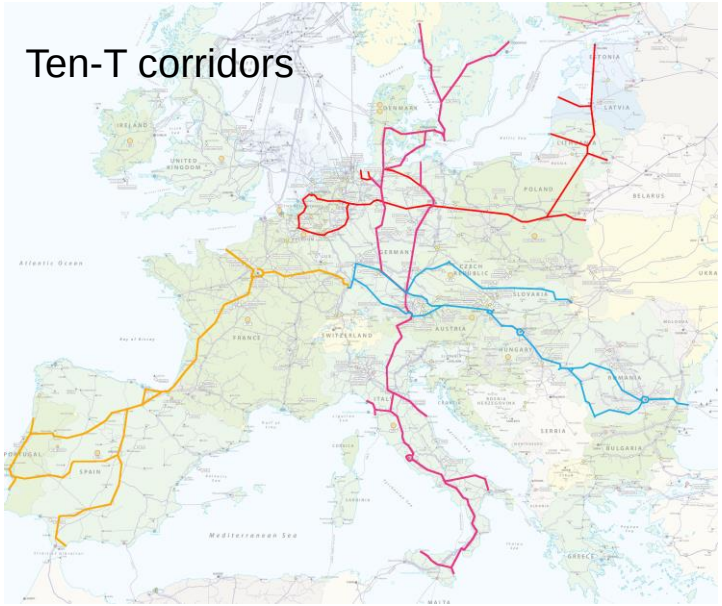
Utilise the **Danube sea ports and inland ports** for storage and intermodal transport of green hydrogen

Bring green hydrogen to early movers in the **industry and mobility sectors** and roll out the hydrogen economy along **TEN-T core corridors**

Strengthen and decarbonise both traditional and new industry sectors in Europe all along the hydrogen value chain

The Vision

Spill-over effects: Connect the Danube value chain to the **River Rhine**, to the **Black Sea**, to **pipeline networks** across Europe and to **maritime ports**



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Partnering has just begun

elringklinger

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DB SCHENKER

chemgas

ÖBB

SIEMENS
Ingenuity for life

hydrogenious
LOHC TECHNOLOGIES

1948
Donaukommission
Commission du Danube
Дунайская Комиссия

Supported by the Secretariat of the Danube Commission

Next steps: complete partnering and start detailed project planning

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