VERBUND Green Hydrogen GmbH
Decarbonisation partner for a successful energy transition

Green
Hydrogen

Verbund

Verbund at a glance

Austria's **leading** energy utility and electricity company

Route length of around **3,400** supra-regional electricity grid kilometres

129 VERBUND hydropower plants with over 8,300 MW of maximum electricity capacity

And approximately **900** gas transmission pipeline kilometres

95% of the total electricity generation stemming from renewables

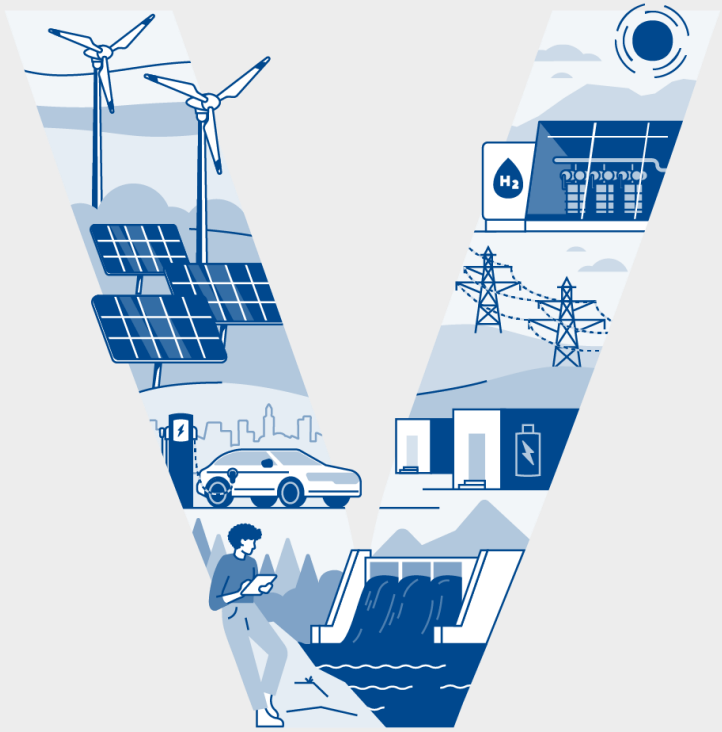
Active RES positions in AT, DE, RO, ES, IT and AL with capacity expansion of

3.8 GW by 2030

Strategy 2030 – Accelerating the energy transition - focus on the three strategic directions and the goal of further growth

Expansion of Renewables in Europe

Significant expansion of wind & solar power in Europe



Positioning as European Hydrogen player

Green Hydrogen as key to the energy transition and decarbonisation

Strengthening of integrated domestic market

Strengthening our position as an integrated provider in the domestic market and a leading hydropower producer, reliable gas and electricity grid operator, and partner in decarbonisation in Austria and Germany.

VERBUND's holistic hydrogen strategy for positioning in the European hydrogen market

VERBUND as a short- and long-term decarbonisation partner for industry: current and future demand forms the basis for VERBUND's H2 business development

S H O R T T E R M

Local production today

- Initiating H2 market development
- Meeting existing demand
- Replacing grey H2 with green H2
- Building partnerships
- Ramp up from pilot to industrial scale

L O N G T E R M

H_2-Import

Securing long-term volumes at competitive costs

Develop diversified import flows

Enable deep decarbonisation at scale

Develop infrastructure

Abstract from VERBUND's hydrogen project portfolio for local hydrogen production and storage

H2FUTURE: GREEN HYDROGEN FOR THE STEEL INDUSTRY

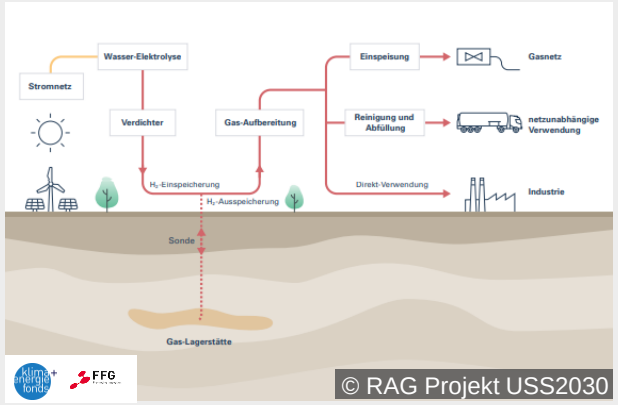
- 6 MW electrolyser - up to 1,000 tonnes/year
- Commissioning in 2019
- Industrial integration of H2 production into the steel making process
- Further development into a filling plant and commercial distribution by 2025
- High pressure trailer filling up to 500 bar
- 5.0 quality (suitable for fuel cells)

LARGE-VOLUME ELECTROLYSIS PLANT WITH BURGENLAND ENERGIE

- 60-300 MW electrolyser
- Production of green hydrogen from wind and solar energy for industrial customers in eastern Austria
- 2-stage expansion: from 9,000 to 40,000 tonnes of green hydrogen per year

JOINT PROJECT ON AN INDUSTRIAL SCALE WITH LAT NITROGEN LINZ

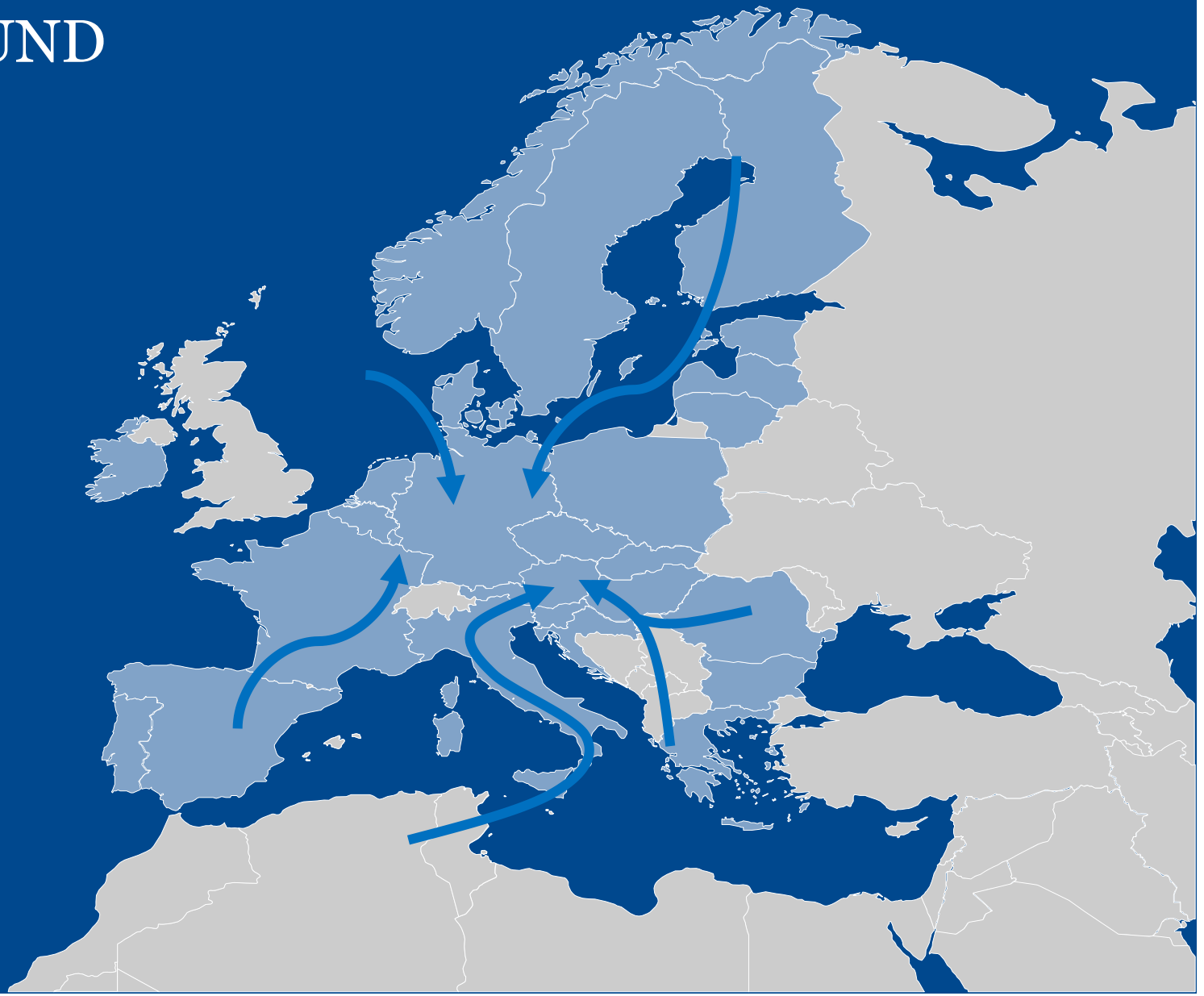
- 60MW electrolyser at LAT Nitrogen Linz
- Production of up to 7,000 tonnes of hydrogen per year
- IPCEI (Important Projects of Common European Interest) Hy2Use and Innovation Fund funding approved
- Use of green hydrogen in the production of fertilisers, melamine and technical nitrogen products



UNDERGROUND SUN STORAGE 2030: HYDROGEN AS SEASONAL STORAGE

- Development and demonstration of a large-volume seasonal storage facility for green hydrogen in underground gas reservoirs
- Processing and utilisation of hydrogen with high purity based on a novel purification technology

H2 Import:
Role and activities of VERBUND



VERBUND is active across the value chain and as orchestrator

Establishment of **partnerships** for RES & H2 production

Selection of **most favourable regions** to develop large-scale H2 production

Long-term reliable connection needed to link supply and demand regions

Pipeline transport particularly important for **supply security** in Central Europe

VERBUND as **decarbonization partner** with experience and industrial know-how

Aggregation of demand of main H2 offtakers in our core market

VERBUND role as orchestrator in order to …

I

Synchronise timings

Address chicken-egg problem via coordination of value chain activities

II

Connect supply & demand

Ensuring market acceptance through solid, long-term solutions

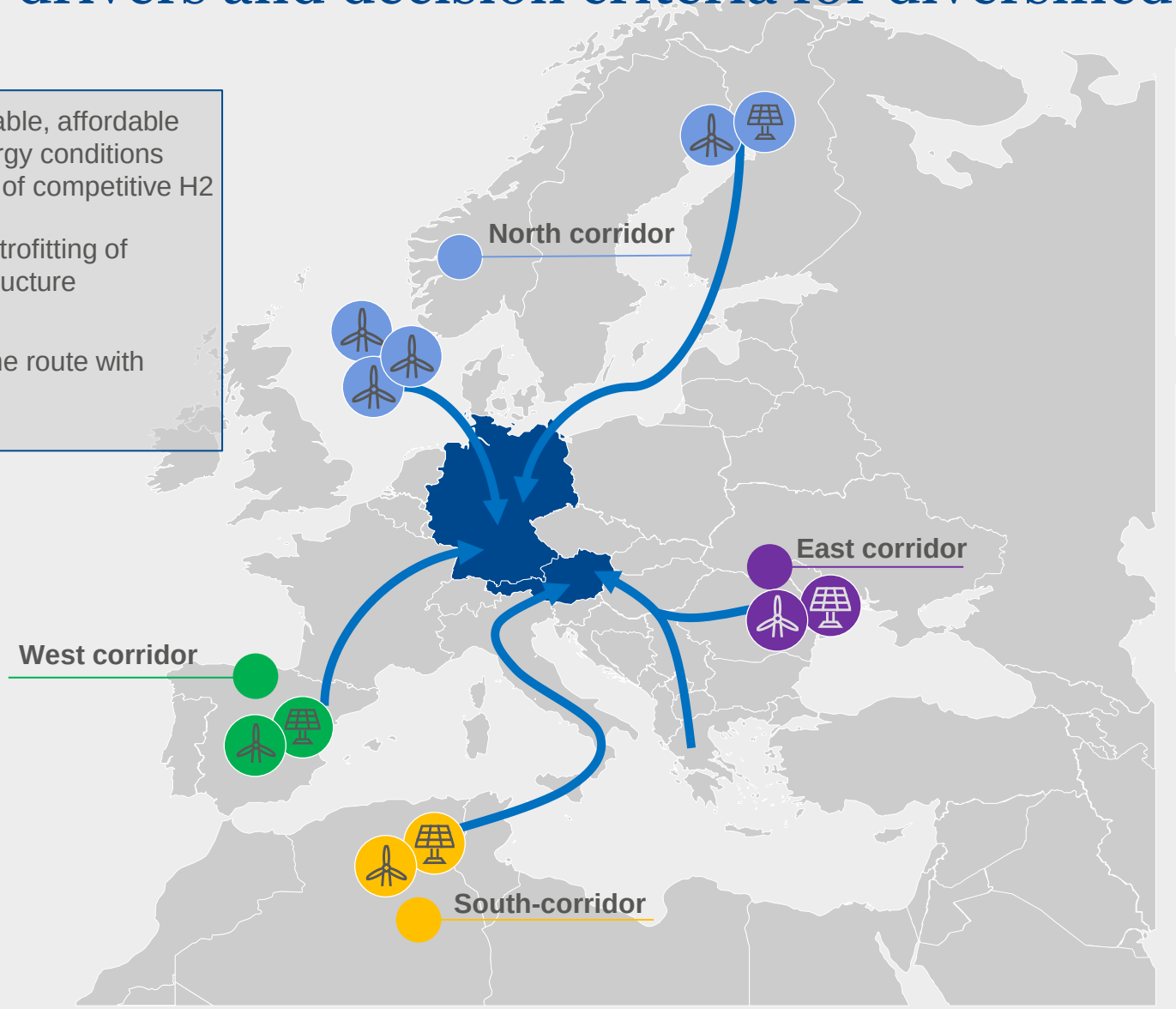
III

Achieve cost-effectiveness

Long-term competitive H2 supply to secure European industrial locations

H2 import: drivers and decision criteria for diversified corridors

- Access to scalable, affordable renewable energy conditions and availability of competitive H2
- Possibility of retrofitting of existing infrastructure
- Feasibility of the route with local support

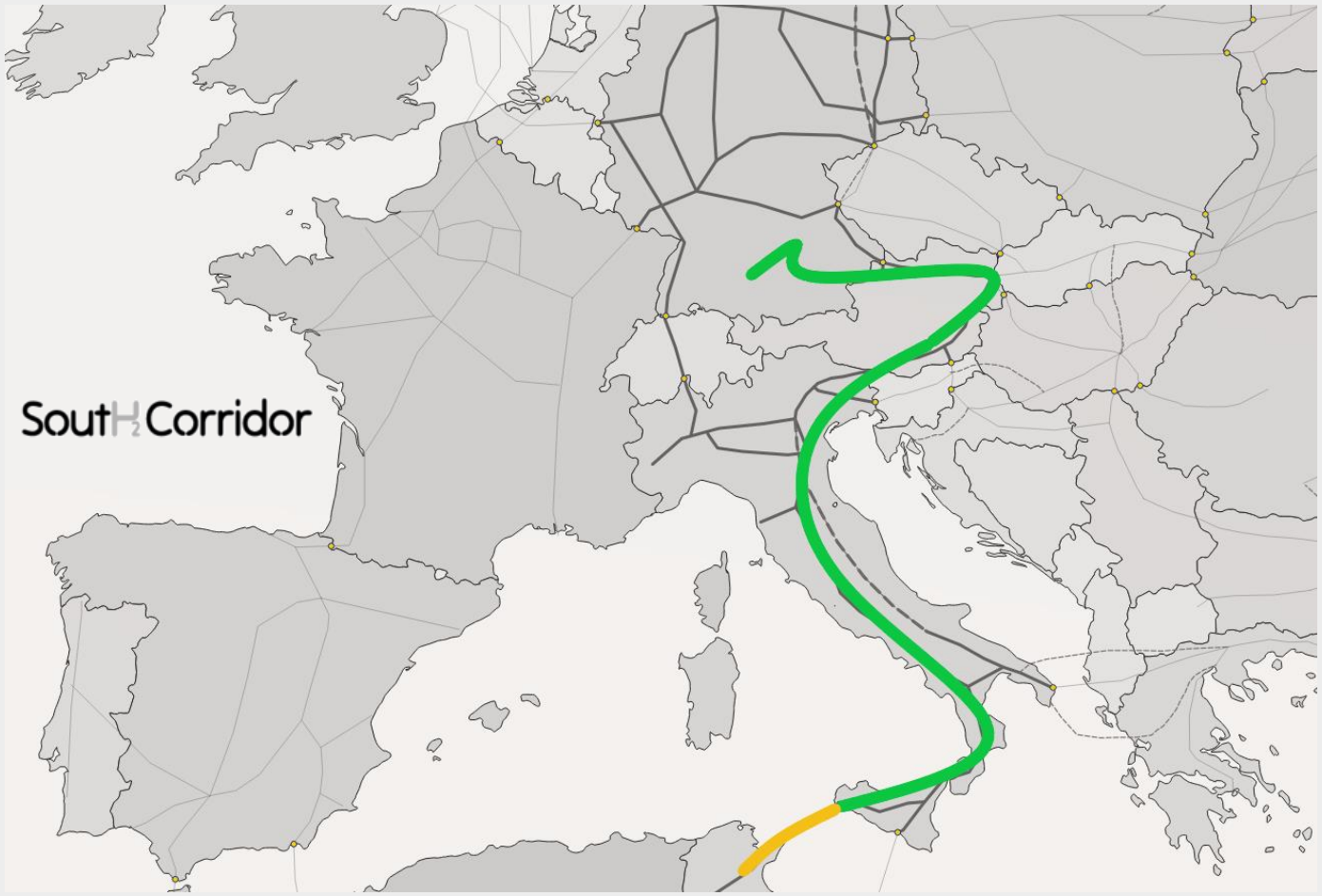


Long-term coverage of the significantly **increasing H2 demand** in Austria and Southern Germany through imported green H2 at **competitive prices** from 2030 onwards, leading to the decarbonization and securing the industrial sites.

Limited **regional renewables expansion** potential, indicating that the hydrogen demands of Austria and Southern Germany cannot be met in the long term through local production alone.

Identification and development of the four most promising import corridors to **Austria** and **Southern Germany** by VERBUND.

SoutH2Corridor



SoutH2 Corridor

- 3 300 km dedicated hydrogen pipeline in **2030**
- Serving **hard-to-abate demand** clusters of Italy (e.g. Augusta, Taranto and northern Italy), Austria (e.g. Styria, Vienna and Linz) and Germany (e.g. Burghausen and Ingolstadt)
- **Mainly repurposed pipelines** (~75%)

- https://www.south2corridor.net/

Snam Rete Gas	2300km (73% repurposed / 27% new built) Import capacity in Mazara 448 GWh/d (4.4Mtpa)
Trans Austria Gasleitung GmbH	380km (only repuposed) Arnoldstein 168 GWh/d (1.7Mtpa)→
Gas Connect Austria GmbH	340km (200km new) Baumgarten 142 GWh/d
Bayernets GmbH	294km (14 km new) Überackern/BH 150 GWh/d

SoutH2 - Home (south2corridor.net)

Green Hydrogen via Pipeline - H2 NOTOS

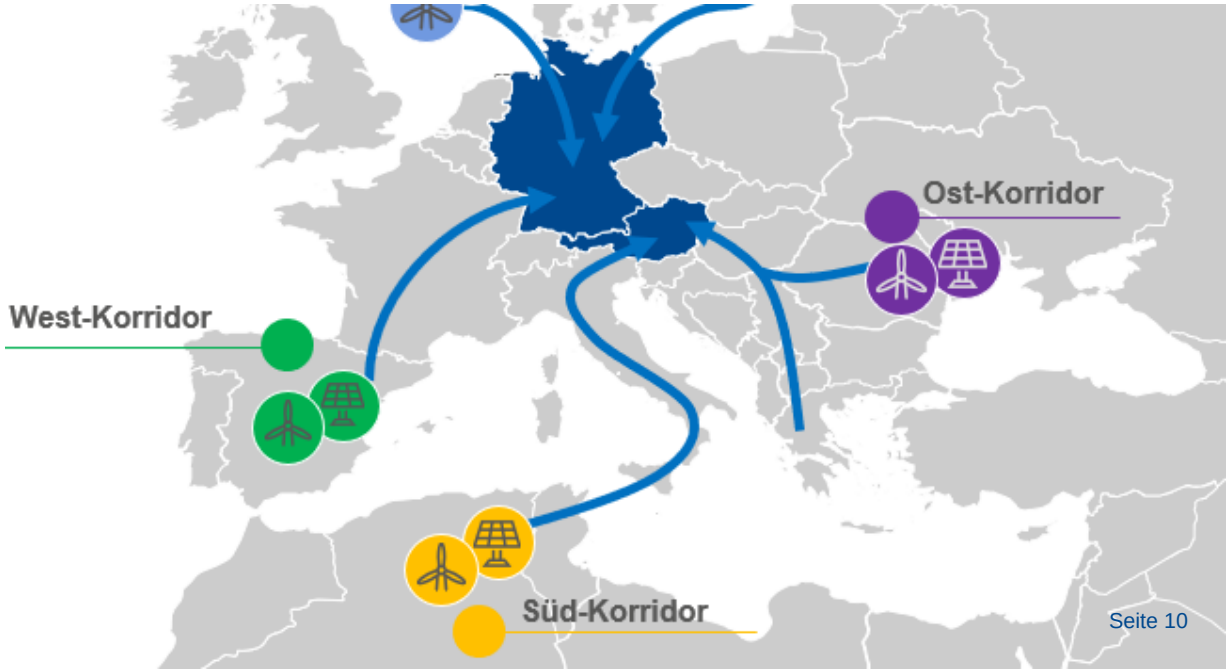
Together with TOTAL Energies H2, VERBUND is developing ‘H2 NOTOS’, a large-scale project to produce green hydrogen in Tunisia and export it to Central Europe. The country offers excellent wind and PV potential and therefore ideal conditions for green Hydrogen production. The connection to Europe is via the planned “SoutH2 Corridor” pipeline, which connects North Africa with Italy, Austria and Germany. The project is an important building block in the development of VERBUND's diversified import portfolio for the long-term and sustainable supply of green hydrogen to our European customers and partners.

Key Data

TotalEnergies H_2 a company owned by TotalEnergies and eren

Verbund

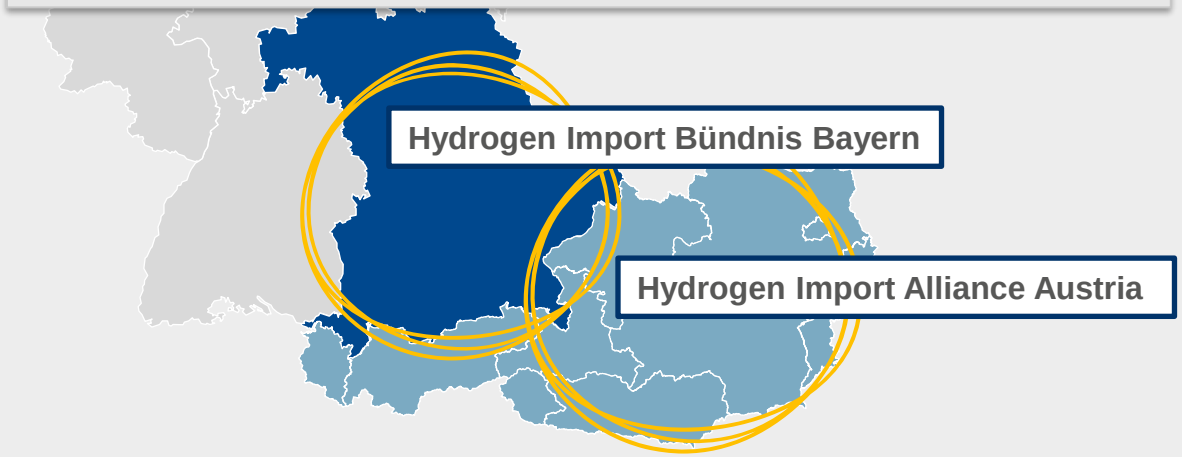
- **H_2 NOTOS** produces **Green Hydrogen** through electrolyzers, powered by Wind and Solar Energy
- Initial Production: **200,000 tonnes annually**
- **Scaling** up till **1 Million tonnes** is possible
- Water supply via desalination plants
- Entry to European Market through „**SoutH2 Corridor**“ Pipeline – planned commissioning ~**2030**
- TE H2 and VERBUND lead **development**, **financing**, **construction** and **operation**
- VERBUND **coordinates** Hydrogen **Transportation** to Central Europe



Partnerships - an important building block for a successful hydrogen economy

IMPORT

- **Bundling** of hydrogen offtake
- **Development** of a clear and feasible roadmap for hydrogen imports to Austria and Southern Germany (Bavaria)
- Development of corridors for **low-cost hydrogen imports**



The partner companies work together on:

- Accelerating the H2 economy
- Coordinating H2 production, transport and demand
- Solving the "chicken and egg" problem
- Sharing expertise and resources

V

International partnerships for H2 production

Development of large-scale projects for the production of H2 in Europe and in neighbouring regions

Examples of partnerships are:

Masdar · TotalEnergies H_2 a company owned by TotalEnergies and eren · ACWA POWER

Supporting PCI Corridor Development Projects

Working together for a supply of green hydrogen from a diversified range of import routes.

Examples of partnerships are:

SouthH2Corridor · Flow making hydrogen happen · H2ercules

National and international memberships

We contribute to the development of the European hydrogen economy through our membership of associations and consortia.

Examples of partnerships are:

AquaVentus · NATIONALER WASSERSTOFFRAT · HyCentA · Hydrogen Partnership Austria · H2Global Stiftung · Dii · WASSERSTOFF BÜNDNIS BAYERN · bdew Energie. Wasser. Leben. · WIVAP&G Energy Model Region

Vielen Dank!

Verbund