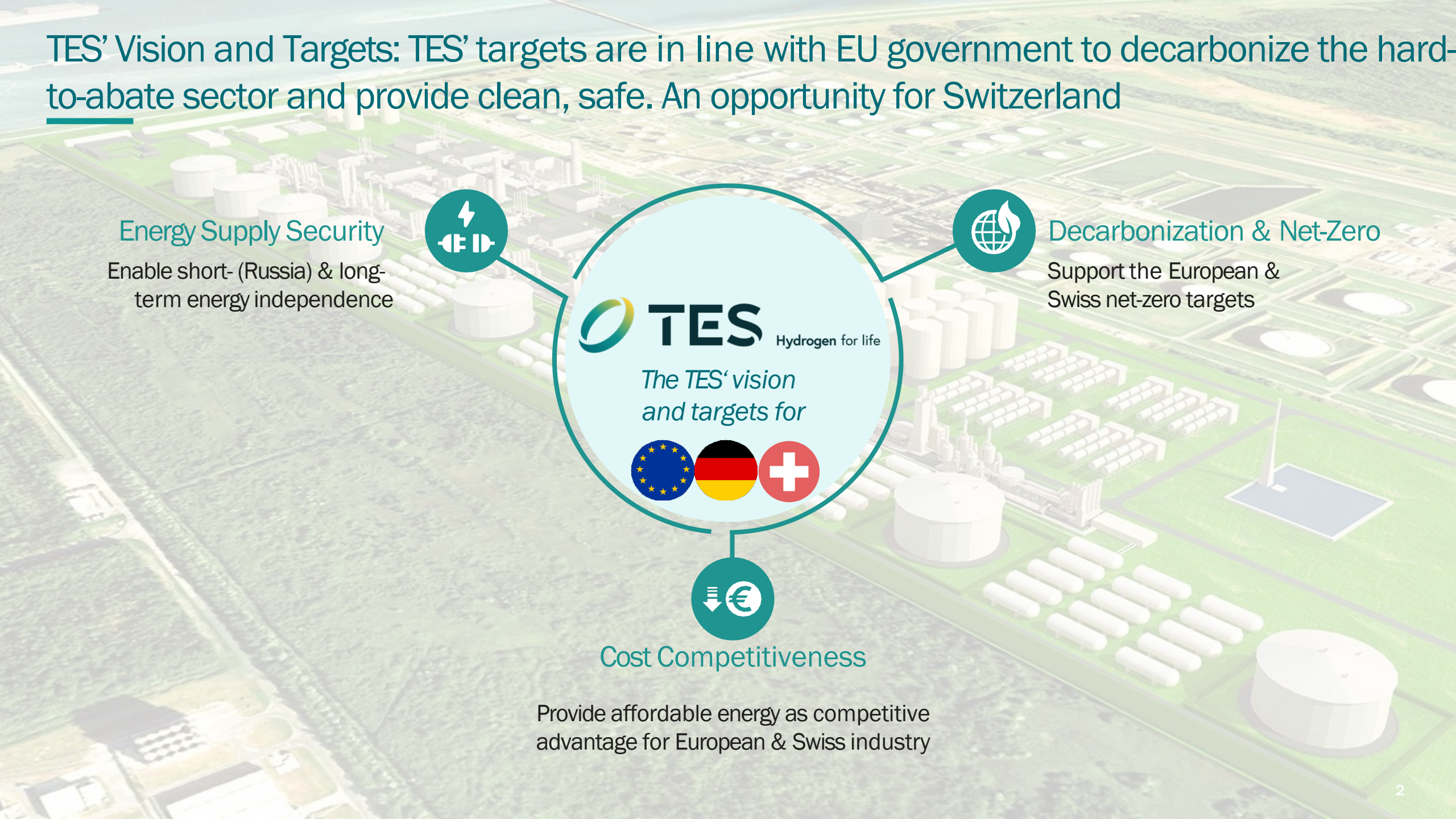
TES Hydrogen for life

# Industrial scale Green Hydrogen, Green Gas supply and CO2 offtake

Your solution to achieve ‘Net zero’ in the most cost effective way

# TES' Vision and Targets: TES' targets are in line with EU government to decarbonize the hard-to-abate sector and provide clean, safe. An opportunity for Switzerland




## Energy Supply Security

Enable short- (Russia) & long-term energy independence

## Decarbonization & Net-Zero

Support the European & Swiss net-zero targets

## Cost Competitiveness

Provide affordable energy as competitive advantage for European & Swiss industry

# Fast tracking Europe's largest and greenest energy hub in 3 steps


## Before end 2023

### Super Fast Track @speed

- LNG Import, Floating Storage Regasification Unit (FSRU)
- Signing binding offtake agreements

## Before 2026

### Fast Track @scale

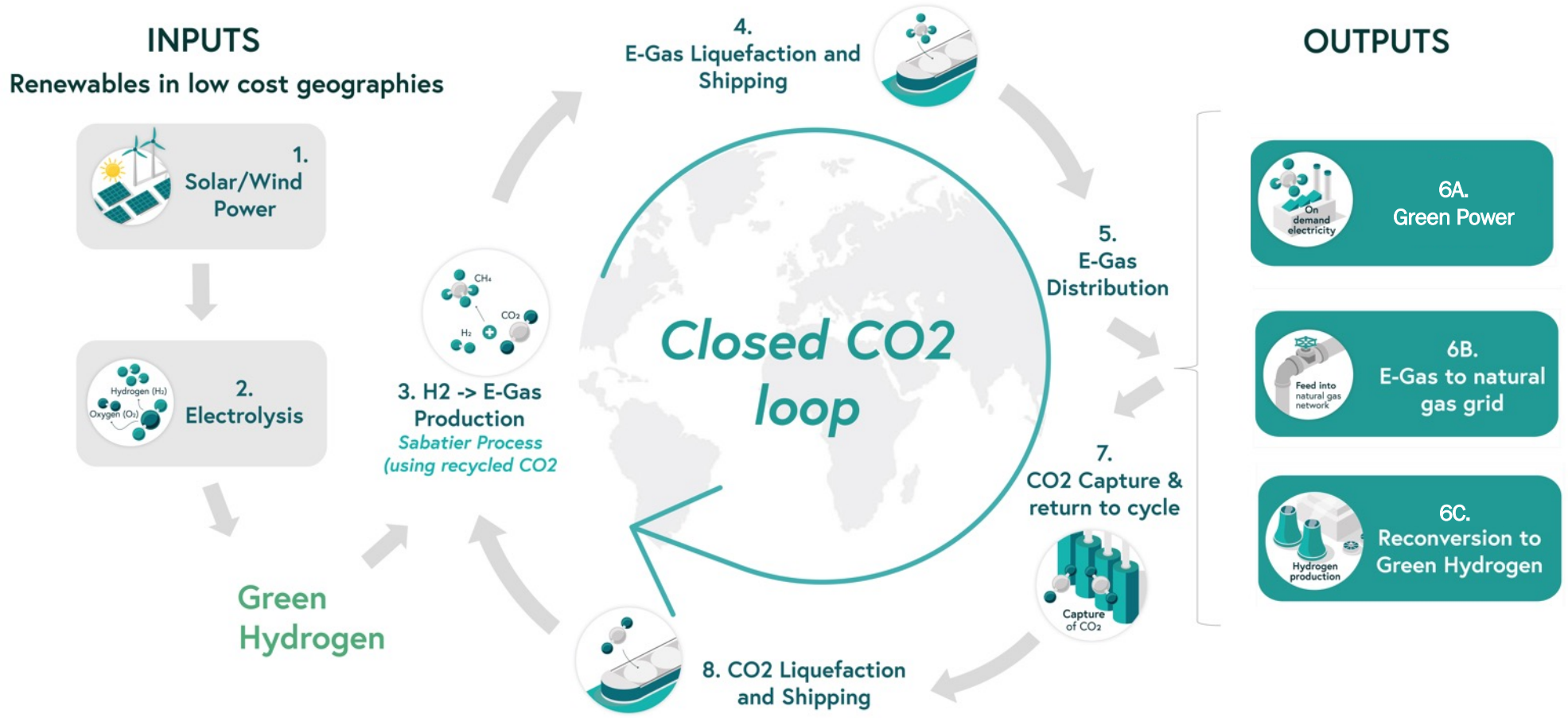
- On shore green gas terminal with 6 jetty positions
- Ramping up green gas and green hydrogen supply
- Production of green power in WHV
- Start building cheapest global H2 upstream portfolio
- Focus on technology & manufacturing

## Before 2043

### Fully decarbonized energy hub

- Importing >7 MT green hydrogen
- Providing flexibility and price cap to power prices
- Price < 30€/MWh

# Efficient Hydrogen transport as E-Gas (eNG), introducing TES' closed $CO_2$ loop




**Transporting renewable energy from low cost geographies to high demand locations using $CH_4$ as a carrier**

# TES offers tailored solutions to customers in the Mobility, Industry and Power segments

Starting 2026/27


## Clean & Green $H_2$

Production of $H_2$ at your location with any capacity or supply of $H_2$ via a hydrogen pipeline

## Green Gas

Green $CH_4$ (eNG) for your energy demand incl. offtake of related $CO_2$

## Green Power

Power plants with post combustion $CO_2$ capture and new plants e.g. Allam-Fetvedt Cycle

Starting 2026


## CO2 off-take

We take the $CO_2$ from your emissions for sequestering purposes

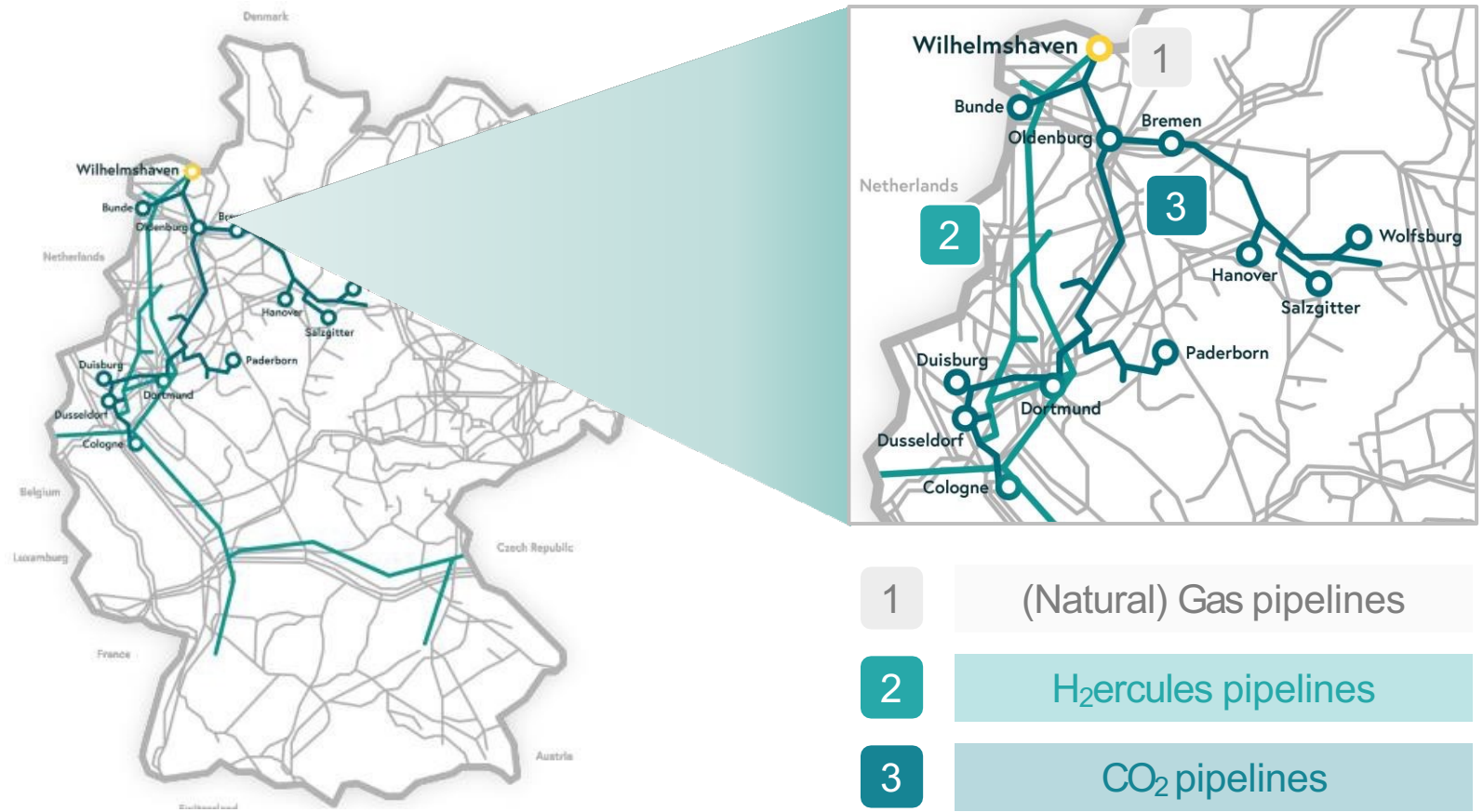
## Flexibility on-demand

Commodity storage (Green gas, $H_2$, $CO_2$) balancing the energy system.

We offer flexibility in offtake, seasonal and daily to plan for intermittent load levels

# Pipeline Access: Green Energy Hub will be strategically located at the deep water port in Wilhelmshaven with gas, $H_2$ and $CO_2$ pipeline access planned

## Planned pipeline network access




| | |
|---|---|
| 1 | (Natural) Gas pipelines |
| 2 | $H_2$ercules pipelines |
| 3 | $CO_2$ pipelines |

## Details

- TES already acquired site for Green Energy Hub in Wilhelmshaven in 2022
- Location features deep water port location and access to wide network of pipelines
- Planned connection to Germany's industrial core :
  - ✓ (Natural) Gas pipelines –partnership with OGE (also eNG-ready)
  - 2 $H_2$ercules pipelines – connection to planned OGE / RWE $H_2$ pipeline network
  - 3 $CO_2$ pipelines –partnership with OGE, OGE develops a central European $CO_2$ pipeline network[1]

OGE = Open Grid Europe, [1] $CO_2$ access potentially realized via train terminal

# Development of the CO2-Pipeline network by TES and OGE

## Key facts

- ~ 1,500 km of pipeline grid connecting main $CO_2$ emission clusters to WH2V
- Initial capacity of 20-25Mtpa, dimensioning of WH2V connection ongoing
- Connecting neighboring countries
- Transporting CO2 from both, unavoidable emitters and $CO_2$ for CCU (eNG)
- Pipeline and Terminal submitted application to be listed as PMI (project of Mutual Interests)

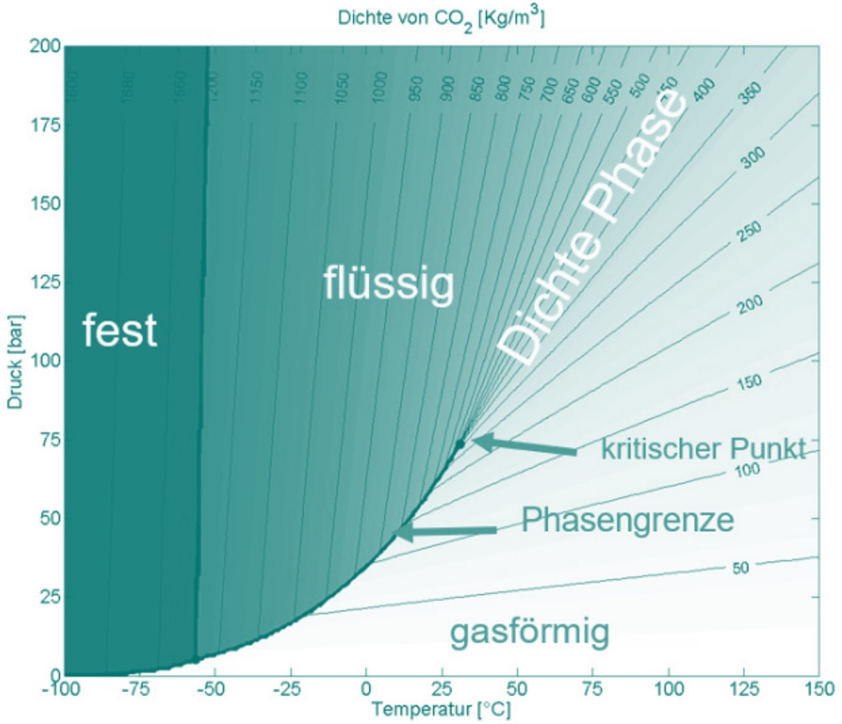
## Timeline + Outlook

– **First routes available from ‘28** with Ruhrgebiet and area Salzgitter connected by ‘30-32 depending on **the regulatory framework** (KSpG)

– **Other routes and connection to neighboring countries** can be planned and started in parallel depending on demand


Source: www.co2-netz.de

# $CO_2$ Transport by pipeline




| Component | Proportions |
|---|---|
| Carbon dioxide ($CO_2$) | > 98 vol.-% |
| Water ($H_2O$) | < 30 ppmv |
| Hydrogen sulphide ($H_2S$) | < 10 ppmv |
| Total sulphur (S) | < 30 ppmv |
| Nitrogen ($N_2$) | < 2 vol.-% |
| Argon (Ar) | < 0,25 vol.-% |
| Oxygen ($O_2$) | < 30 ppmv |
| Hydrocarbons ($C_xH_y$) | < 0,25 vol.-% |
| Carbon monoxide (CO) | < 100 ppmv |
| Nitrogen oxides ($NO_x$) | < 1 ppmv |
| Sulphur oxides ($SO_x$) | < 1 ppmv |
| Dust | < 1 ppm |
| Amines | < 1 ppmv |
| Hydrogen ($H_2$) | < 1 vol.-% |
| Mercury (Hg) | < 5 ppbv |
| Ammonia ($NH_3$) | < 10 ppmv |

- For economical and space reasons, the CO2 will be transported in the backbone in **dense/liquid form reducing space requirements by ~20 times**
- Operating pressure expected to be **80-90 bar**

- Proposed CO2 specification
- Alignment within different stakeholders ongoing
- Final definition forthcoming

# Way forward

Work in progress

## Access and commercial

- Open and non-discriminatory access
- Different business and pricing models are evaluated
  Postage stamp vs. Zone vs. Route
- Secure access through firm commitment

## Regulation legal framework

- Adjustment of legal framework is necessary, in particular the German Dioxide Storage Act (KSpG)
- Finalizing the German Carbon Management Strategy

## Timeline

- First part of the pipeline could be operational in 2028
- Access to Swiss boarder between 2035 and 2040

## Train connection

- Fast to implement and economically viable solution
- Development of large-scale receiving terminal in Wilhelmshaven
- Prepares the market for CO2 pipeline

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# Our Locations

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tes-h2.com

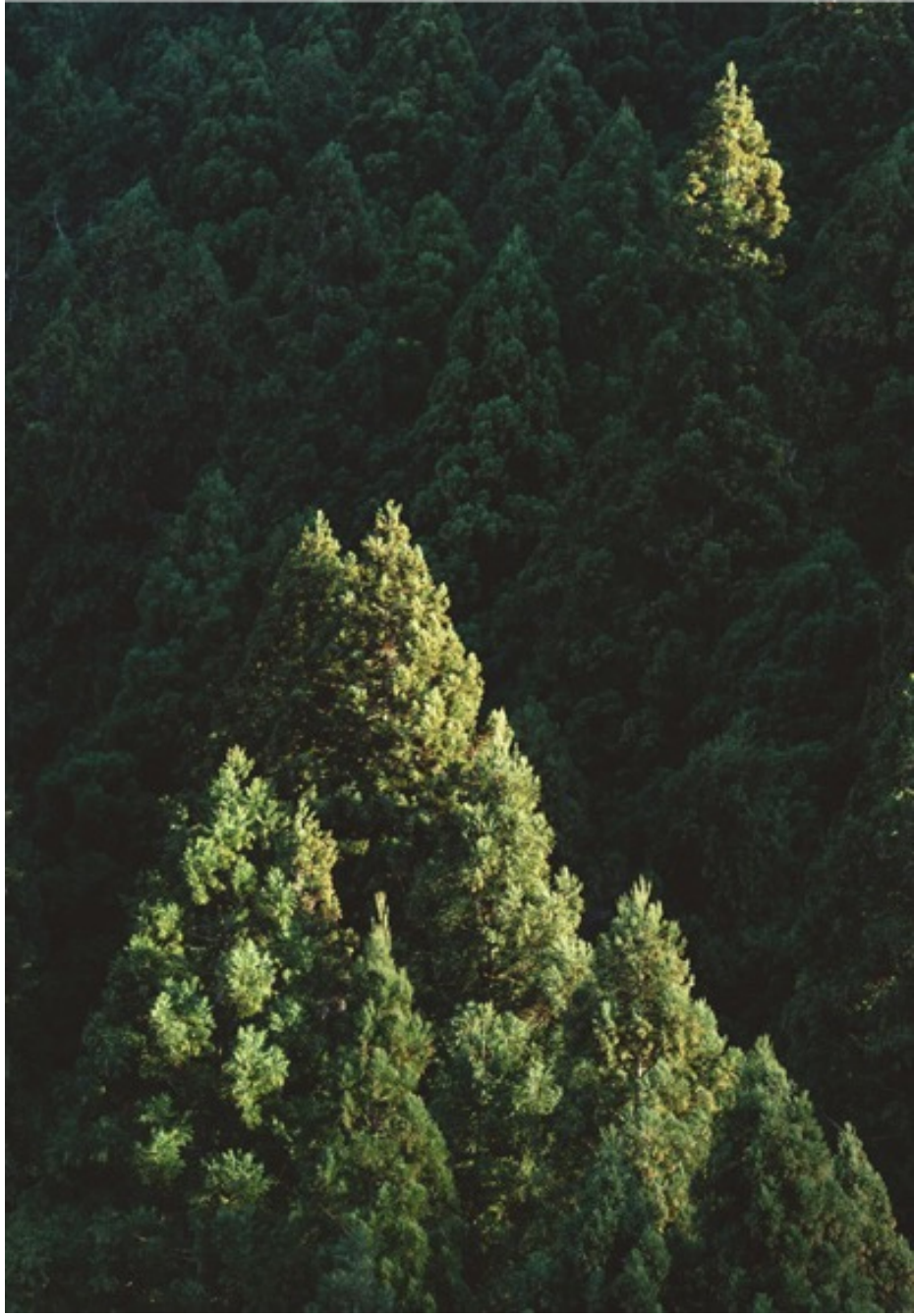
# About TES – your Energy Partner of Choice

TES is a **world-scale green hydrogen company** with a mission to deliver on a net-zero future by decarbonising the energy chain.

TES's prime objective is to accelerate the energy transition by utilising the existing global energy infrastructure to reach customers with **green hydrogen, green gas and green power** while accelerating the phase out of fossil fuels from the system globally and introducing **CO2 circularity.**

TES provides green hydrogen at scale into global markets with an innovative business model based on proven technologies to current and future hydrogen users, particularly across **mobility, industrial and power** sectors.

TES is currently developing energy supply and import hubs in **Germany, Benelux, France, Middle East, Canada, Australia, North Africa, South Africa and the United States** to integrate and optimize global supply chains.



# TES: building the most efficient and diversified upstream green energy portfolio

## Attractive supply positions to access world's best and most secure renewable locations


Building secure and diversified portfolio also through industrial and G2G alliances

# In Wilhelmshaven TES is building the EU Green Hydrogen Hub

**22.5 Mt (340 TWh / 30 BCM)** Synthetic $CH_4$ arrives in WHV per year
**7 Mt** green/clean $H_2$ can be produced per year
**52 Mt** $CO_2$ export capacity per year for circular use + **~20 Mt** export for CCS

**FID:** End of 2022 → **Phase 1** Green 2027 → ... → **Phase 10** Green 2045

## Production

- Secured **technical partnerships** with major technology providers
- Negotiations with **Middle East partners** for long term agreements ongoing since 2020

## Transportation

- **Suez-max ships**: feasibility for dual mode $CH_4$-$CO_2$ carriers confirmed, design ongoing
- Negotiation of **ship charters commenced in parallel**

## Distribution

- **Infrastructure:**
  - **145 ha industrial land with 15.5 m deep water port**
  - Direct **access to extensive pipeline network** and salt caverns
  - Advanced stage in **permitting process**
  - **Public consultation process** completed Feb. 2022
  - **FEED** being prepared
- **Sales:**
  - **MOUs/LOIs with leading German consumers** (power, steel, chemicals and cement plant operators)

## Support

- **Political support** from EU, Federal Ministry of Economics, State of Lower Saxony and local authorities in city of Wilhelmshaven