

ILF CAPABILITIES

HYDROGEN PRODUCTION, STORAGE AND TRANSPORT

JANUARY 2022



ILF AT A GLANCE

50+

YEARS OF EXPERIENCE

6,000+

PROJECTS SUCCESSFULLY
EXECUTED

40+

OFFICE LOCATIONS
ACROSS FIVE CONTINENTS

224

MILLION € REVENUE

150+

COUNTRIES IN WHICH ILF HAS
BEEN SUCCESSFUL

2,400+

EMPLOYEES WORLDWIDE

SERVICES

Consulting Services

Market Studies	Financial Advisory	Lender's Technical Advisory
Master Planning	Transaction Advisory, Due Diligence	
Institutional Analysis		Operation Maintenance Consultancy
Project Screening	PPP Advisory	Dispute Resolution
Pre-Feasibility Studies	Bankable Feasibility Studies	
	Optimization Studies	Optimization Studies
	Environmental & Social Impact Assessment	

Engineering Services

Pre-Concept	Conceptual Design	Basic Design	Guide Design	Integrity Assessment	Decommissioning Planning
		FEED, Tender Design	Detailed Design	Rehabilitation Design	
		Permit Application Design	Construction Design	Modification Design	
			Design Review		
			As-Built Documentation		

Project Management Services

Project Organization	Project Management Consultancy			Operation Supervision
	Risk Management			
	Stakeholder Management			
	Project Execution Planning	Procurement Services	Supply Chain Management	
			Construction Supervision	
			Commissioning Supervision	



BUSINESS AREAS

ENERGY & CLIMATE PROTECTION



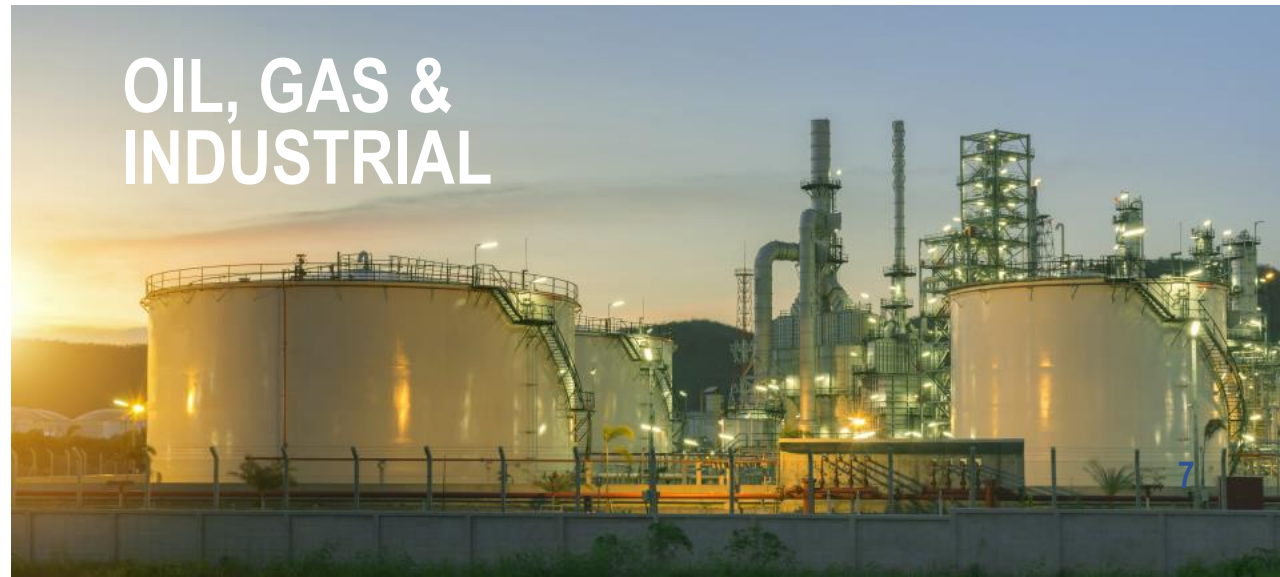
WATER & ENVIRONMENT



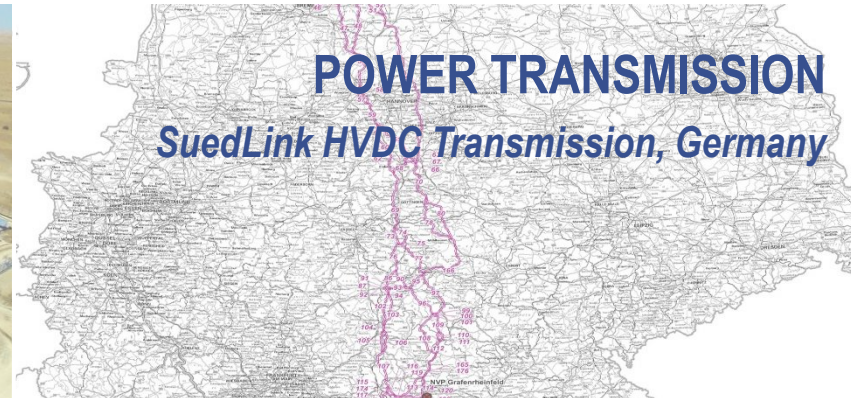
TRANSPORTATION & URBAN SPACES



OIL, GAS & INDUSTRIAL



INFRASTRUCTURE REFERENCES



HYDROGEN SUPPLY CHAIN

ENERGY SOURCE

- Solar power plant design
- Wind power plant
- Hybrid power plant
- Hydropower



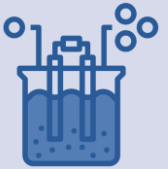
POWER TRANSMISSION

- Energy system planning
- Grid connection
- Grid stability analysis
- Transmission lines
- Energy storage



HYDROGEN PRODUCTION

- Electrolysis
- PAE, PEM...
- Storage
- Water treatment



GREEN DERIVATIVES

- Methanation
- Ammonia production
- LOHC production
- Liquefaction
- Compression / C-H₂



PIPELINE EXPORT

- Power-to-Gas
- Blending
- Conversion
- Compression



SHIP EXPORT

- Ports and terminals
- Loading
- Unloading



OFFICES WITH ACTIVITIES IN H2

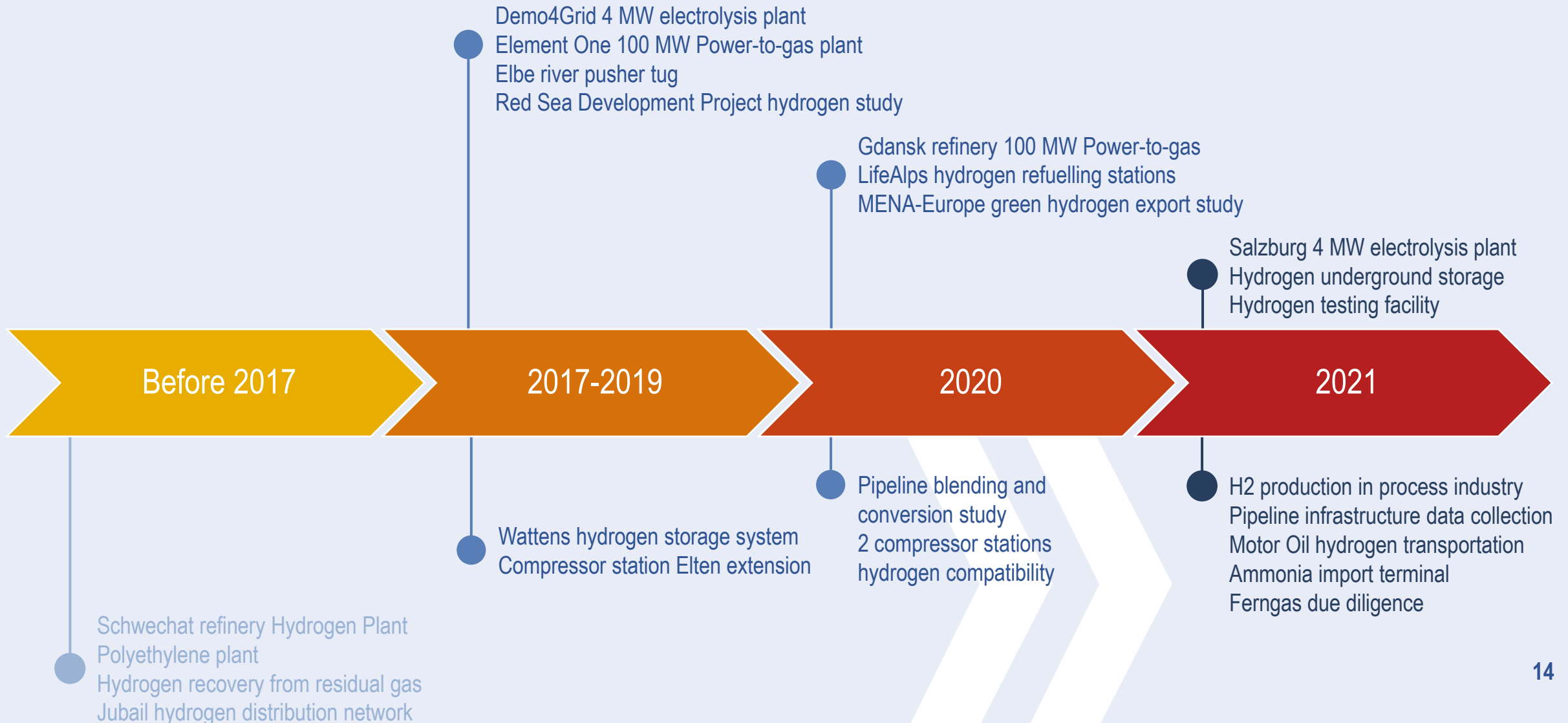


TYPICAL HYDROGEN SERVICES

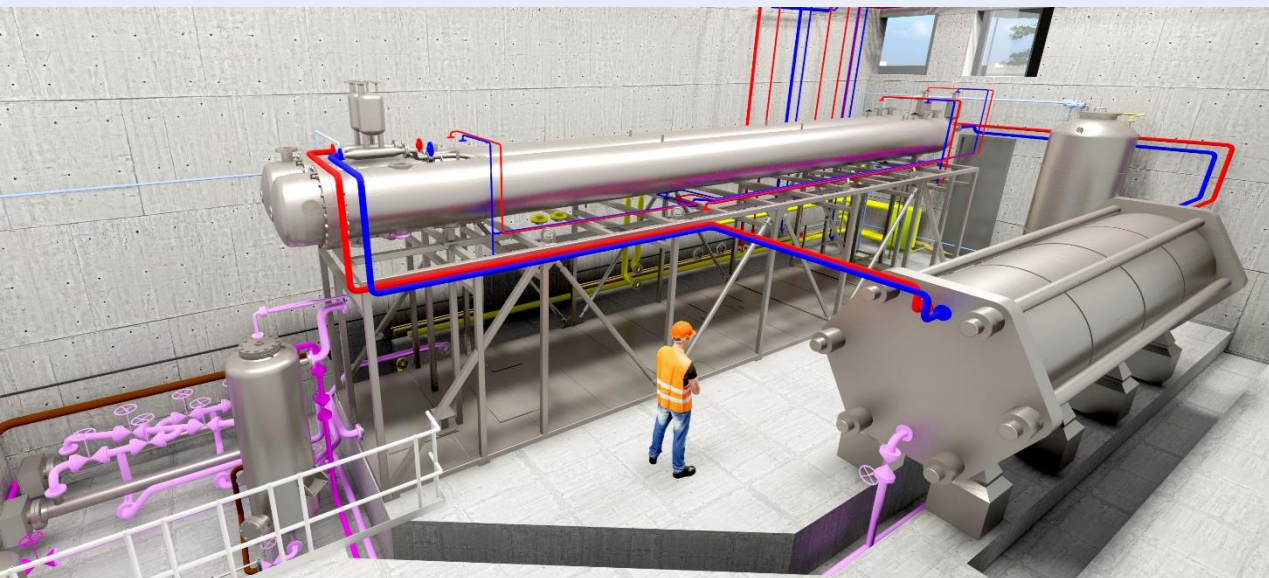
- Roadmaps
- Design review
- Feasibility study
- Conceptual design
- Basic design
- Front End Engineering Design (FEED)
- Authority engineering/ Permitting
- Safety Studies
- Detailed design
- Construction supervision
- Engineering, Procurement and Construction Management (EPCM)



REFERENCES (CHRONOLOGICAL)



DEMO4GRID – 4 MW ELECTROLYSIS



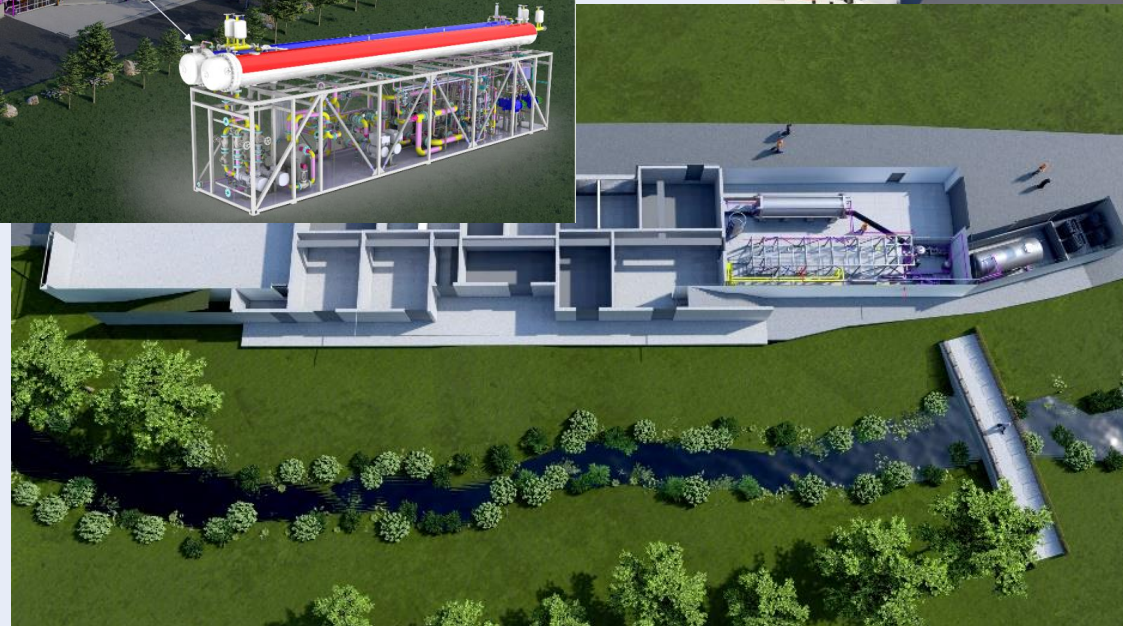
HYDROGEN PRODUCTION FROM GRID BALANCING MARKET

- Location: Innsbruck, Austria
- Client: MPREIS, large retail chain in Austria
- Application: Heating and H2 refuelling
- Utilisation of 4 MW PAE electrolyser for grid balancing
- Preparation of tender documents and authority engineering completed
- Start of construction: September 2020
- Construction period: approx. 1 year
- ILF services since 2017: Conceptual design, detailed design, permitting & authority design
- 2021 Construction supervision & commissioning

PRODUCTION, HEATING, REFUELING STATION

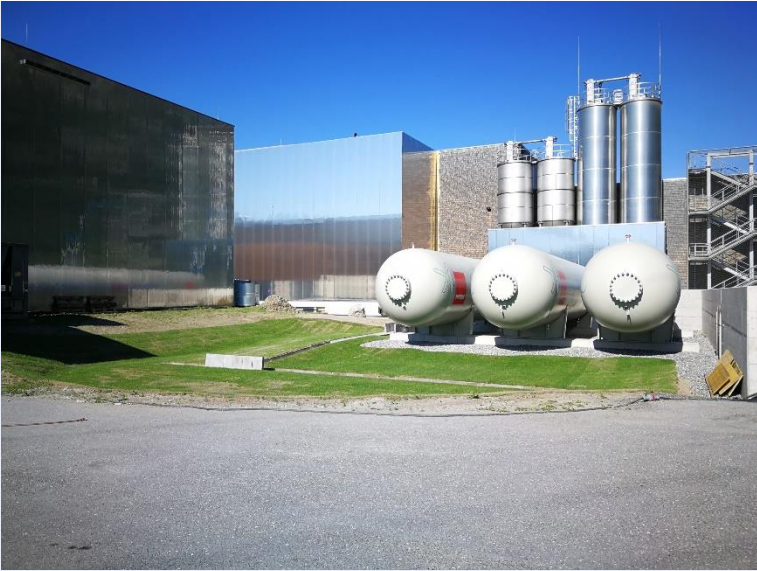
DEMO4GRID – 4 MW ELECTROLYSIS

H2 PRODUCTION, STORAGE AND REFUELLING

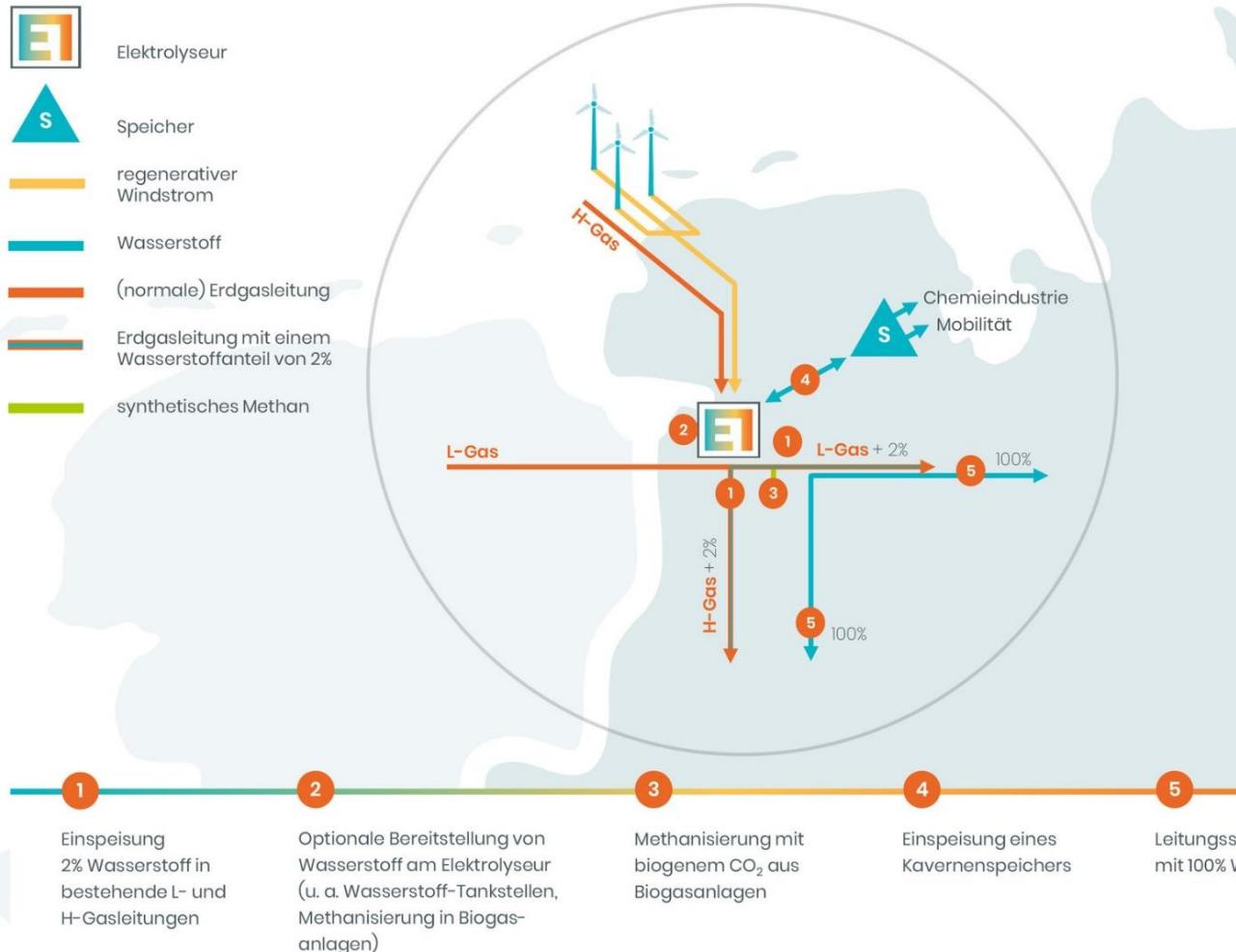


PRODUCTION, HEATING, REFUELING STATION

DEMO4GRID – 4 MW ELECTROLYSIS



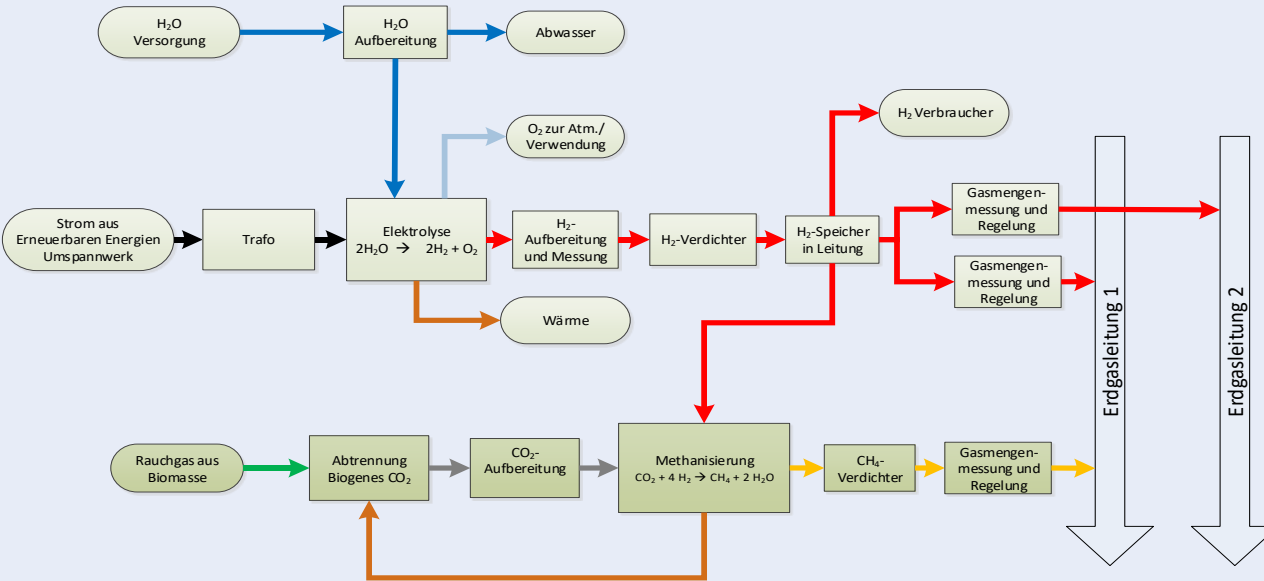
ELEMENT ONE: 100MW POWER TO GAS



TRANSFORMING WINDPOWER TO EMERGING FUEL (GAS) AND INJECTING INTO THE EXISTING GAS GRID

- **Production**
 - » Decentral
 - » Renewable (e.g. wind)
- **Storage**
 - » Buffer storage tanks
 - » In Pipelines
- **Applications**
 - » Power2Gas
 - » Power supply
 - » Mobility (sector coupling)

ELEMENT EINS 100 MW POWER TO GAS



FEASIBILITY STUDY FOR ELECTROLYSIS

- Plant concept, modular design
- Layout plan and site analysis
- CO2 potential for methanisation
- Injection into the gas pipelines:
 - » CH4 + 2% H2
 - » 100% H2, modification of infrastructure
 - » Methanation
- Permitting process
- Technical data of plant components
- Cost estimate
- Project risk workshop

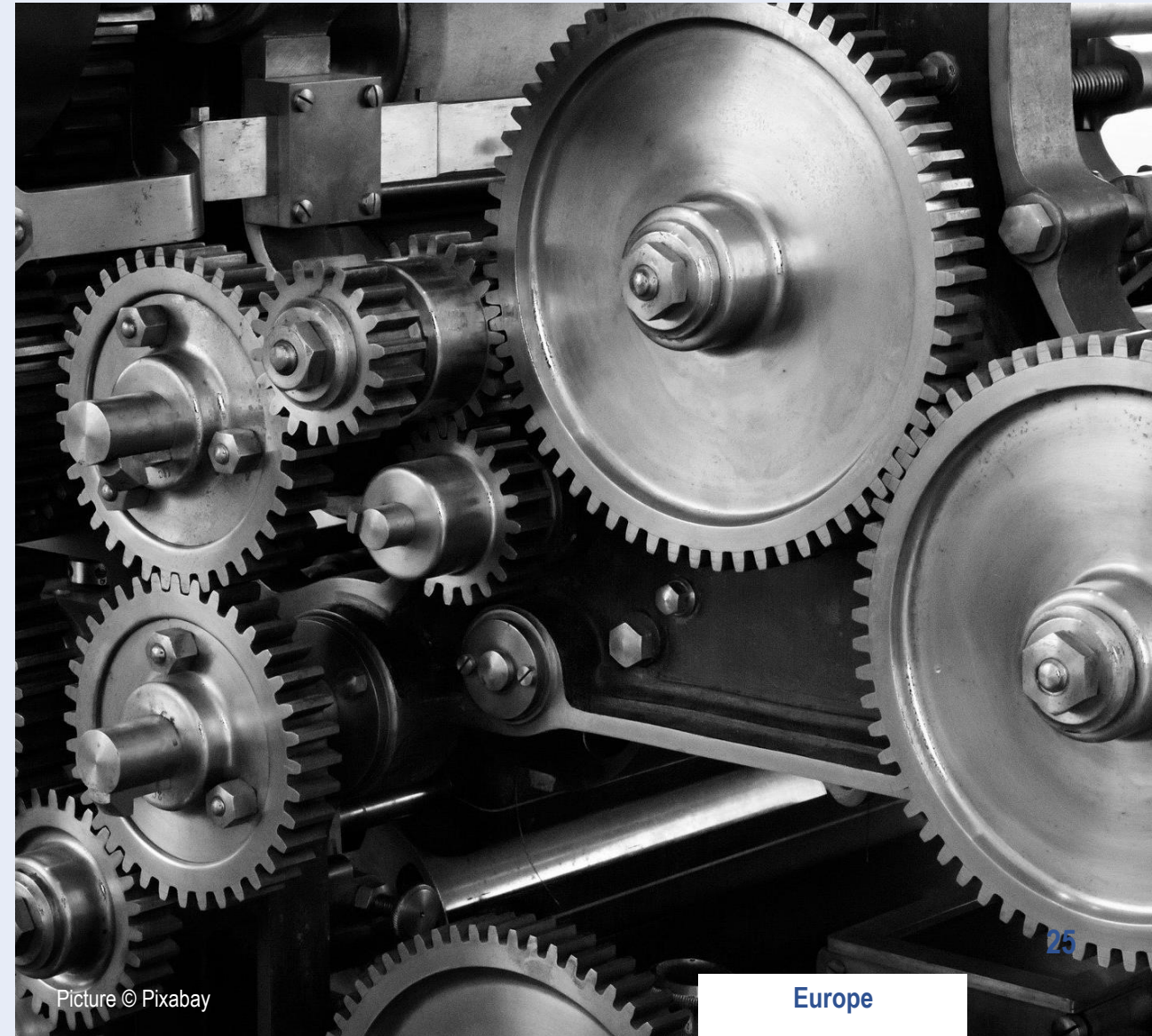
SALZBURG ELECTROLYSIS PLANT

CLIENT	Salzburg AG
PERIOD	2021 - ongoing
DATA	Construction of an 4-8 MW H ₂ generation plant with electrolyzer, pressure storage tank and compressor, refuelling station and filling station for transport trailers, as well as a natural gas grid feed-in (blending). Including waste heat utilisation from the electrolyser and compressor plant via a heat pump into the existing district heating network.
SERVICES	Owner's Engineering Services from concept to commissioning



HYDROGEN IN PROCESS PLANT

CLIENT	Confidential, process industry
PERIOD	2021 - ongoing
DATA	The Client is a manufacturer of fuel cells and gas/diesel engines. Due to a change in company strategy, the demand for hydrogen for test benches will increase significantly in the next few years. For this purpose, a concept for hydrogen production including a hydrogen filling station at the site is to be implemented with ILF.
SERVICES	Feasibility study



GREEN HYDROGEN IN REFINERIES



REFINERY CONTEXT AND GREEN FUEL

- Replacement of grey hydrogen
- Large-scale electrolysis installation with power up to 100 MW
- Hydrogen storage tanks
- Fuel cells and/or hydrogen turbines
- Own dedicated PV source
- Pilot plant with power up to 1 MW
- ILF service: technical feasibility study

LARGE SCALE TRANSPORT OF H2

CLIENT Confidential

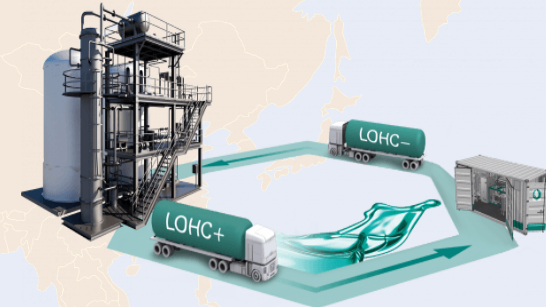
TIME FRAME 2020

DATA

- GW scale RE production in MENA Region
- GW scale H2 production as storage in MENA Region
- Long distance (>3000km) transport of H2 from MENA to Central Europe

SERVICES

- Techno-Economic analysis of H2 production technologies
- Techno-Economic analysis of H2 transport incl.:
 - Via pipeline
 - Via ship
 - Liquid H2
 - Ammonia
 - LOHC



Source: <https://www.hydrogenious.net>



Source: <https://global.kawasaki.com>

PIPELINE DATA COLLECTION

CLIENT Confidential, refinery

PERIOD 2021

DATA Under the European Union's Renewable Energy Directive (RED) II, refineries in Europe are looking for opportunities to supply green hydrogen for their refinery processes, including blending with fuels. ILF has conducted an analysis of the European gas grid regarding the technical possibilities for feeding and transporting hydrogen on a large scale to supply European refineries.

SERVICES Consulting



CONNECTION BETWEEN REFINERIES

CLIENT	Motor Oil
PERIOD	2021
DATA	The aim of this project is to design the facilities required to enable the transport of this hydrogen from one refinery to the second. Initially, the transport options will be evaluated and a design planning for compression and loading onto H2 trailers and unloading at the arrival point will be carried out.
SERVICES	Feasibility Study

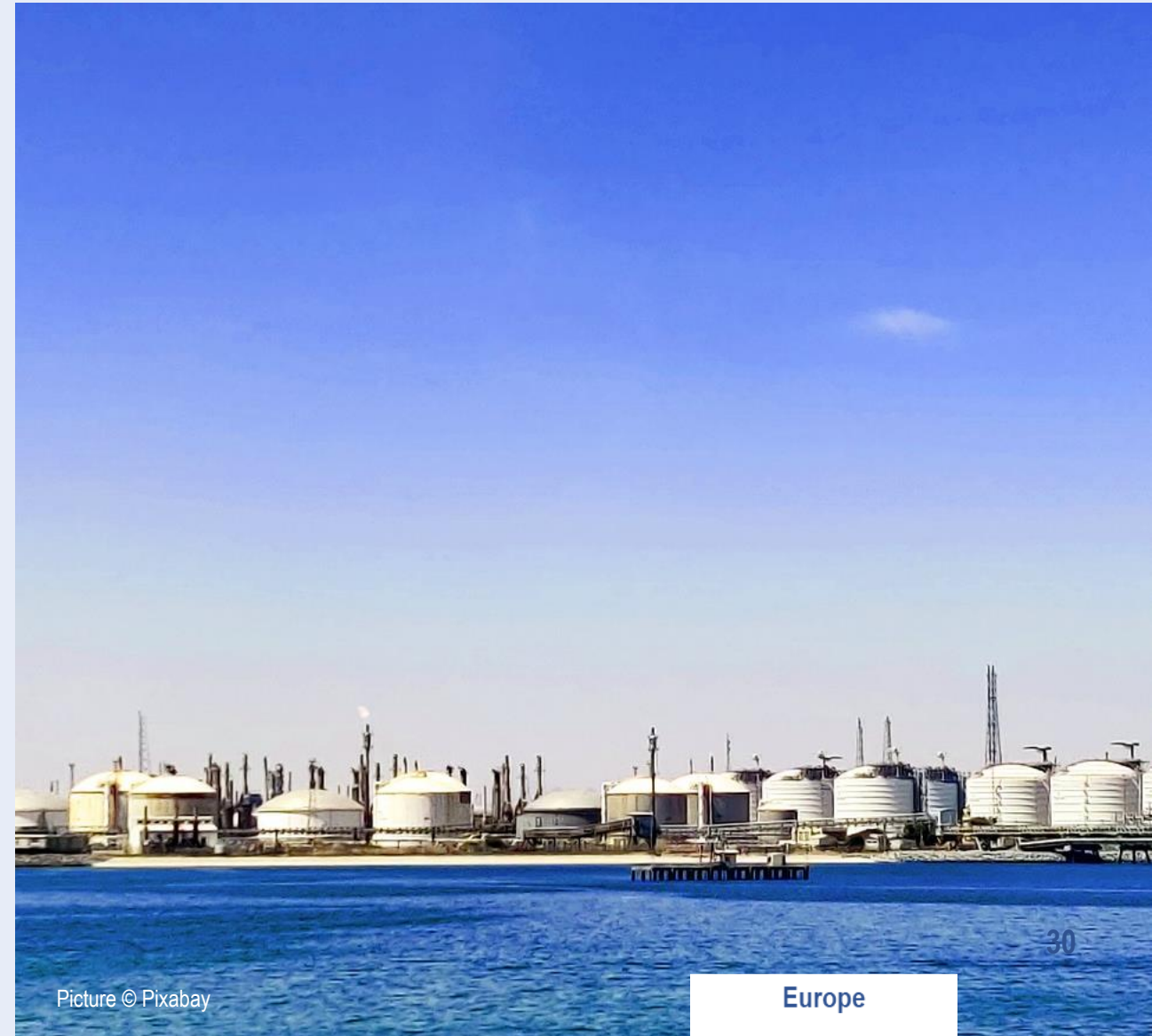


Picture © Motor Oil @ LinkedIn



TERMINAL FOR GREEN DERIVATIVES

CLIENT	Confidential, terminal operator
PERIOD	2021
DATA	Potential Study on how the existing tank farm and free spaces could be used for handling of "innovative fuels" in the future. This includes the storage and handling of H2 carriers (e.g. ammonia, LOHC, methanol) as well as E-fuels.
SERVICES	Feasibility study



Picture © Pixabay

Europe

H2 STUDY FOR HP GAS PIPELINE

CLIENT	Confidential
TIME FRAME	2020
DATA	<p>Natural gas pipeline with 2 to 10% hydrogen blend</p> <p>Length: 80 km</p> <p>Diameter: 40"</p> <p>Design pressure: 73.5 bar</p>
SERVICES	<p>Scenarios for admixture of H2</p> <p>Impact on permitting documentation</p> <p>Impact related to the overall pipeline network</p> <p>Review of existing technical project documentation</p> <p>Assessment on impact of cost and time</p> <p>Considerations of 100% content</p>



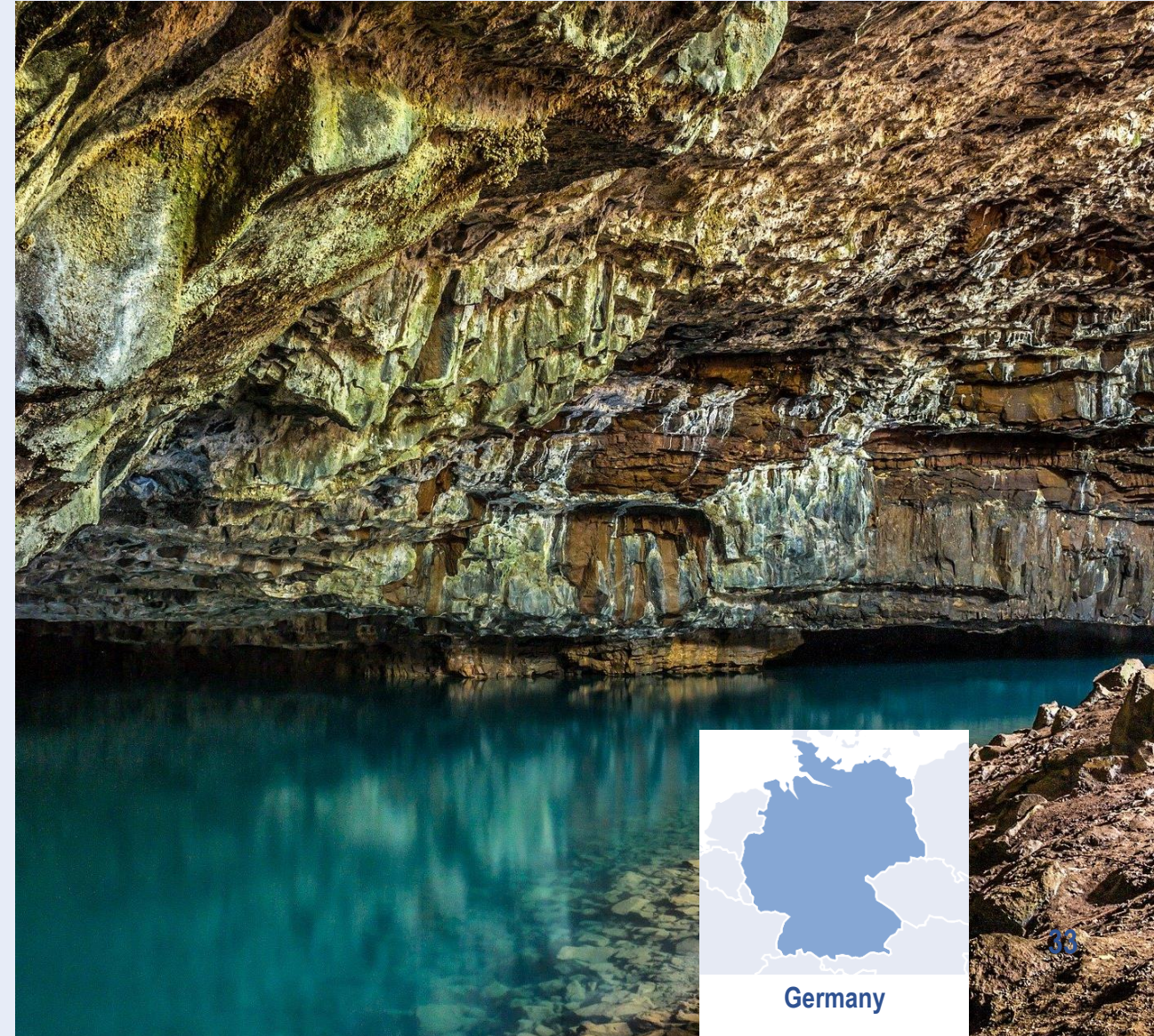
FERNGAS INFRASTRUCTURE

CLIENT	First Sentier Investments / Ferngas
PERIOD	2020 - 2021
DATA	Transaction of a combined gas grid operator (GCO) providing gas transmission and distribution services
SERVICES	<p>Development of a Hydrogen strategy</p> <p>Technical and Environmental Vendor Due Diligence including analysis of pipelines hydrogen capability</p> <p>PMC Services for Pipeline replacement (Hydrogen ready)</p>



H2 UNDERGROUND STORAGE

CLIENT	Confidential
PERIOD	2021 – ongoing
PURPOSE	Industrial scale transport and storage of green hydrogen for use in the refinery process. Replacement of grey hydrogen.
DATA	Surface facility for brownfield underground storage of 30 MW green hydrogen. Potential to scale up to 700 MW Transmission pipeline connection to refinery
SERVICES	Conceptual design Basic design



BOLZANO HYDROGEN STATIONS

CLIENT	IIT – Institute for Innovative Technologies
PERIOD	2020 - present
DATA	6 Hydrogen Fuelling Stations 700 barg car dispenser 350 barg bus dispenser
SERVICES	Authority engineering Station design Safety studies & hazardous area definition Risk assessment Review of applicable law and regulations Gas dispersion calculations



TECHNICAL STUDY – H2 TEST CENTRES

CLIENT	Confidential
TIME FRAME	2021
DATA	H2 Production Technologies H2 Conditioning/ Compression/ Storage Technologies Fuel Cells
SERVICES	Analysis of H2 technologies Market study of relevant companies and institutes Specification of requirements for future testing facilities



Source: NEUMAN & ESSER Group



Source: <https://www.hydrogenious.net>

NPROXX



Source: NPROXX

DO NOT HESITATE TO CONTACT US



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