UK Hydrogen Value Chain

SIEMENS

Businesses and services of Siemens AG serving Hydrogen Ecosystems

Siemens AG

Digital Industries

Automation & Drives

Smart Infrastructure

Energy Automation & Smart Grids

Siemens Financial Services

Project & structured finance

Mobility

Micro & Hydrogen Trains

Siemens Advanta

Strategic advisory & custom engineering

Siemens Energy

- Siemens Energy is a separate legal entity since October 2020
- Services: Conventional and renewable power, grid technology & storage and electrolysers
- Siemens AG is a minority shareholder of Siemens Energy (approx. 25% of shares)

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Supporting Start–Ups

Strategic partnerships with catapults

Advanced Manufacturing Research Centre

Manufacturing Technology Centre

Memorandum of Understanding

- Expertise
- Time
- Application support
- Sets out both parties' expectations

Letters of Support

- Not legally binding
- Letter of intent to show support for business goals/objectives
- Typically used to assist funding bids etc.

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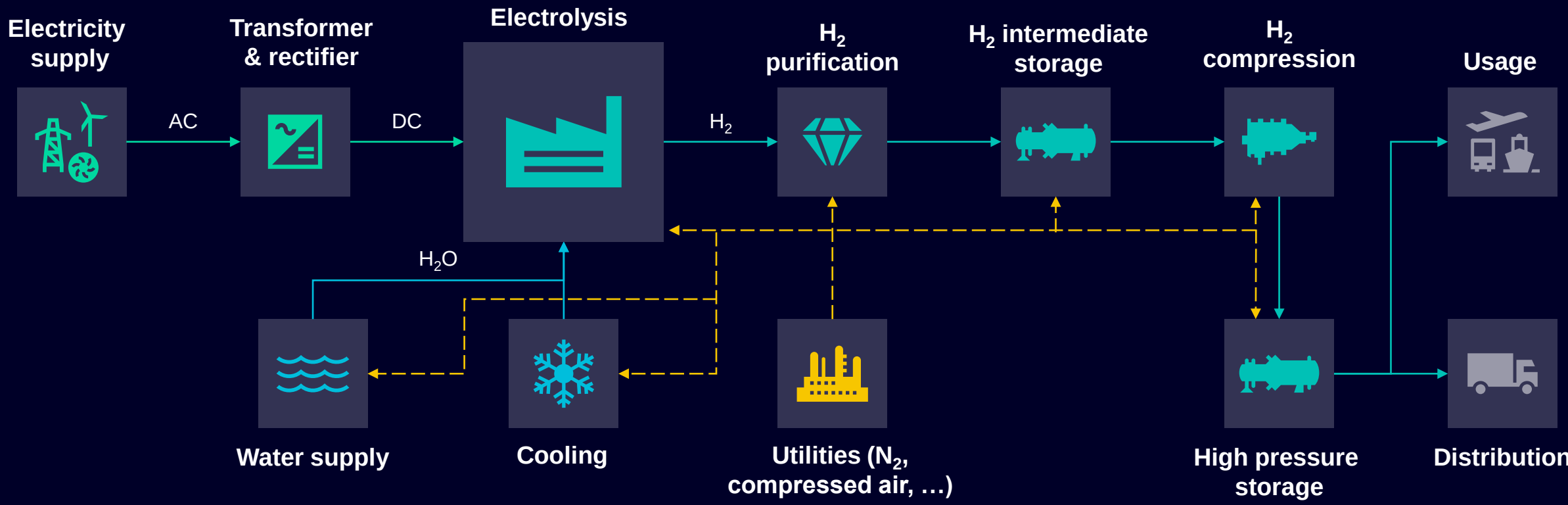
Typical component structure of a hydrogen plant



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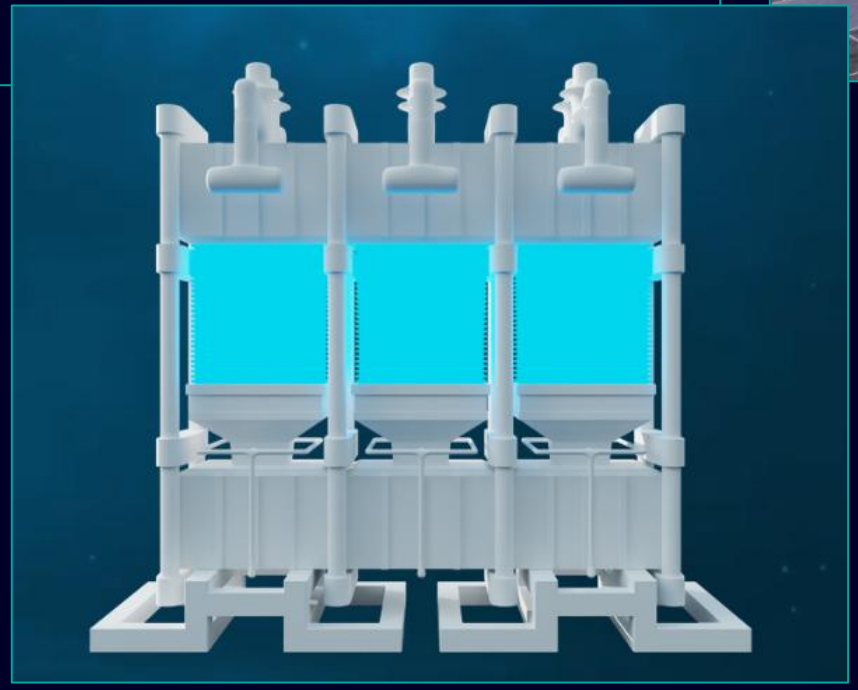
- Largest serial production facility for PEM electrolysers in the world
- 12,500 square metre manufacturing capacity
- 1 GW per year capability
- 1.5GW expansion due to open by the end of 2024
- itm-power.com



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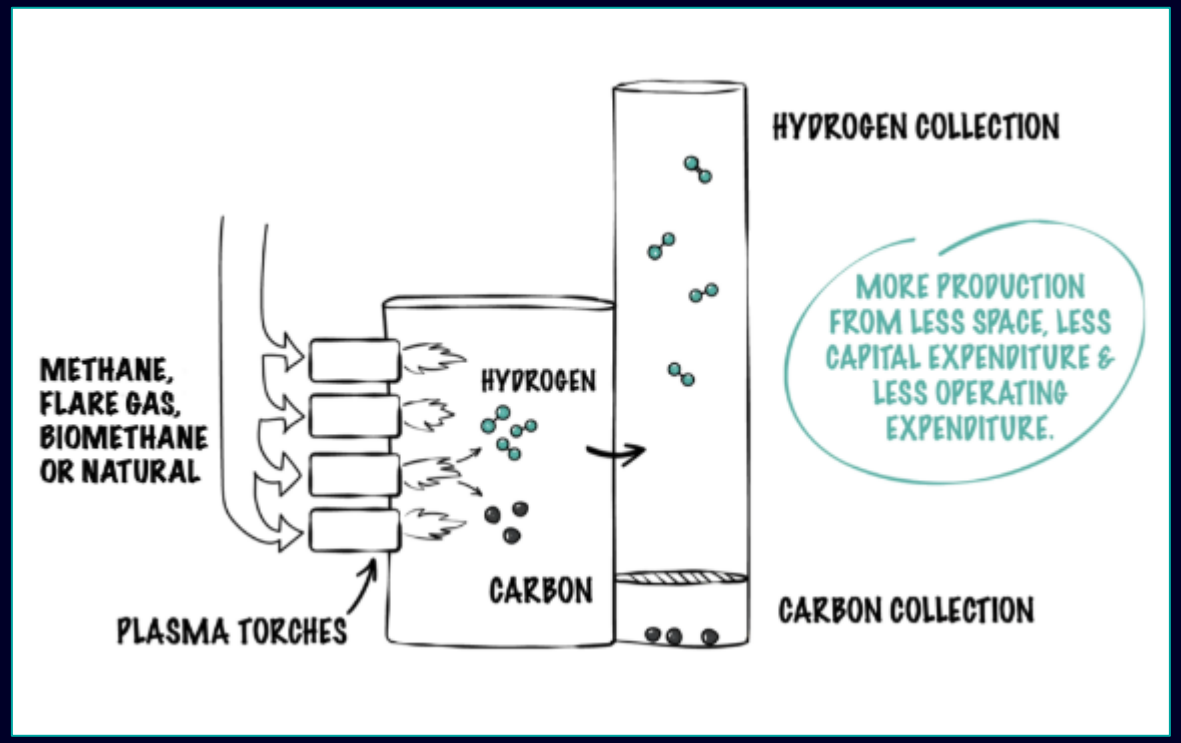
HiiROC



Thermal Plasma Electrolysis (TPE) is:

- As clean as PEM
- As economical as SMR

HiiROC's solution is:

- Continuous flow
- Modular and scalable from small point of use production through to industrial scale
- HiiRoc.com

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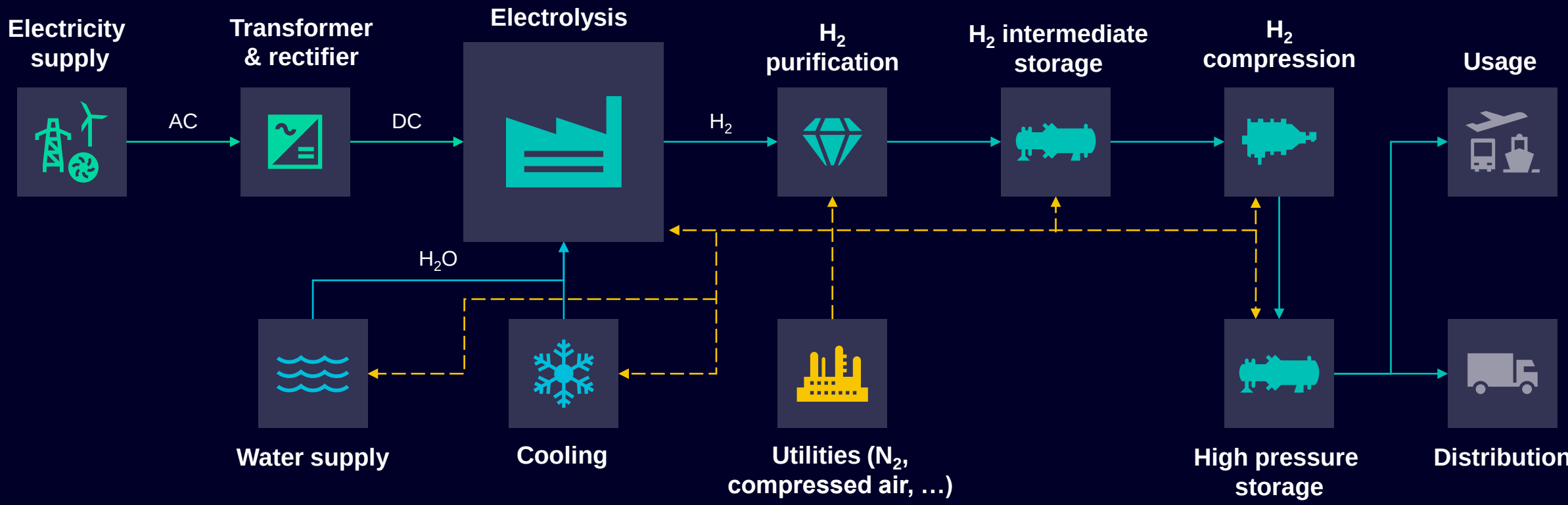

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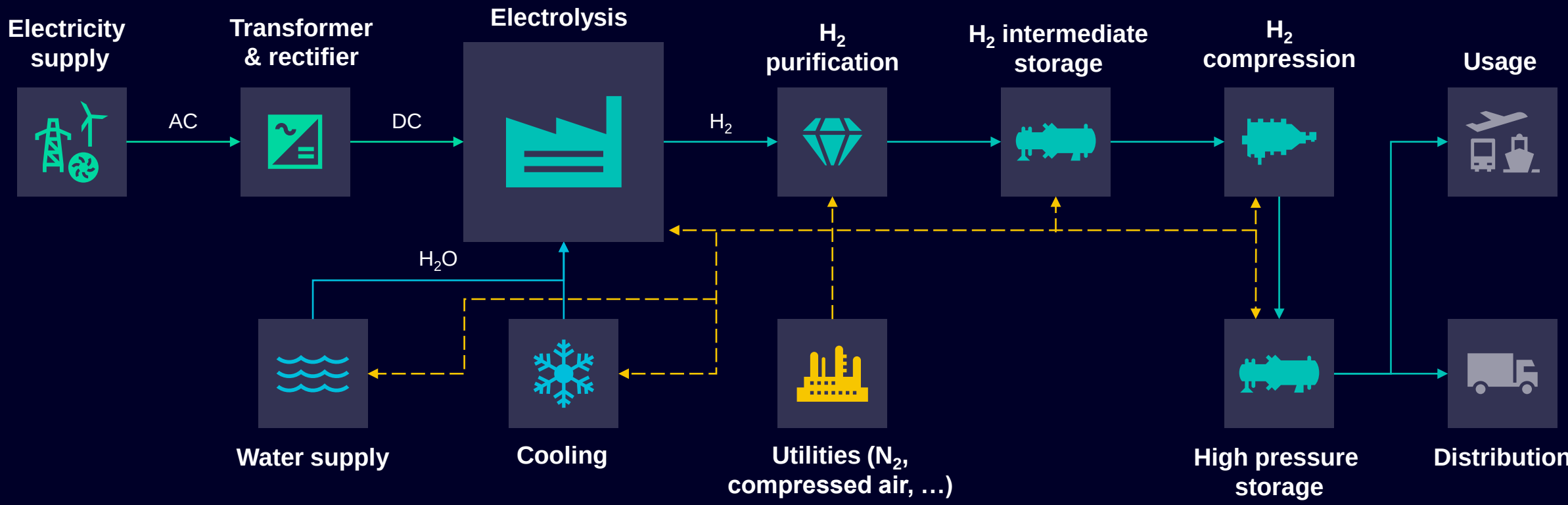
Hydrogen Purification

- From impure to 99.9999% pure hydrogen
- Generic gas purification solution which can be tailored to a wide range of gases
- unicattechnologies.com

Typical component structure of a hydrogen plant



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Haskel
An Ingersoll Rand Business

Compression and refuelling infrastructure

- Modular and scalable solutions
- Proven technology
- Highly energy efficient
- Fully compliant with J2601 refuelling protocols
- Convenient and easy user experience
- haskel.com

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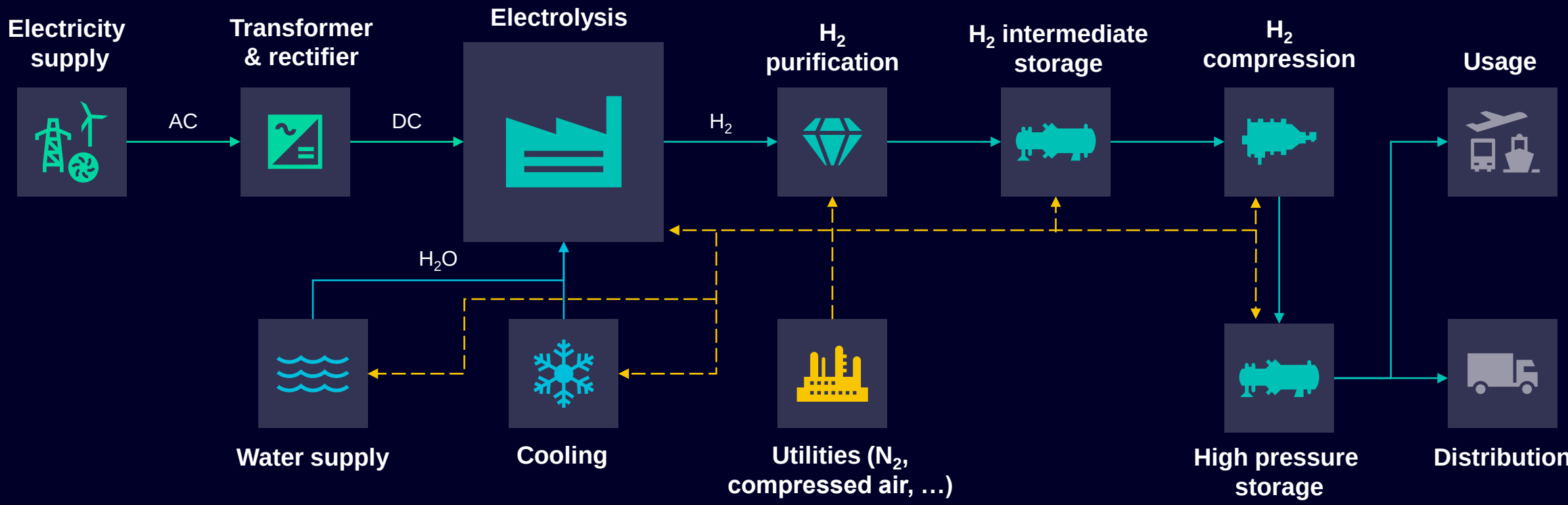
Typical component structure of a hydrogen plant



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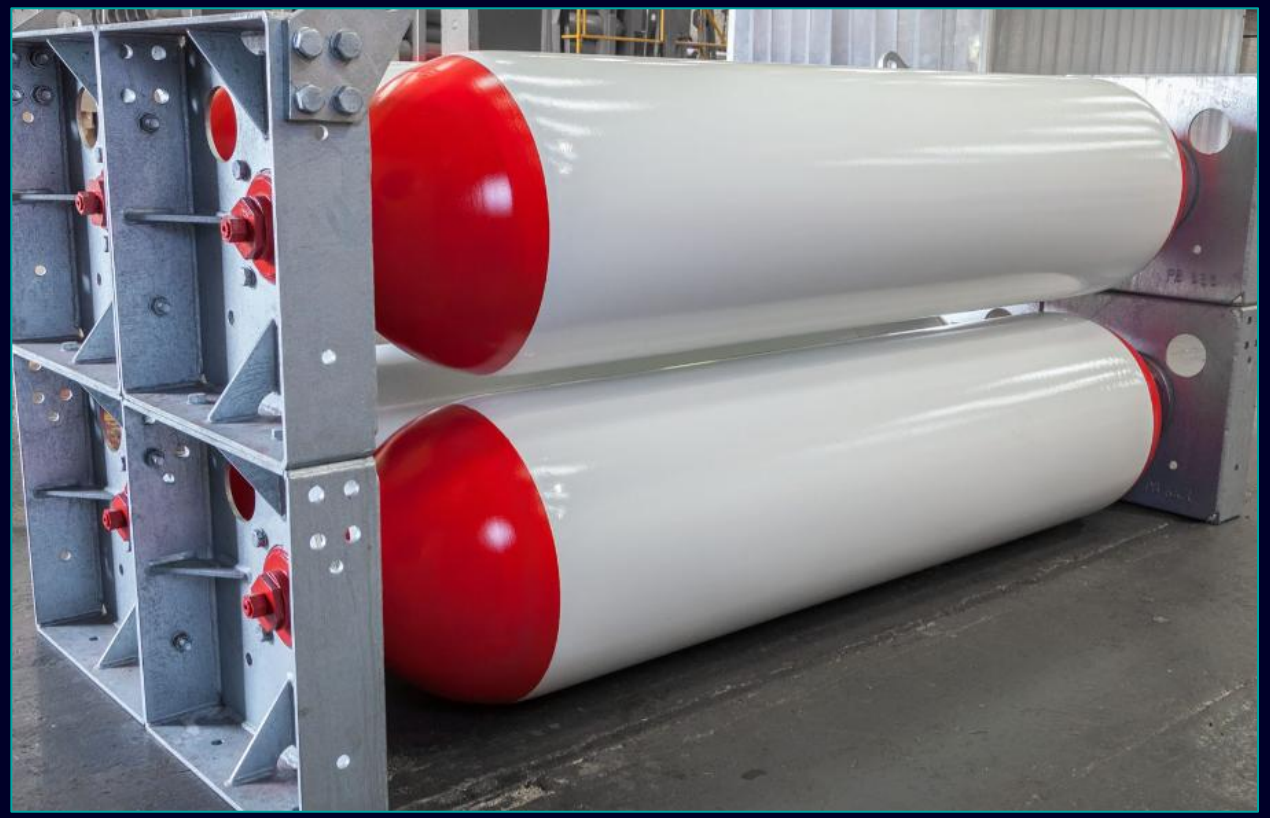
Chesterfield Special Cylinders



- Type 1 seamless steel cylinders manufactured in Sheffield
- Standard or bespoke design
- 100 to 700 bar
- 5 to 3000 litre capacity
- Customised manifolded solutions available
- Supply 500 bar trailer systems

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GeoPura, Ltd.

OEM / Owner | Wysall, UK

Project information

Development, production and engineering of Hydrogen Power Units

Customer challenge

- Difficulties in scaling up number of hydrogen units deployed in different end uses
- Ensuring compliance with cybersecurity for regulatory adherence
- Enabling efficient remote HPU operation

Offered solution

- Broad and flexible portfolio (especially PLC, HMI) combined with hydrogen specific libraries and templates
- Safety and Cybersecurity functionality integrated
- IT/OT integration for remote monitoring and analytics
- Expert knowhow and market expertise

Customer benefit

- Shorter time to market and lowered lifecycle costs
- Ensured state of the art cybersecurity protection with adherence to standards
- Facilitated fast, easy, and remote operation of several HPUs in the field
- Possibility to add on-top end customer services (e.g. energy efficiency and CO_2 tracking)

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WUN H_2 GmbH

EPC | Wunsiedel Bavaria

Project information

In Wunsiedel, Bavaria, one of the biggest PEM hydrogen production plants in Germany was built. The goal of the ambitious project: a CO_2 free sustainable energy supply based on green hydrogen.

Customer challenge

- Decarbonization of regional industry and mobility
- Achieving security of supply with CO_2-free hydrogen
- Reducing long transport distances of hydrogen for industrial processes

Offered solution

Developing and implementing a holistic concept for hydrogen supply

- Construction of local, turnkey H_2 production plant with an installed power of 8.75 MW – completely supplied from renewable energy sources
- Siemens supports the entire process including simulation, planning, construction, operation and monitoring of the facility
- Establishing an operating company (Siemens AG holds a stake of 45%)

Customer benefit

- Generating up to 1,350 tons of CO_2 free hydrogen per year
- Up to **13,500 tons of CO_2 are saved per year** compared to conventional hydrogen generation
- **Reliable supply with local green hydrogen**
- Grid-supportive operation of electrolysis to relieve the grids
- Dynamic operation of the system on the energy market (intraday trading) via a „Digital Twin“ to optimize electricity costs
- Reduced operational costs through sector coupling and usage of all material flows of the system (hydrogen, oxygen and heat)

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Thank you for your time

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