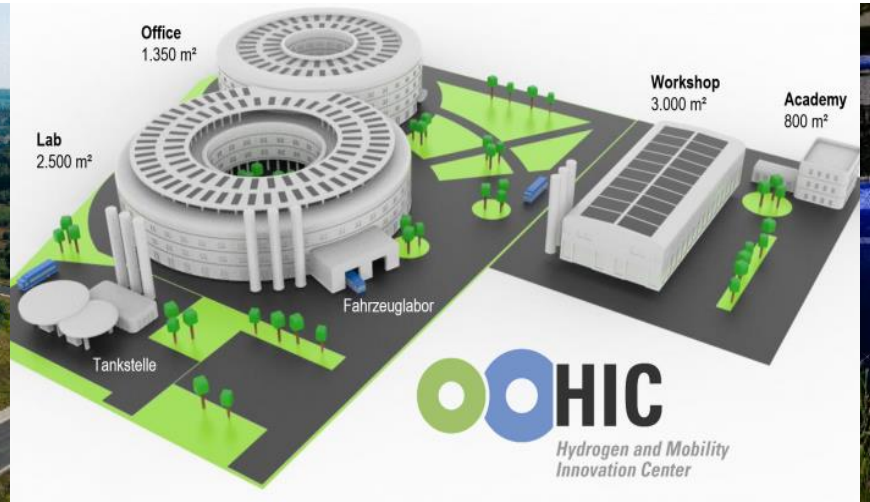
HZwo - Hydrogen Technology Cluster

Dr.-Ing. Gert Schlegel



Saxon hydrogen competence centre

www.hzwo.eu

WASSERSTOFFLAND SACHSEN

Sächsischer Innovationscluster für Brennstoffzellen und Wasserstoff

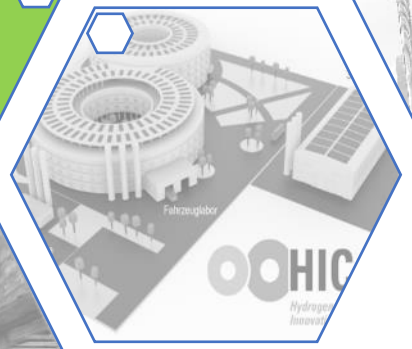
Educational advertising and PR

Specialist consulting services

Networking events and conferences

Project engineering

Technology and knowledge transfer



Our Memberships:

European Clean Hydrogen Alliance

Hydrogen Europe

DWV Deutscher Wasserstoff- und Brennstoffzellen-Verband

Der Mittelstand. BVMW

go-cluster EXZELLENT VERNETZT!

CLUSTER MEMBERS

www.hzwo.eu

- fuel cell and electrolyzer manufacturers
- tier one and component suppliers
- mechanical engineering companies
- gas network operators and energy suppliers
- universities and research institutions

www.hzwo.eu

HZwo OPERATES THROUGHOUT EUROPE

members and partners in Europe

SWITZERLAND
Celeroton AG (Volketswil near Zurich) - member
Stadler Rail AG (Bussnang) - member
Feintool International Holding AG (Lyss) - partner
inspire AG (Zurich) - partner
Streetscooter GmbH (Oensingen) - partner

AUSTRIA
AVL (Graz) - member
Graz University of Technology - partner
HyCentA Research GmbH (Graz) - partner
Hydrogen Austria (Innsbruck) - partner

FRANCE
DAM Group GmbH (Lyon) - member
CARA European Cluster (Lyon) - partner

GREAT BRITAIN
Bramble Energy (Crawley) - member
Vanguard Sustainable Transport Solutions (Birmingham) - member

CZECH REPUBLIC
POLAND
NETHERLANDS
BELGIUM

Scope and focus of the cluster

www.hzwo.eu

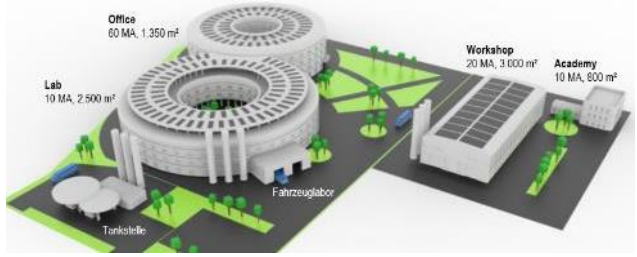
Network

- Partnerships
- Public Awareness
- Project Office

Hydrogen Technologies

- Production
- Storage
- Usage

Innovation Center



- Labs and Campus
- Testing and R&D
- Academy

Innovation Cluster

Companies

Research

Education

Innovation Cluster

Public funding

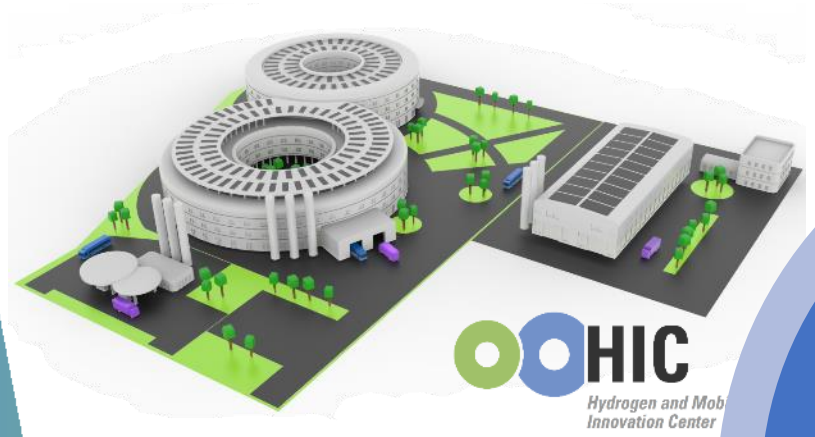
Hydrogen and fuel cells

new products for the growing market

- Development of new components and manufacturing technologies
- automization and quality
- Hydrogen infrastructure
- Codes & Standards
- Education and traing
- Excellent research

Our project network

www.hzwo.eu



National Hydrogen Center HIC

Saxon Innovation Cluster

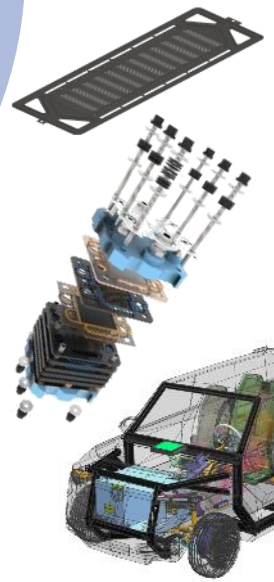
H_2 Region Chemnitz

R&D projects

WASSERSTOFFLAND SACHSEN

Sächsischer Innovationscluster für Brennstoffzellen und Wasserstoff

energy saxony



Europa fördert Sachsen.
EFRE
Europäischer Fonds für regionale Entwicklung
Europäische Union

Freistaat SACHSEN

nip

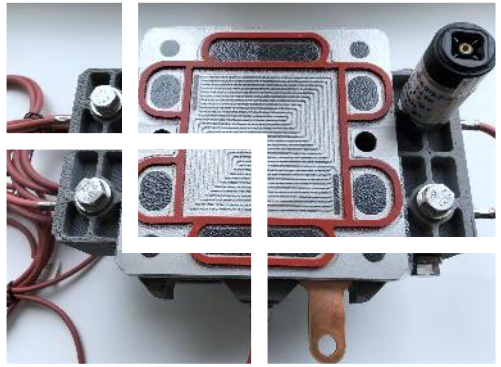
SmartERZ
Smart Composites ERZgebirge

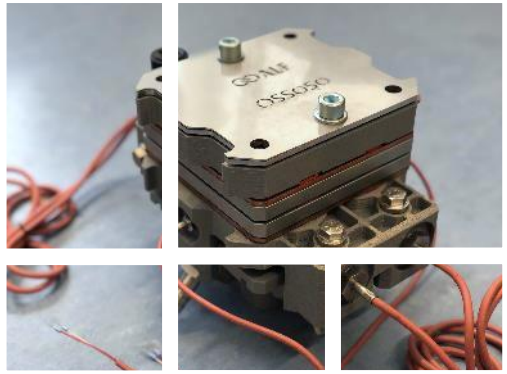
FOSTA Forschungsvereinigung Stahlanwendung e. V.

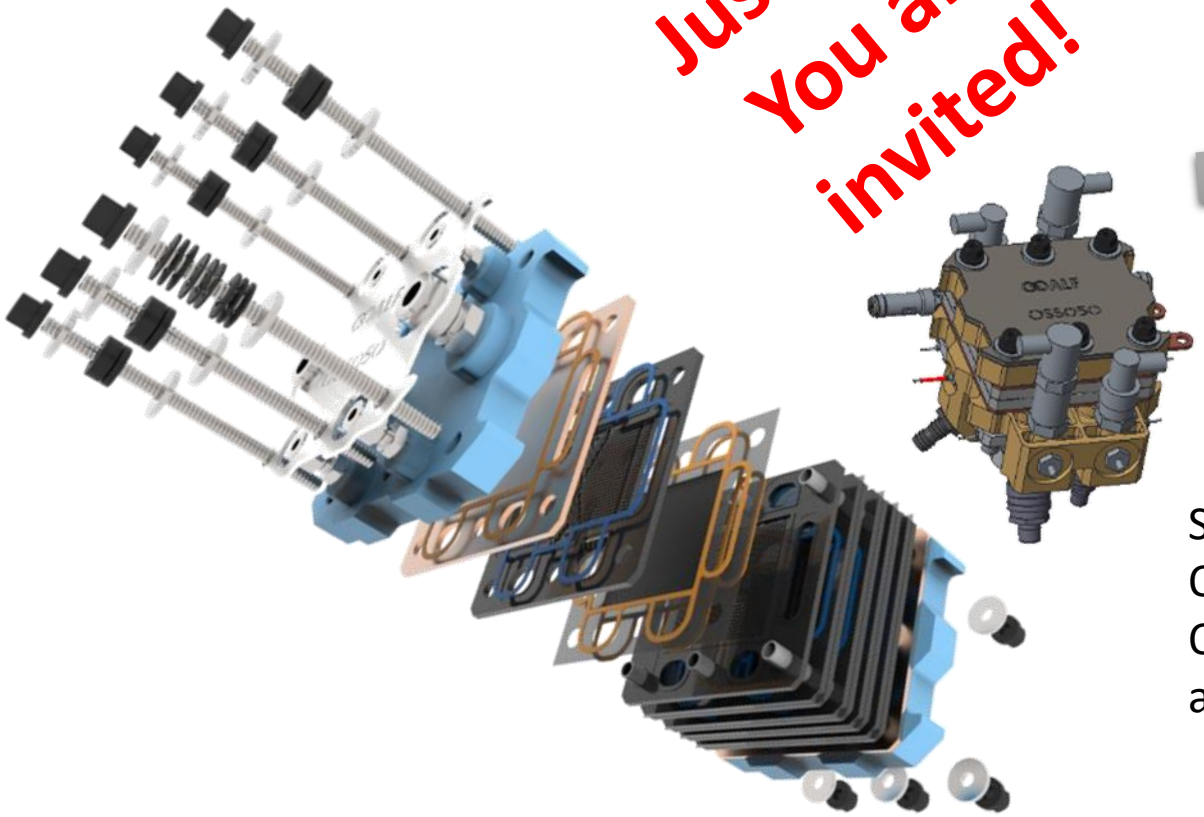
OSS - Open Source Stack

Central FC Function Platform

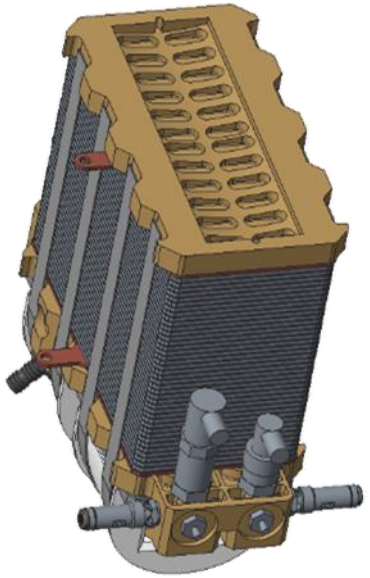
www.hzwo.eu







Just join! You are invited!



Scaling of the current OSS050 concept to OSS150 (150 cm2 active area)

Based on projects funded by:

Gefördert durch: Bundesministerium für Verkehr und digitale Infrastruktur

Koordiniert durch: NOW GMBH.DE

Europäische Union

Europa fördert Sachsen. EFRE

Freistaat SACHSEN

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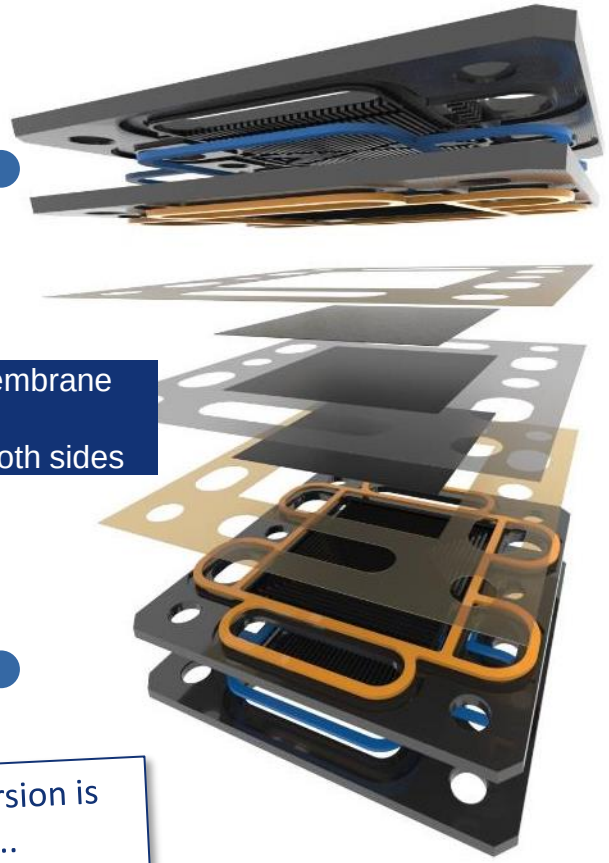
Cell construction (single cell)

Open Source Stack



Cooling gasket

Sub-gasket frame

Polymer electrolyte membrane with electrodes applied on both sides

Sub-gasket frame

Cooling gasket

Bi-polar plate

Media gasket

Gas diffusion layer

Gas diffusion layer

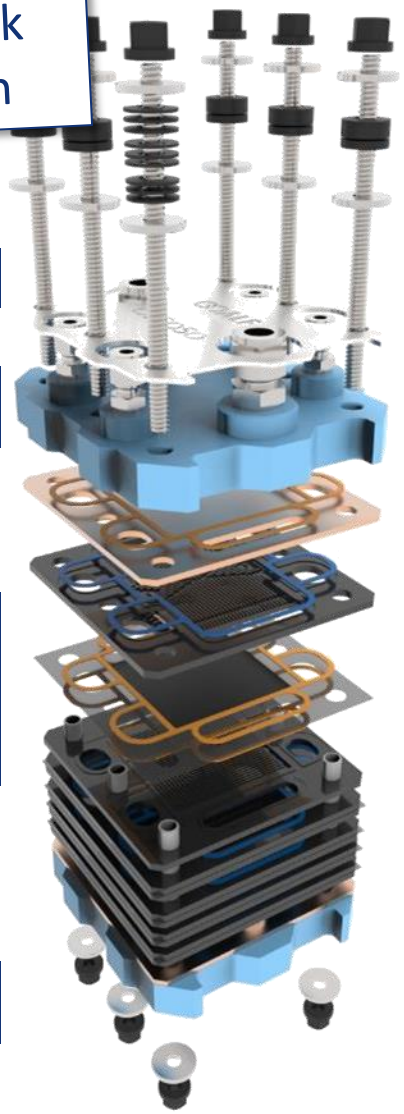
Media gasket

Bi-polar plate

The interactive version is available at....

http://hzwo.eu/wissen

Fuel cell stack construction



Tie rod

End plates with Insulation

Single cells stacked in a row = Stack

Current collector

End plates with Insulation

Suspension systems

Media connections

Gaskets

Current collector

Gaskets

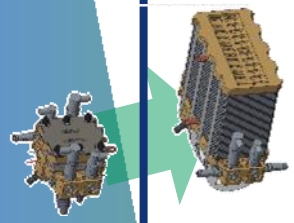
OSS050 Stack output up to 8 kW

Open Source Stack Prospects and Opportunities

www.hzwo.eu

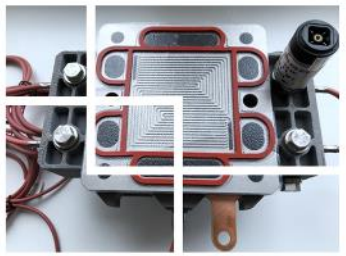
2021

2022



OSS050

Ready for use…



OSS150

OSS150 Stack Output up to **30 kW**

OSS300

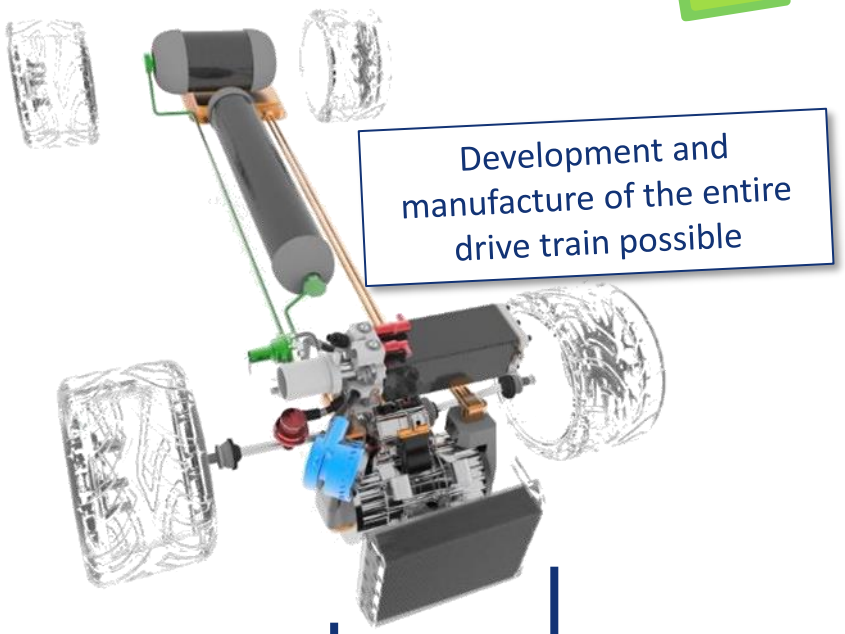
OSS300 Stack Output up to **100 kW**

Possible applications:

Stationary systems and mobile machines

up to

Tractors and harvesters



Development and manufacture of the entire drive train possible

Weiterentwicklung zum Open Source System

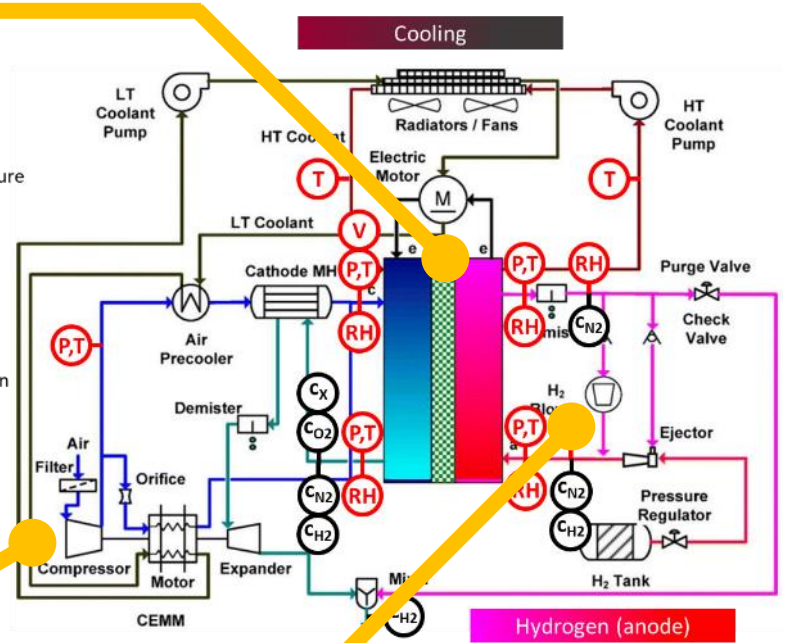
www.hzwo.eu

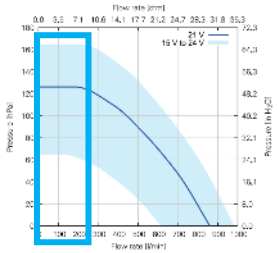
- Modulare Systemstruktur mit offenen Systemschnittstellen
- Freie BoP-Komponentenstruktur und -Integrationspotenziale

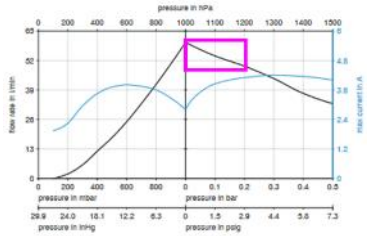
Basis OSS050 2.0

Stackdesign

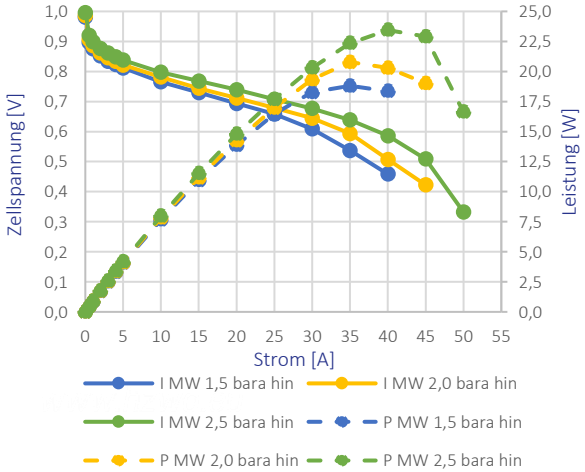
1 kW Testsystem







Experimentelle Zellvermessung



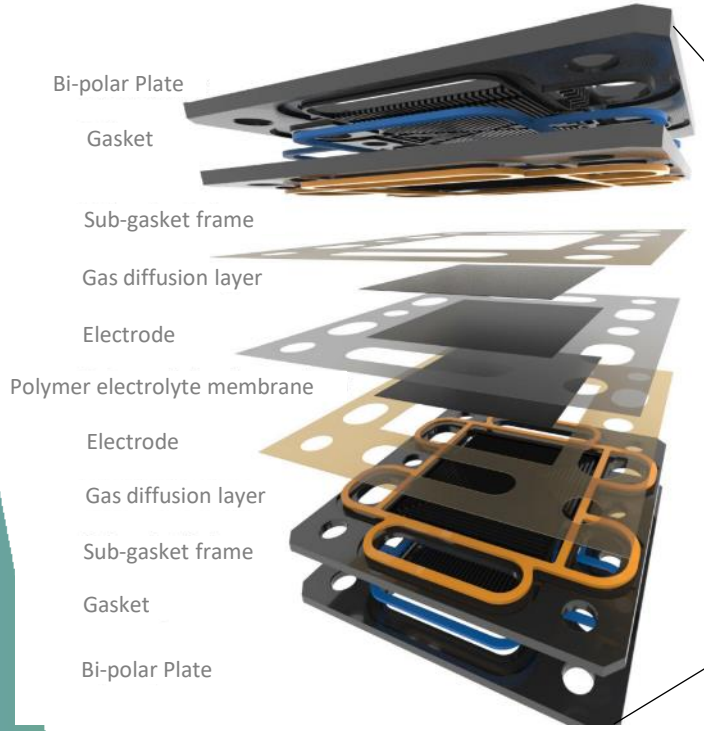
Systemsimulation und -auslegung

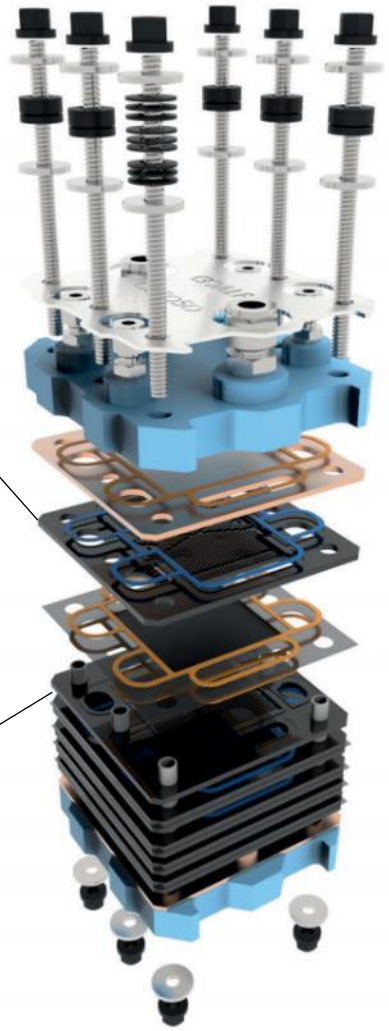
https://link.springer.com/article/10.1007/s41918-020-00068-1/figures/20

Products for Suppliers in the Stack

www.hzwo.eu

300 – 400 Cells per 100 kW stack





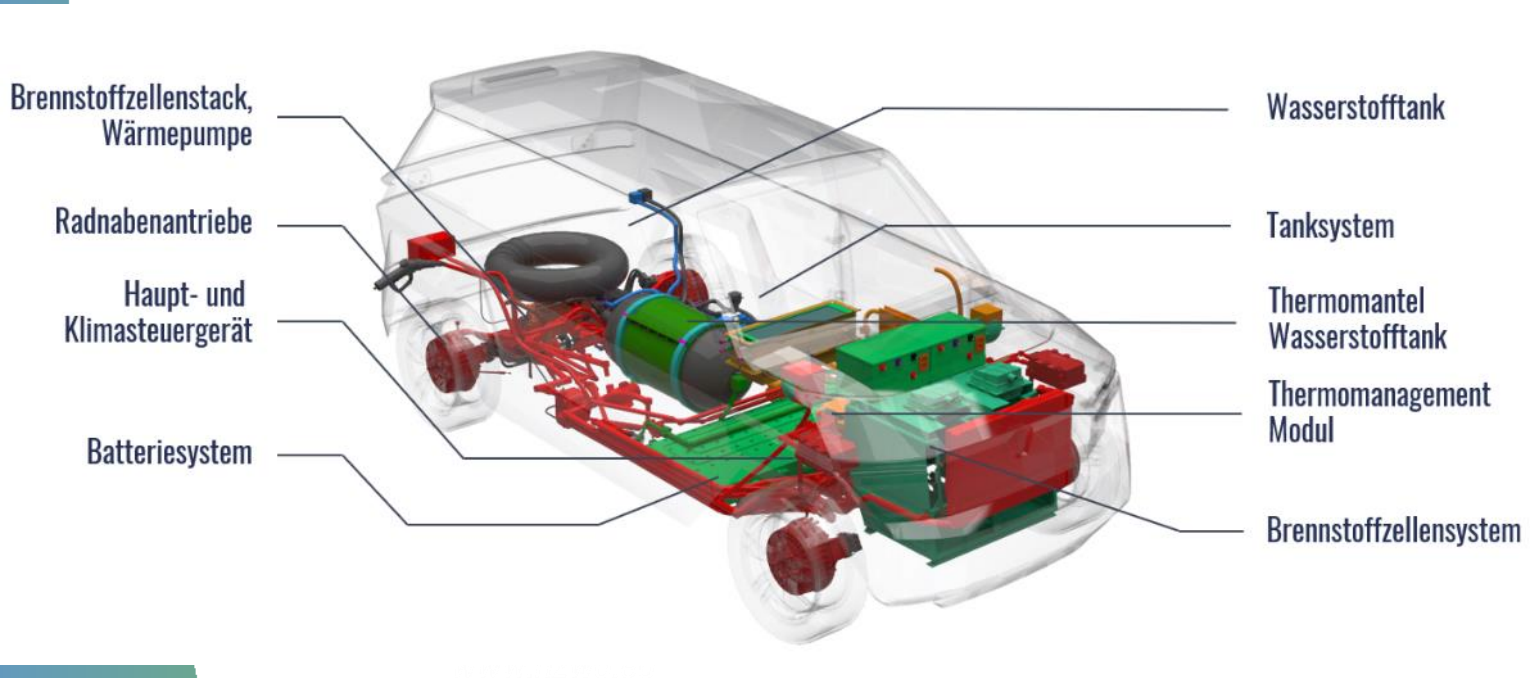
Need for 100.000 systems*:

End plates:	200.000
Suspension systems:	600.000
Tension anchors:	600.000
Gaskets:	75.000.000
Bi-polar plates:	37.600.000
Half plates:	75.200.000
MEA:	37.500.000

*Systemleistung 100 kWel, 375 Zellen, Aktivfläche 300 cm², Aktiv /Passivfläche 60 %, Stromdichte 1,5 A/cm² bei Zellspannung 0,6 Vw

HZwo: OSCar

- Experimental platform for research, teaching, training and further development
  - Full access to CAD data, control data and the real vehicle
  - Test platform for the integration of innovative components, subsystems or overall system developments



Europäische Union
Europa fördert Sachsen.
EFRE
Europäischer Fonds für regionale Entwicklung
Freistaat Sachsen
Diese Maßnahme wird mitfinanziert durch Steuermittel auf Grundlage des von den Abgeordneten des Sächsischen Landtags beschlossenen Haushaltes.
ALF Alternative Fahrzeugantriebe
ICM Institut Chemnitzer Maschinen- und Anlagenbau e.V.

HIC
Hydrogen and Mobility Innovation Center

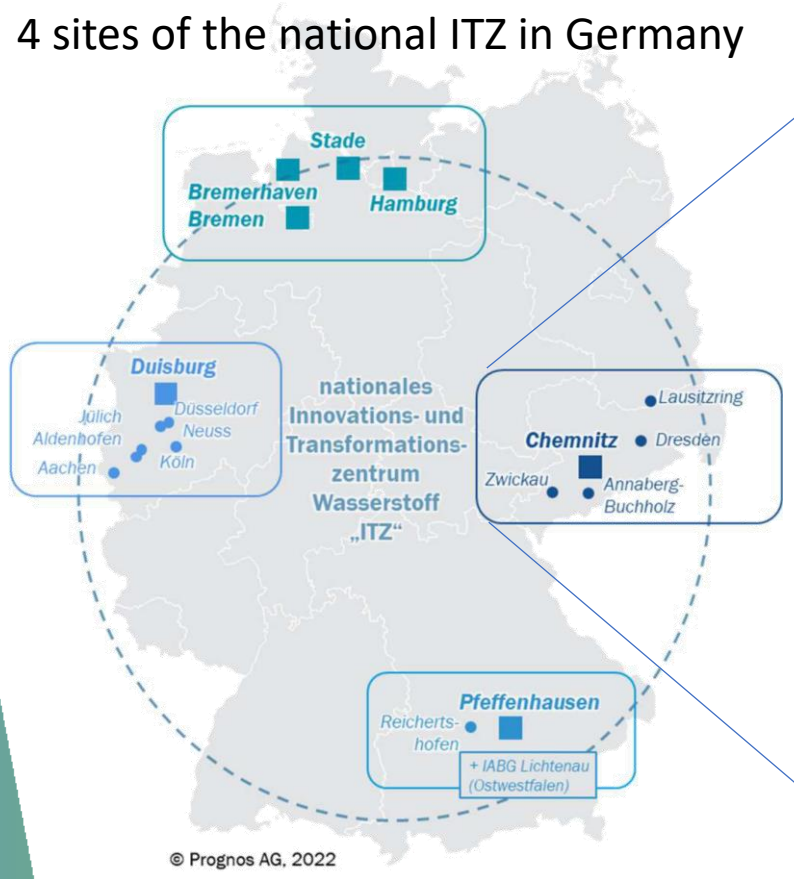
HIC - Hydrogen Innovation Center

Site of the national innovation and technology center for hydrogen technologies

Hydrogen Innovation Center

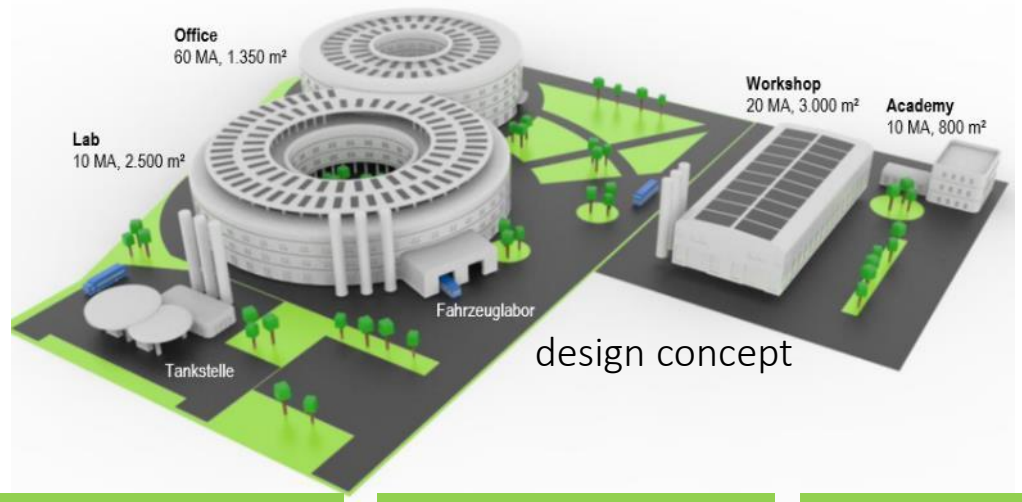
www.hzwo.eu

4 sites of the national ITZ in Germany



industrial research-, test- and certification-center

test facilities for fuel cell systems and components



design concept

startup center with hydrogen labs and workshops

nearby test tracks for LD-vehicles and rail vehicles

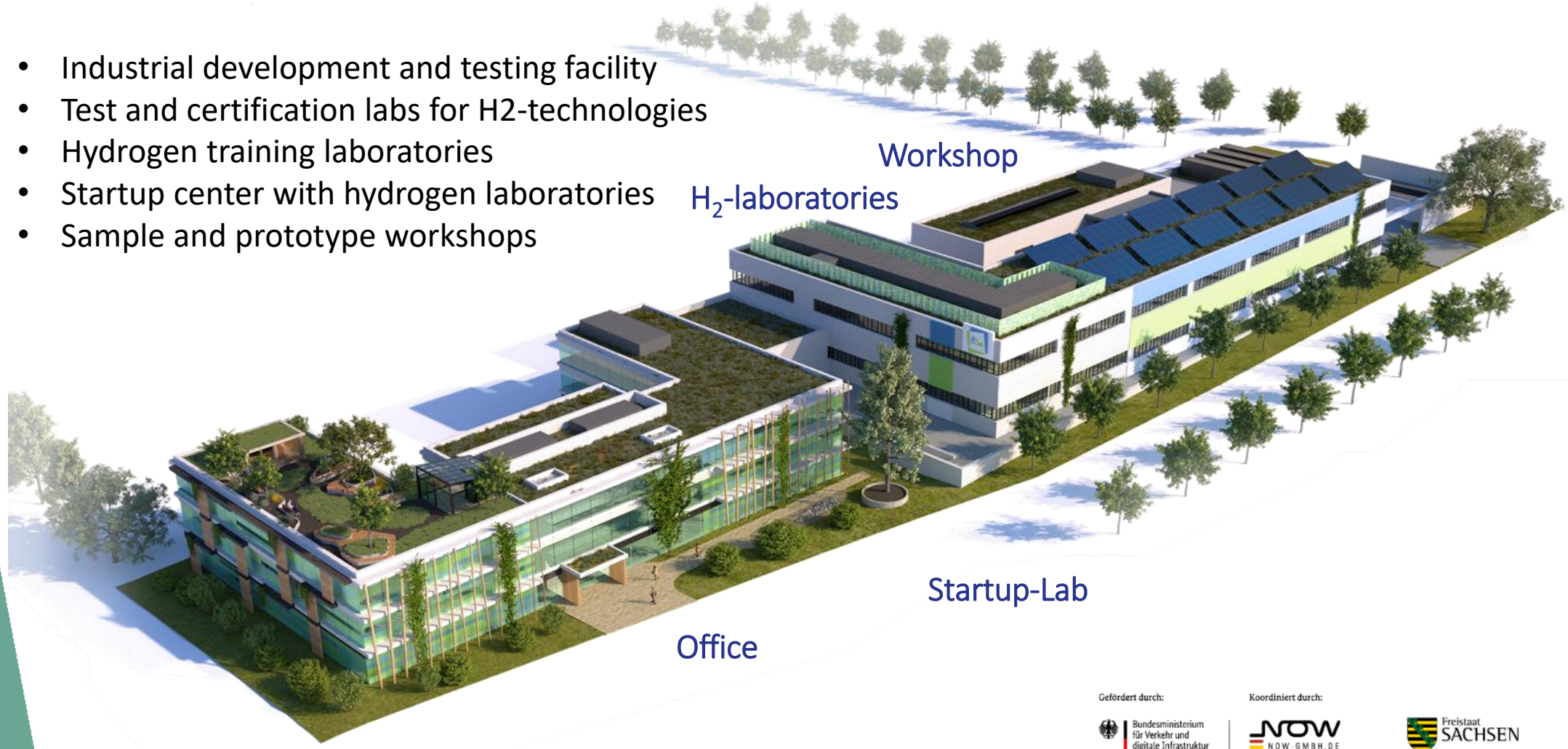
hydrogen lab for education and training

www.hzwo.eu

HIC HYDROGEN INNOVATION CENTER

National Innovation and Technology Center for Hydrogen

- Industrial development and testing facility
- Test and certification labs for H2-technologies
- Hydrogen training laboratories
- Startup center with hydrogen laboratories
- Sample and prototype workshops



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Koordiniert durch: NOW GMBH.DE
Freistaat SACHSEN

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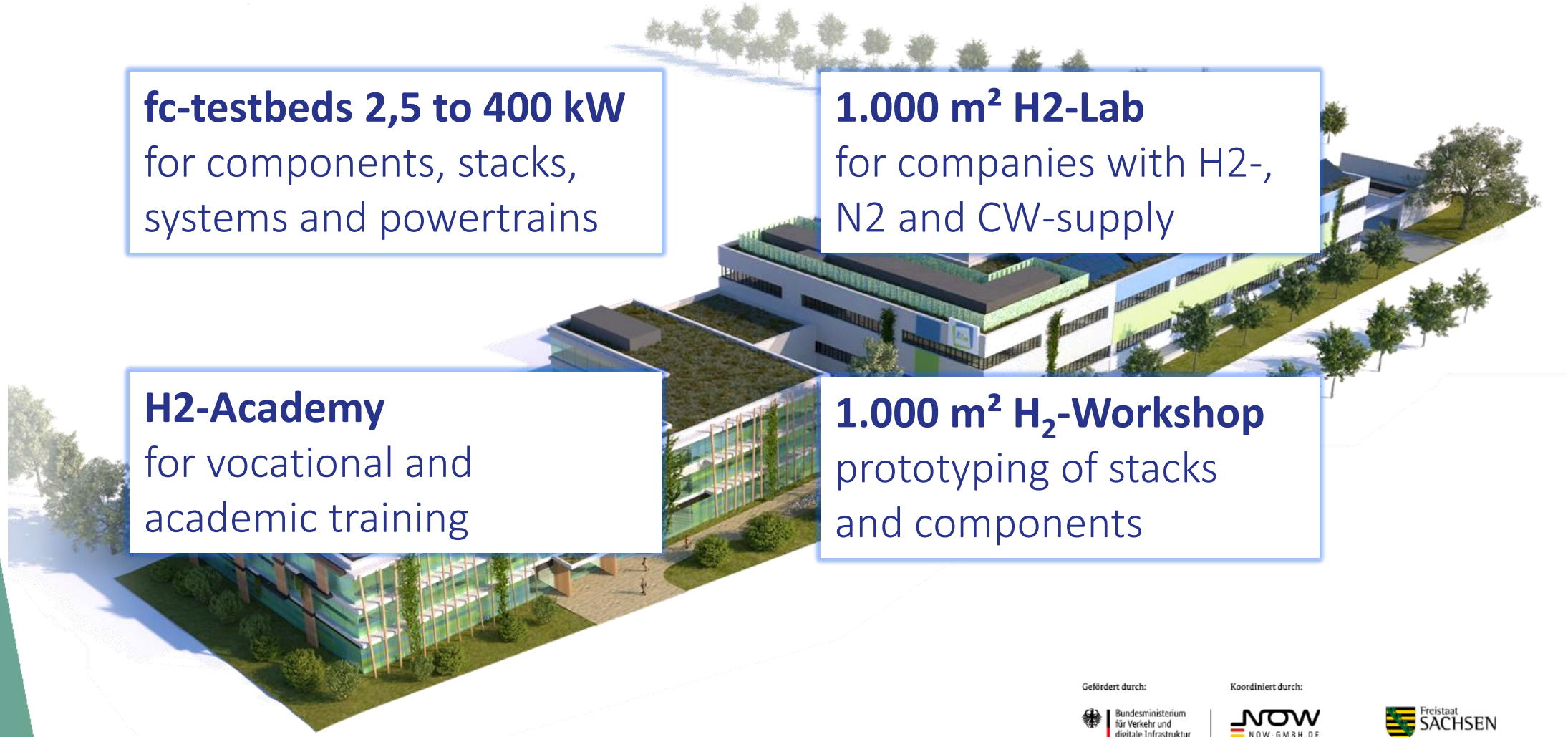
HIC HYDROGEN INNOVATION CENTER

National Innovation- and Technology Center for Hydrogen



fc-testbeds 2,5 to 400 kW
for components, stacks, systems and powertrains

1.000 m² H2-Lab
for companies with H2-, N2 and CW-supply

H2-Academy
for vocational and academic training

1.000 m² H_2-Workshop
prototyping of stacks and components

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Koordiniert durch: NOW GMBH.DE

Freistaat SACHSEN

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HIC HYDROGEN INNOVATION CENTER

National Innovation- and Technology Center for Hydrogen

testing

RCS

R&D

Academy

Networking

Trainings

Projects

H_2-Lab and Workshop for companies

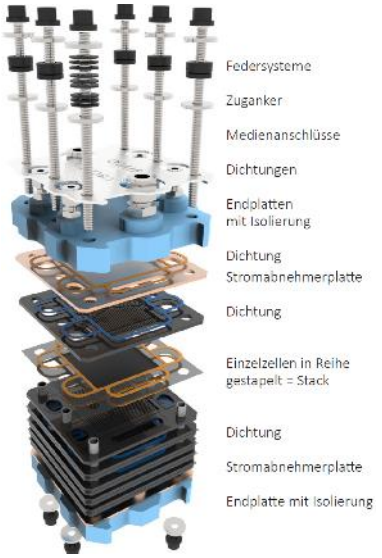
Nucleus for developers of H_2-technologies

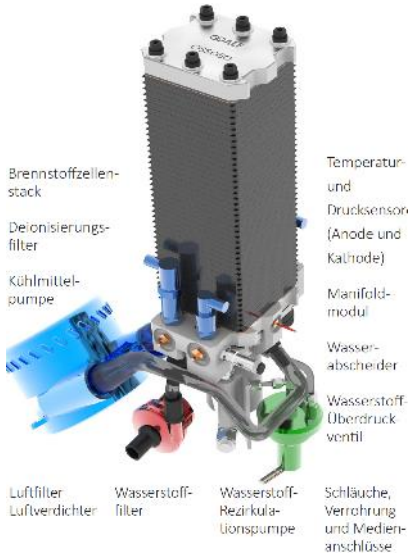
Gefördert durch: Freistaat SACHSEN | Bundesministerium für Verkehr und digitale Infrastruktur

Koordiniert durch: NOW GMBH.DE

Focus of the HIC in Chemnitz

HIC Hydrogen and Mobility Innovation Center www.hzwo.eu HZwo





Passenger cars and light commercial vehicles

Rail vehicles

Components → Stack → System → Drive → Vehicle

including BoP components, integration, operating strategies, software, etc.

Alliance of the HIC

HIC Hydrogen and Mobility Innovation Center www.hzwo.eu

Alliance of more than 100 companies, research institutions and professional associations:

Coordinator and planned founder and friends‘ association of the HIC:

Antrieb für Sachsen
Sächsischer Innovationscluster für Brennstoffzellen und Wasserstoff

consulting board: Fraunhofer IWU, Chemnitz Kulturhauptstadt Europas 2025, Technische Universität Chemnitz, eins energie in sachsen, Staatsministerium für Wirtschaft Arbeit und Verkehr, Freistaat Sachsen

H2-Tech Campus Chemnitz

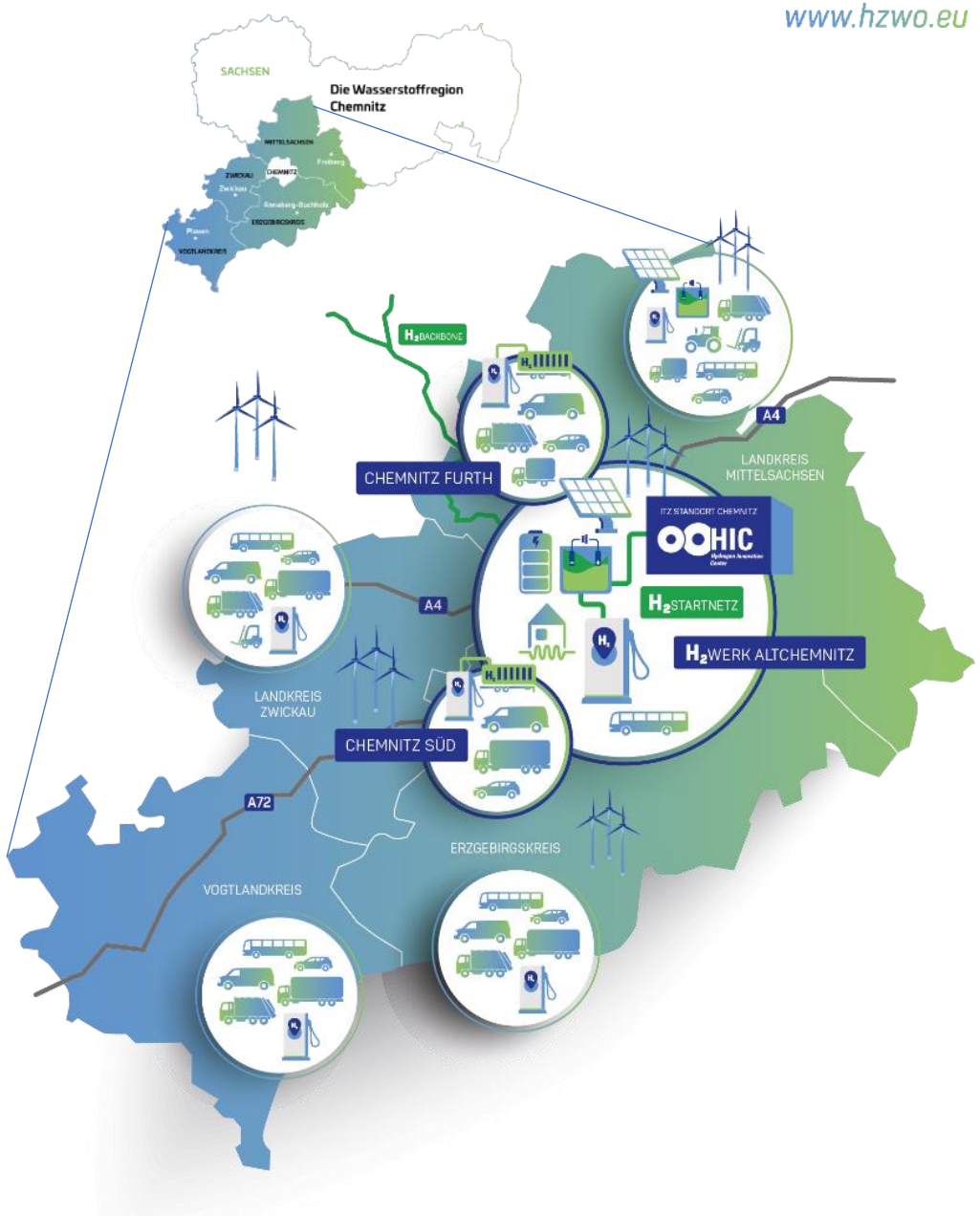
- **80.000 m²** campus area
- **1.000** workspaces
- **HIC** Hydrogen Innovation Center
- **University Campus / event areas**
- central **hydrogen** grid
- central **campus facilities**

WASSERSTOFF REGIONCHEMNITZ

HYEXPERTS
WASSERSTOFFREGIONEN IN DEUTSCHLAND

www.hzwo.eu

- HyExperts Region Chemnitz is part the federal „HyLand-Program“
- > 200 M€ investments in hydrogen projects are planned (mobility, industry and R&D)
- Industry Region of Chemnitz is largest the industry region in east germany
  → 11.000 companies
- HIC, H2-Tech Campus, automotive industry, component suppliers, research and development, autonomous driving, FES, IAV, TU Chemnitz, Fraunhofer IWU, H2GO



CLEAN HYDROGEN CONVENTION

with accompanying international trade fair for hydrogen and fuel cell technologies

POLITICS AND BUSINESS IN DIALOGUE

KNOWLEDGE AND TECHNOLOGY TRANSFER

CHC FAIR - ACCOMPANYING FAIR

Current information, newsletter, call for speakers, exhibitor information, registration and much more:

www.cleanhydrogenconvention.eu

Thank you!

HZwo e. V.
Dr.-Ing. Gert Schlegel
gert.schlegel@hzwo.eu

WASSERSTOFFLAND SACHSEN
Sächsischer Innovationscluster für Brennstoffzellen und Wasserstoff

Gefördert durch: Freistaat SACHSEN

Diese Maßnahme wird mitfinanziert durch Steuermittel auf der Grundlage des von den Abgeordneten des Sächsischen Landtags beschlossenen Haushaltes.