



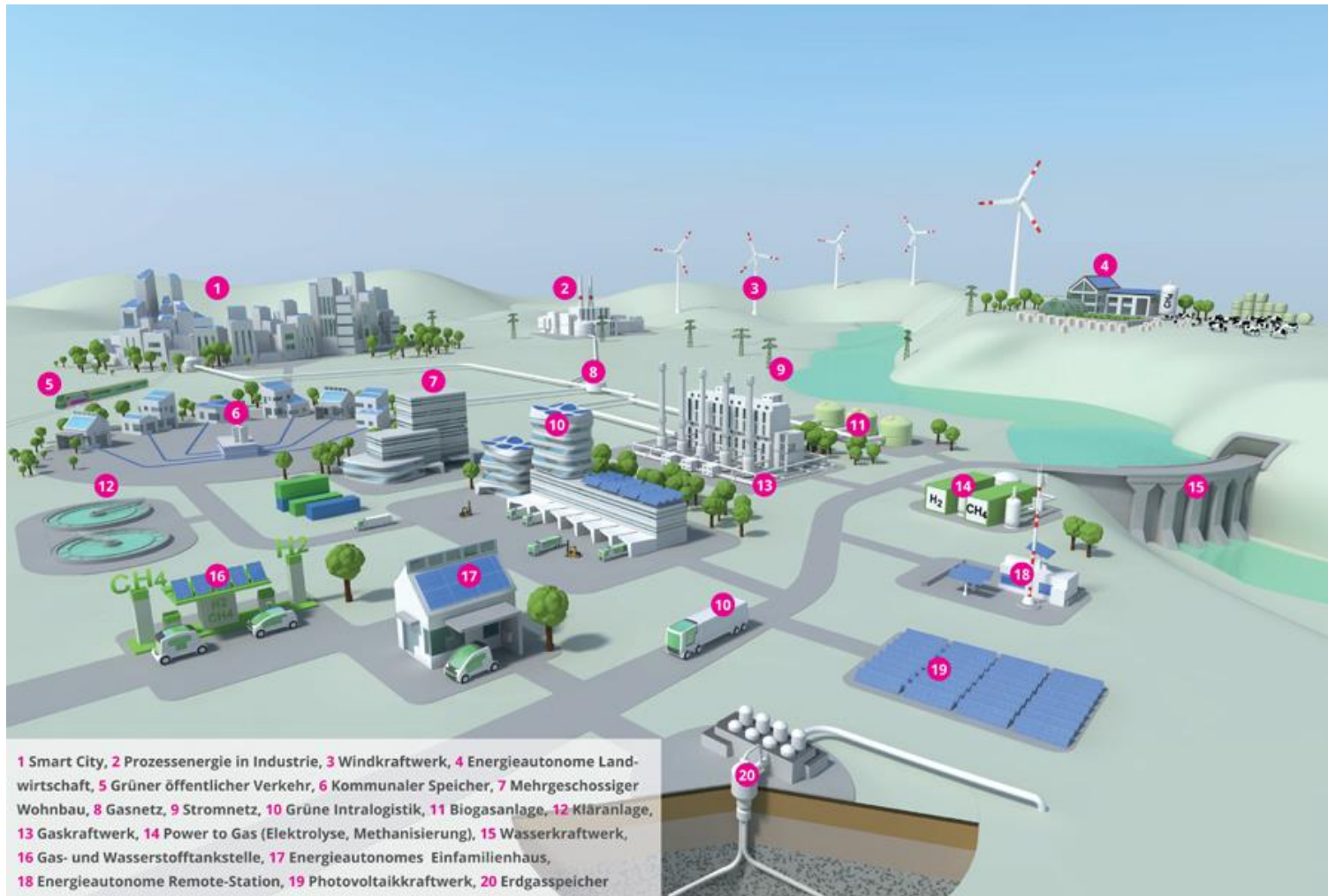
WIVA P&G Energy model region

Challenges for the Transition of the Energy System

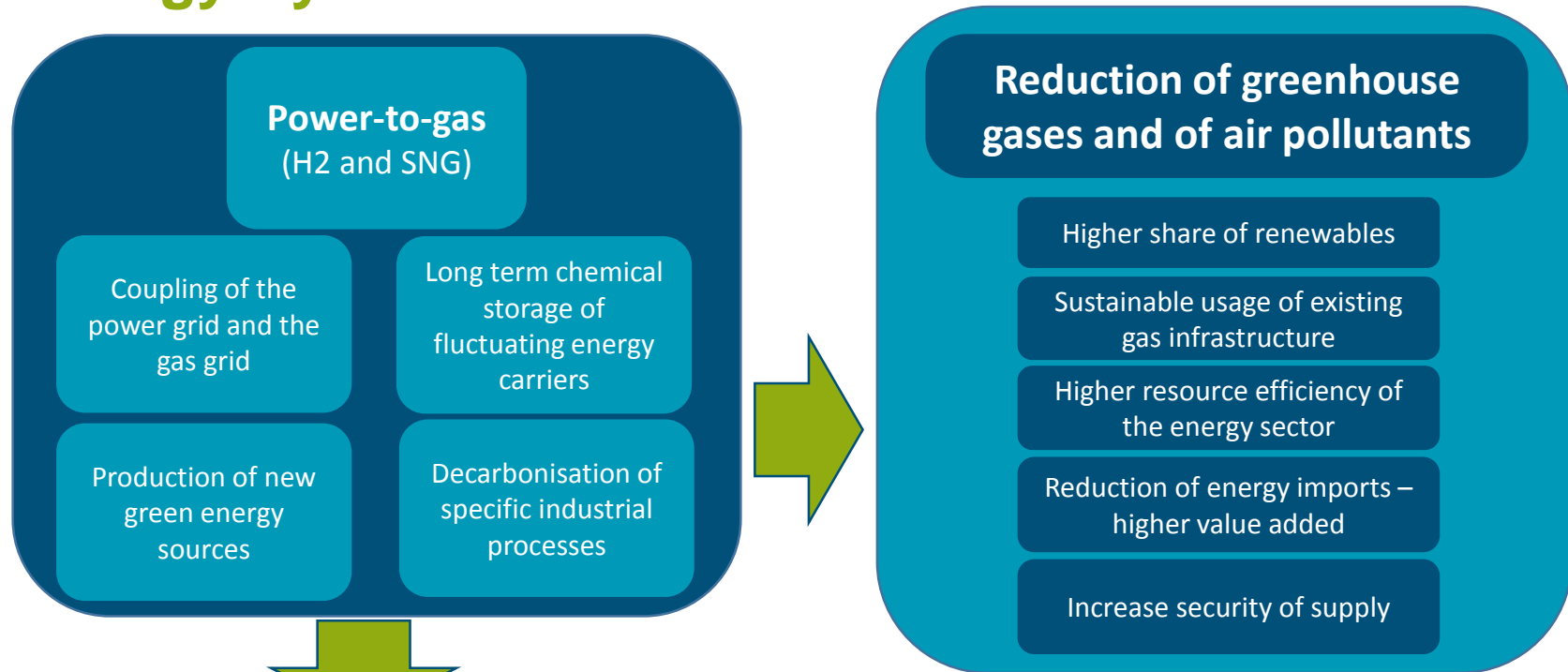
- **Challenge 1: reduction of greenhouse gas emissions** puts every economic sector under pressure to generate new solutions for substituting fossil by renewable resources.
 - >> as one consequence, volatile renewables like wind- or solar-power get strengthened and expanded in huge amounts, leading to a significant **necessity for new energy storage solutions and coupling of energy sectors**
- **Challenge 2: The dependency of the EU on imports of fossil (energy) sources** – and therefore also on geopolitical problematic regions - is still very high, leading also to enormous **losses of added value**

An increased integration and implementation of green hydrogen and other (therefrom generated) hydrocarbons such as methane are necessary for a manifold of both ecological and economic reasons (such as decarbonization, necessity of long-term energy storage, alternative energy transmission solutions,...)

Vision of WIVA P&G



Benefits of a Transition to a Hydrogen-based Energy System



Why Hydrogen?

Austria

- as a central energy production and storage region,
- as a hub for energy transport,
- as a national economy with a strong industry,
- as a country with significant renewable energy sources,

has already forced the topic hydrogen from renewable energy sources before the Energy Model region WIVA P&G was being launched.



Partners of the Energy Model Region



Key innovation fields

• Green energy



- Production of green hydrogen via electrolysis
- Storage, distribution and utilization of renewable energy

• Green industry



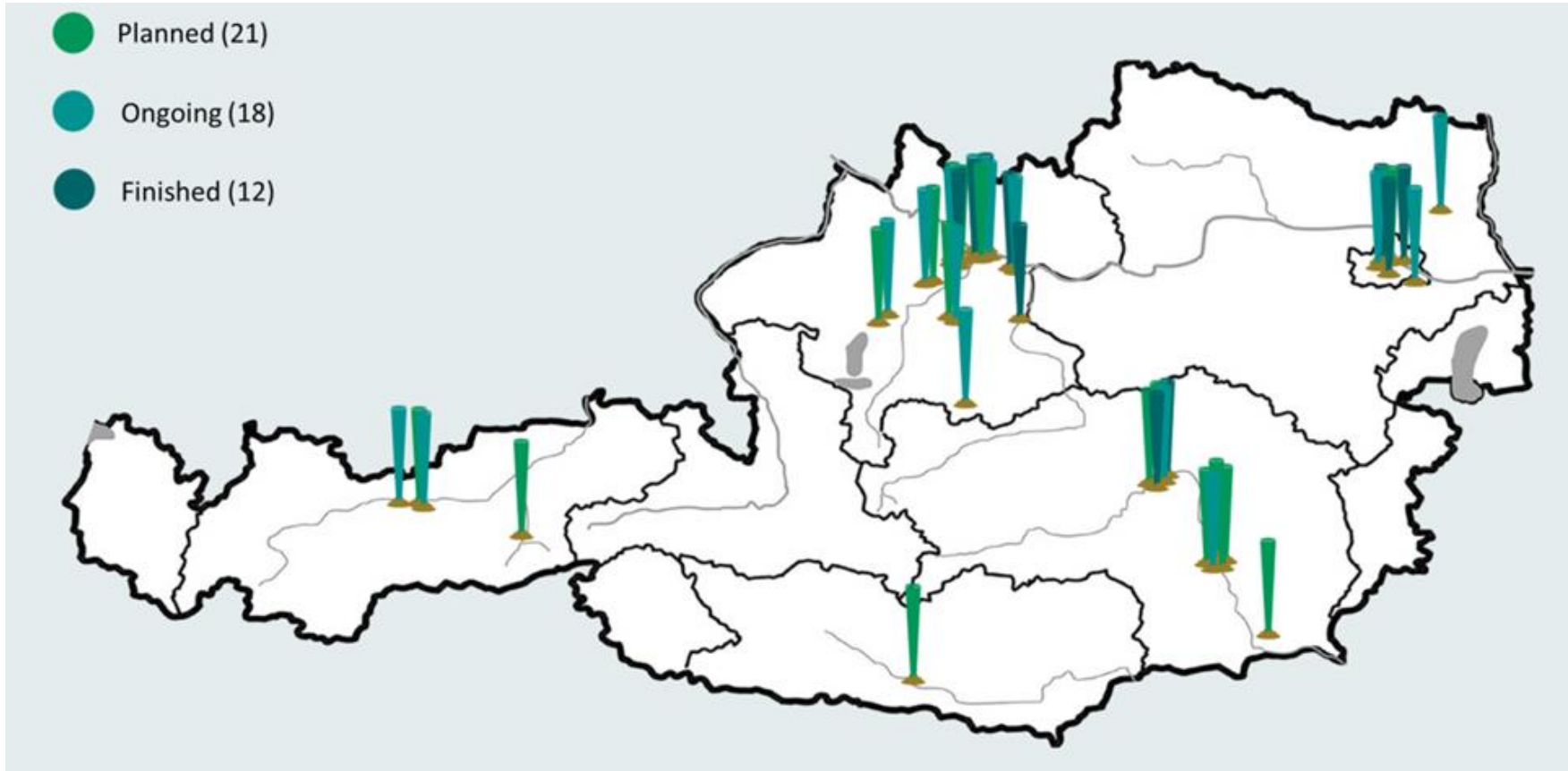
- Optimization of industrial processes
- Lowering emissions in the industrial sector
- Usage of hydrogen in different processes

• Green mobility



- New approaches for transport and logistics sector
- Lower CO₂ emissions (well-to-wheel)
- Local zero-emissions
- Higher efficiencies
- Lower costs for fuel cells
- Utilization of fuel cells in newly developed vehicles and applications

Our projects





WIVA Energy Model Region Projects and selected Lighthouse Projects



HYTRUCK 

HYTRUCK
2018/07 – 2021/06

The main project goal of HyTruck is to develop, build, calibrate and validate a heavy-duty Fuel Cell System including its key technologies that fulfills the requirements of commercial vehicles regarding power, efficiency, reliability, and lifetime.



UPHY  

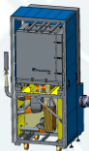
UpHy
2018/05 – 2022/05

Upscaling of green hydrogen for mobility and industry (UpHy I) objectives are also the development of modern analytical methods to determine the required quality parameters directly at the pump and a mobile mass and gas quality measurement of the hydrogen to enable the calibration of all H2 filling stations on site.



SOFC5-60
2016/11 – 2019/10

The project aims towards the development of a 5 kWel Solid Oxide Fuel Cell Combined Heat and Power system for residential and non-residential applications such as hotels, small industries and multi-family homes with an electrical efficiency of 60 % and a total efficiency of 95 % (based on hot water production and/or space heating).



HYDROMETHA
2018/01 – 2021/12

With the flagship project a novel, fully integrated system of CO₂+H₂O high-temperature co-electrolysis (Co-SOEC) and catalytic methanation will be developed. The interconnection of these processes, as well as component and operational optimization will allow a significant increase in conversion efficiencies above 80%el.





WIVA Energy Model Region Projects and selected Lighthouse Projects



H2PIONEER

H2Pioneer
2018/07 – 2021/06

The increasing demand for high-purity hydrogen for semiconductor production processes reveals high ecological and economic optimization potentials. H2Pioneer replaces the current external production and supply, which is based on the intensive use of fossil energy sources and rich in greenhouse gases, with an electrolysis and cleaning plant at the industrial partner with a "green power" supply, together with further concepts for the recovery and reuse of the hydrogen used in the process or for power generation.



UPHY

UpHy
2018/05 – 2022/05

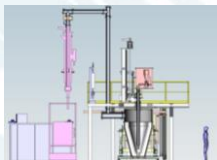
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H2FUTURE
Green Hydrogen

H2Future
2017-2021

Production of green hydrogen via water electrolysis out of electricity coming from renewable energy sources. Design and installation of one of the world's largest PEM electrolyser unit (6 MW, 1200 m³/hSTP hydrogen). Industrial integration of renewable hydrogen production in steelmaking processes, Demand Side Management (www.h2future-project.eu)



SuSteel
2016/09 – 2019/08

Direct transformation process from iron oxides to „steel“ with H₂ plasma smelting reduction process. Upscaling of the reactor (former MUL projects) from 100g to 50 kg batch operation with power consumption of approx. 250 kW. Location of the reactor is the new research melting plant at voestalpine Donawitz site. Follow-up K1-MET project 2020 to 2023





WIVA Energy Model Region Projects and selected Lighthouse Projects

WIVAP&G
Energy Model Region

RENEWABLE GASFIELD



Renewable Gasfield

2018/12 – 2021/11

Holistic approach for coupling hydrogen production from renewable energies by electrolysis with load-flexible methanisation including storage and distribution of renewable hydrogen and synthetically produced natural gas. Development of the versatile plant infrastructure under consideration of regional conditions. Large scale demonstration with direct coupling to an existing biogas plant.

WIVAP&G
Energy Model Region

HYTECHBASIS



HyTechbasis

2019/04 – 2022/03

By applying advanced catalyst coated membrane technology and the usage of sophisticated technology in bipolar plate manufacturing HYTECHBASIS improves state-of-the-art electrolysis technology. A generic PEM fuel cell system platform based on next generation low-cost metal bipolar plates stack architecture and highly function integrated peripheral components paves the way for a broader range of marketable applications.

**UNDERGROUND
SUN.STORAGE**

Underground Sun Storage

2013/09 – 2017/02

Storage of hydrogen produced using solar energy is being trialled at a small depleted gas reservoir in Pilsbach, Upper Austria. Energy from renewable sources that can be retained thanks to storage offers the only straight replacement for conventional energy – and Austria's gas storage facilities provide the necessary infrastructure.

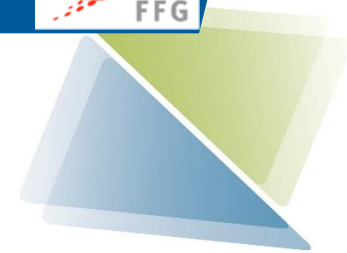


**UNDERGROUND
SUN.CONVERSION**

Underground Sun. Conversion

2017/03 – 2021/02

Hydrogen is produced from solar/wind power and water and then injected with carbon dioxide into an existing (porous) natural gas reservoir. At a depth of over 1,000 metres, in a relatively short time naturally occurring micro-organisms convert these substances into renewable gas which can be stored in the same reservoir, withdrawn as needed at any time, and transported to consumers via the existing pipeline network.



Operational Structure of WIVA P&G

Association WIVA P&G = Cluster Coordinator

Coordination, Dissemination, Virtual Interconnection

Subprojects

Macro-, socio-, techno-economic Evaluation

Legal and regulatory analysis and coordination

Steering Committee

Scientific evaluation of WIVA P&G subprojects

Identification of white spots and integration of new projects

Open Innovation Management

Working Groups

WG Dissemination and Communication

WG International Relations

WG Industry Cooperation and utilising results

WG Quality Control

WG RDI

WIVA Partners 1. Tranche

Members and partners SUBPROJECTS 1. TRANCHE		
AVL List GmbH	Fronius International GmbH	Rohöl-Aufsuchungs AG
Energie AG OÖ Power Solutions GmbH	HyCentA Research GmbH	Verbund Solutions GmbH
Energieinstitut an der JKU Linz	K1-Met GmbH	Voestalpine Stahl
EVN AG	OMV Refining & Marketing GmbH	Energienetze Steiermark GmbH
Energie Agentur Steiermark	Infineon Technologies Austria AG (TU Wien
Heraeus Deutschland GmbH & Co. KG	fensystems	Uniper Energy Storage GmbH
VF Services GmbH (VF)	FEN Sustain Systems GmbH	TU Wien
DB Schenker & Co AG	FPT Motorenforschung AG	TU Graz
Productbloks GmbH	Miba Sinter Holding GmbH & Co KG	Montanuniversität Leoben
Rosenbauer E-Technology Development GmbH		

additional partners 2018 (subproject did not get funding)		
VTU Energy GmbH	Fraunhofer IKTS	Molinari Rail Austria GmbH
Forschung Burgenland GmbH	Zillertaler Verkehrsbetriebe AG	
Axiom	PRIMETALS	



Additional (interested) partners 2. Tranche

Kläranlage Graz - Holding Graz	AEE Intec	Rotreat Abwasserreinigung	Siemens AG	APG Austrian Power Grid	Rail Cargo Austria
Kleinkraft AG	AIT	TU Graz	FH Burgenland,	Vaillant Austria, Group	MiRo Mobility,
Bioenergy 2020	Air Liquide	Wien Energie, SMS group Process Technologies	LogServ Logistik Service,	Grazer Energie Agentur	Thermax Ltd
Greentechonomy GmbH	IESTA (Institut für innovative Energie- & Stoffaustauschsysteme)	Güssing Energy Technologies	Hirtenberger Engineered Surfaces GmbH	TIWAG,	TIGAS-Erdgas Tirol GmbH,
Boku Wien	Saubermacher AG	ecoplus	M-Preis,	Zillertalbahn AG	Stadtwerke Amstetten,
Technologie Services,	guo Business Development Consult,	A1-Plastics,	Stadtgemeinde Amstetten	R2Gas	Biomasseverband Ö
Uni Wien	Solocean GmbH	Johannes Kern e.U	ACGS	FGW	KBVA
Energie Bgld	EEG Elements Energy	Grillenberger GmbH	Energieallianz Ö	Ö Energieagentur	Güssing Renewable Energy
Prozess CAP Optimal	BIOS BIOENERGIESYSTEME GmbH,	Windhager Zentralheizung Technik GmbH,	Peace GmbH	LEC GmbH (Large Engines Competence Center)	NOVAPECC,
Catator AB	Energie Kompass GmbH	VIB Verkehrsinfrastruktur Burgenland GmbH	Christof Project GmbH	Innio Jenbacher	Pirhofer-Automation



Thank you for your attention!

