Manager International Projects
Manager International Projects

HIGH EFFICIENCY POWER TO GAS PROJEKTE

IET INSTITUT FÜR ENERGIETECHNIK

Dr. Luiz C.R. de Sousa

Manager International Projects

Expertengespräche Power-to-Gas 12.01.2017

luiz.desousa@hsr.ch

HSR HOCHSCHULE FÜR TECHNIK RAPPERSWIL

FHO Fachhochschule Ostschweiz

Inhaltsverzeichnis

- **Project PENTAGON**
- **Projekt HEPP** (**H**igh **E**fficiency **P**ower-to-Methane **P**ilot)
- **Ausblick**

Unlocking European grid local flexibility trough augmented energy conversion capabilities at district-level

Project PENTAGON

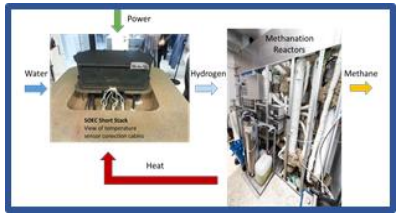
HSR Expertengespräche – 12.01.2017

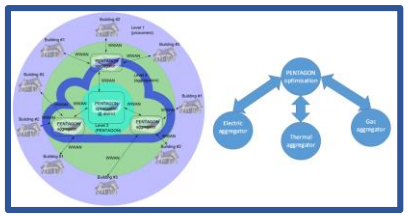
Dr. Luiz C.R. de Sousa
Manager International Projects
luiz.desousa@hsr.ch

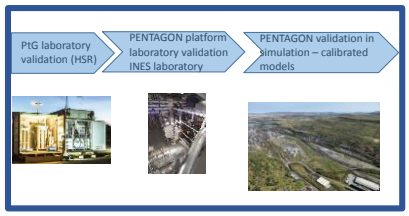
PENTAGON OVER-ALL OBJECTIVE

Pave the way to a new generation of **smarter eco-districts** that allow **extensive renewable (energy) production** based on the combination of a package of **innovative technologies for electric energy conversion** and an **advanced multi-scale energy management platform**.

SUB-OBJECTIVE 1	SUB-OBJECTIVE 2	SUB-OBJECTIVE 3	SUB-OBJECTIVE 4
Boost Power-to-Methane efficiency combining high temperature electrolysis and catalytic methanation and deliver technology suitable for eco-districts	**Deliver versatile energy management** at building and district-scale for enhanced network synergy through provision of multi-scale IoT energy management platform	**Demonstration and assessment** of PENTAGON technologies through extensive experimental and simulation-based testing.	**Foster wide impact and replication potential** at European-level through a combination of targeted dissemination and focused business roadmapping.







Project Partners

Project Coordinator

1 Exergy Ltd, United Kingdom, www.exergy.co.uk

Project Partners

2 R2M Solution SRL, Italy, www.r2msolution.com

3 Tractebel Engineering S.A. Belgium, www.tractebel-engineering-gdfsuez.com

4 Schneider Electric SPA, Italy, www.schneiderelectric.it

5 Commissariat à l'Energie Atomique et aux Energies Alternatives, France www.cea.fr

6 Cardiff University, United Kingdom, www.cardiff.ac.uk

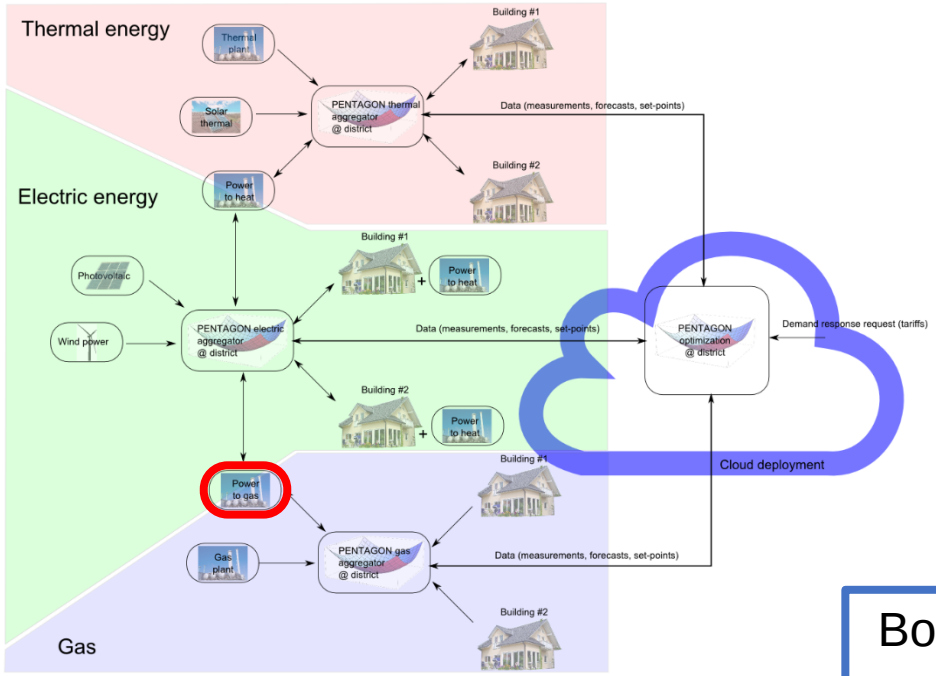
7 CSEM, Switzerland www.csem.ch

8 HSR, Switzerland www.iet.hsr.ch/Power-to-Gas

9 Blaenau Gwent County Borough Council, United Kingdom www.blaenau-gwent.gov.uk

10 EPFL, Switzerland www.epfl.ch

Eco-district exploiting PENTAGON technology



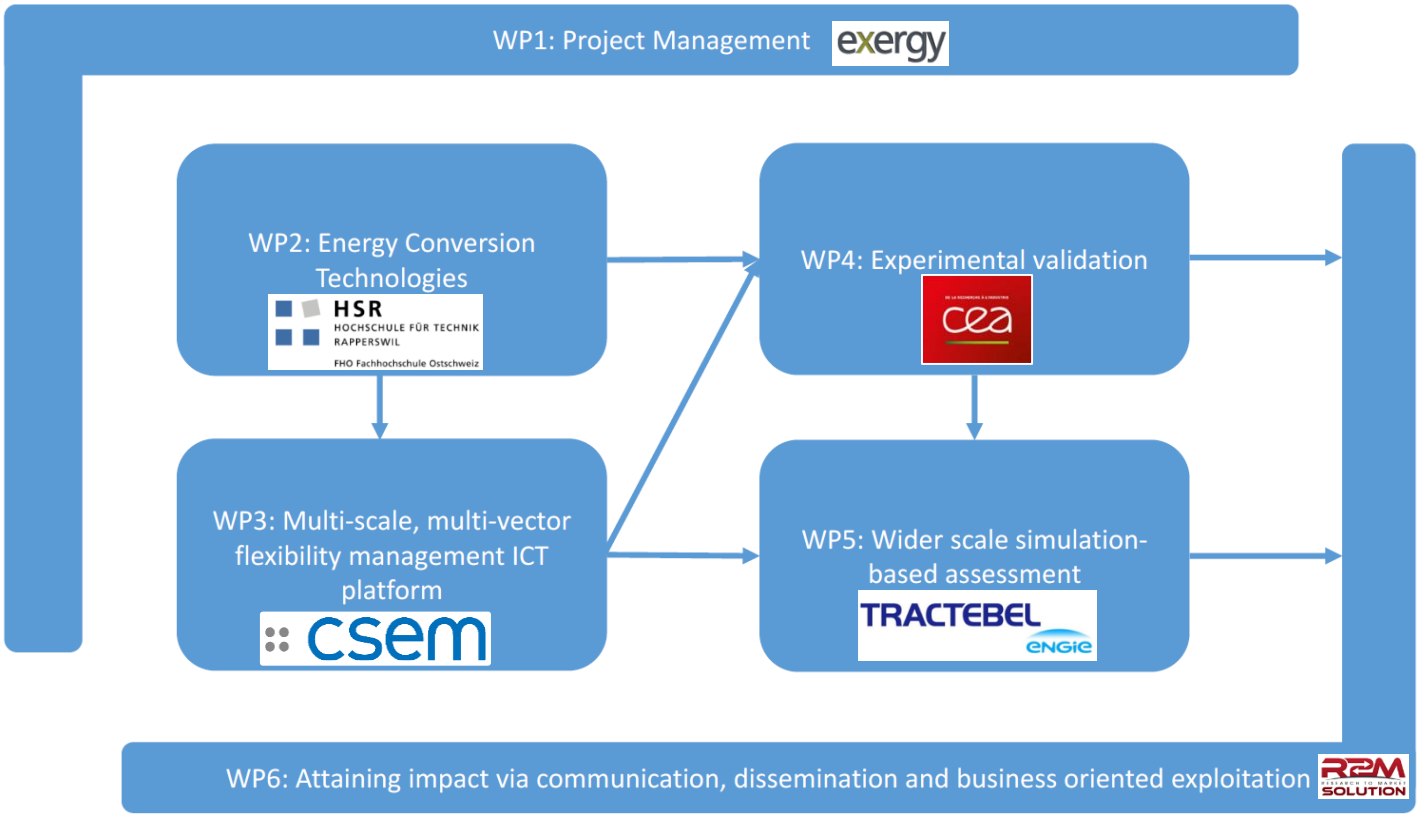
Power to Gas is an important link requiring development

- Current techology employs alkaline or PEM elecrolysis
- 60-65% efficiency*, limited by
  - Electrolysis efficiency
  - Heat from Sabatier reaction lost
- Power consumption is critical and determines
  - Cost and profitability
  - Environmental impact

Boosting conversion efficiency is essential for the success of PENTAGON

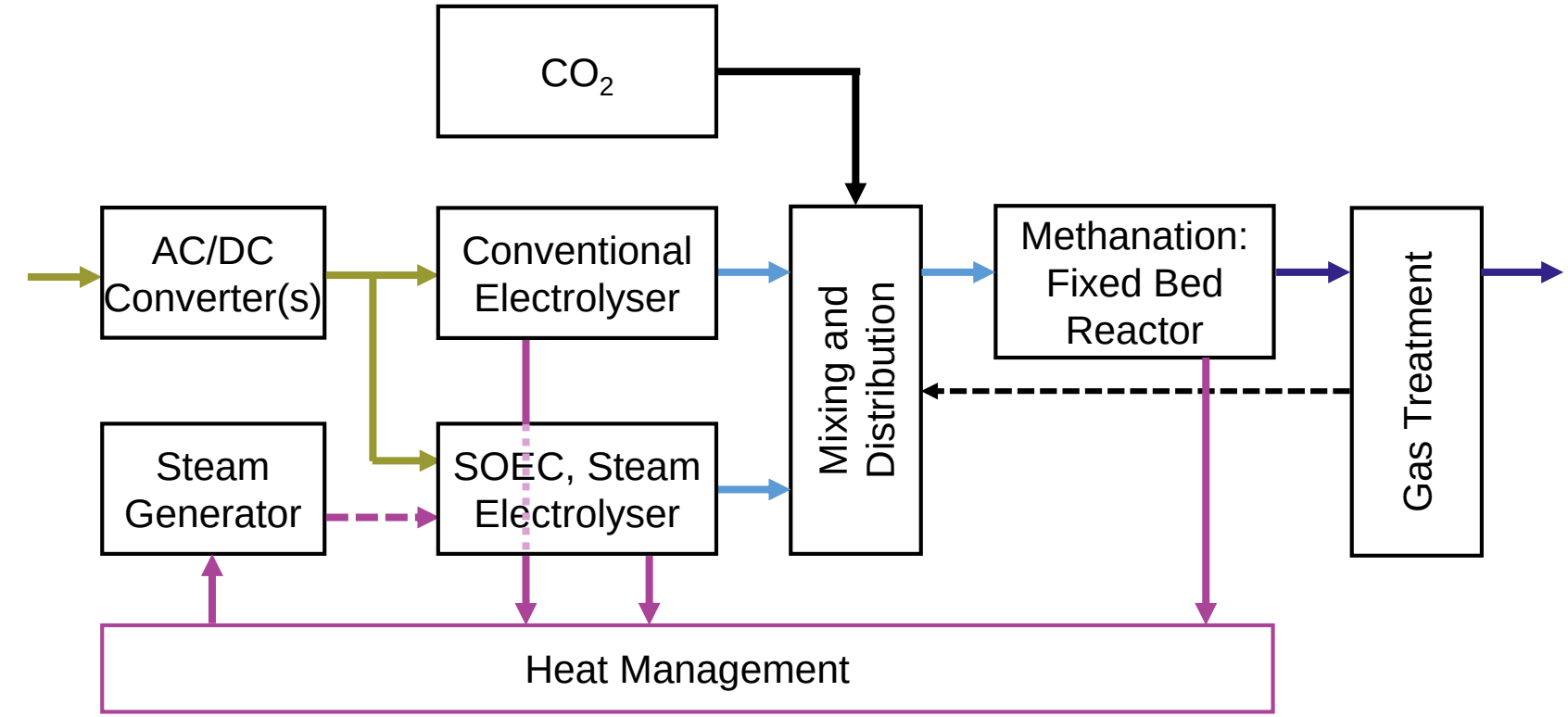
*Power to higher heating value

Project Structure and Workpackage Leaders



Project kicked-off in December 2016 with a duration of 36 months

High-efficiency Power to Gas to be demonstrated in WP2



Tasks and Proposed Timeline for Workpackage 2

			2016	2017											2018												2019										
	Task		D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Pentagon WP 2	T2.1	Requirements and concept consolidation (HSR)																																				
	T2.2	SOEC upgrade and integration of Power-to-Gas technology																																				
	T2.3	Power-to-Gas technology control-command (CSEM)																																				
	T2.4	Power-to-Gas technology operation and testing																																				
	T2.5	Power-to-Heat technology integration strategies (CEA)																																				
	T2.6	Detailed specifications of selected energy conversion technologies (CU)																																				

Manager International Projects
Manager International Projects

PROJEKT HEPP

Dr. Luiz C.R. de Sousa

Manager International Projects

Expertengespräche Power-to-Gas 12.01.2017

luiz.desousa@hsr.ch

HSR
HOCHSCHULE FÜR TECHNIK
RAPPERSWIL

FHO Fachhochschule Ostschweiz

Projekt HEPP

- **Ziele**
- **Arbeitspakete**
- **Partner**
- **Zeitplan**

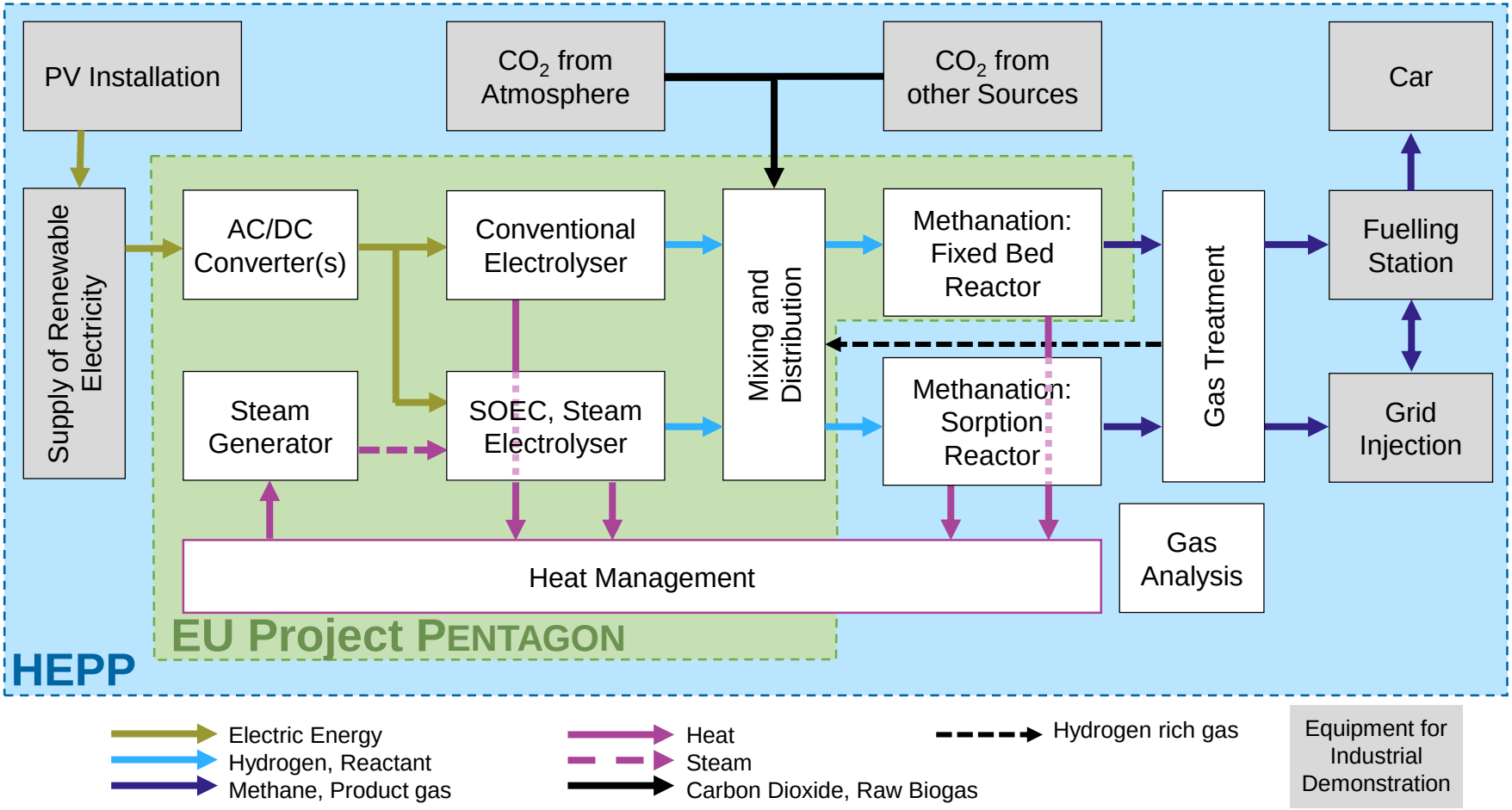
HEPP Projektziele sind komplementär zu PENTAGON

- **Innovative, in der Schweiz entwickelten Technologien in der PtM Anlage integrieren und im Technikumsmassstab demonstrieren**
  - Fortschrittliche Methanisierungskatalysatoren und –konzepte
  - Gasaufbereitung durch Membrantechnologie
  - Fortschrittliche Gasanalytik

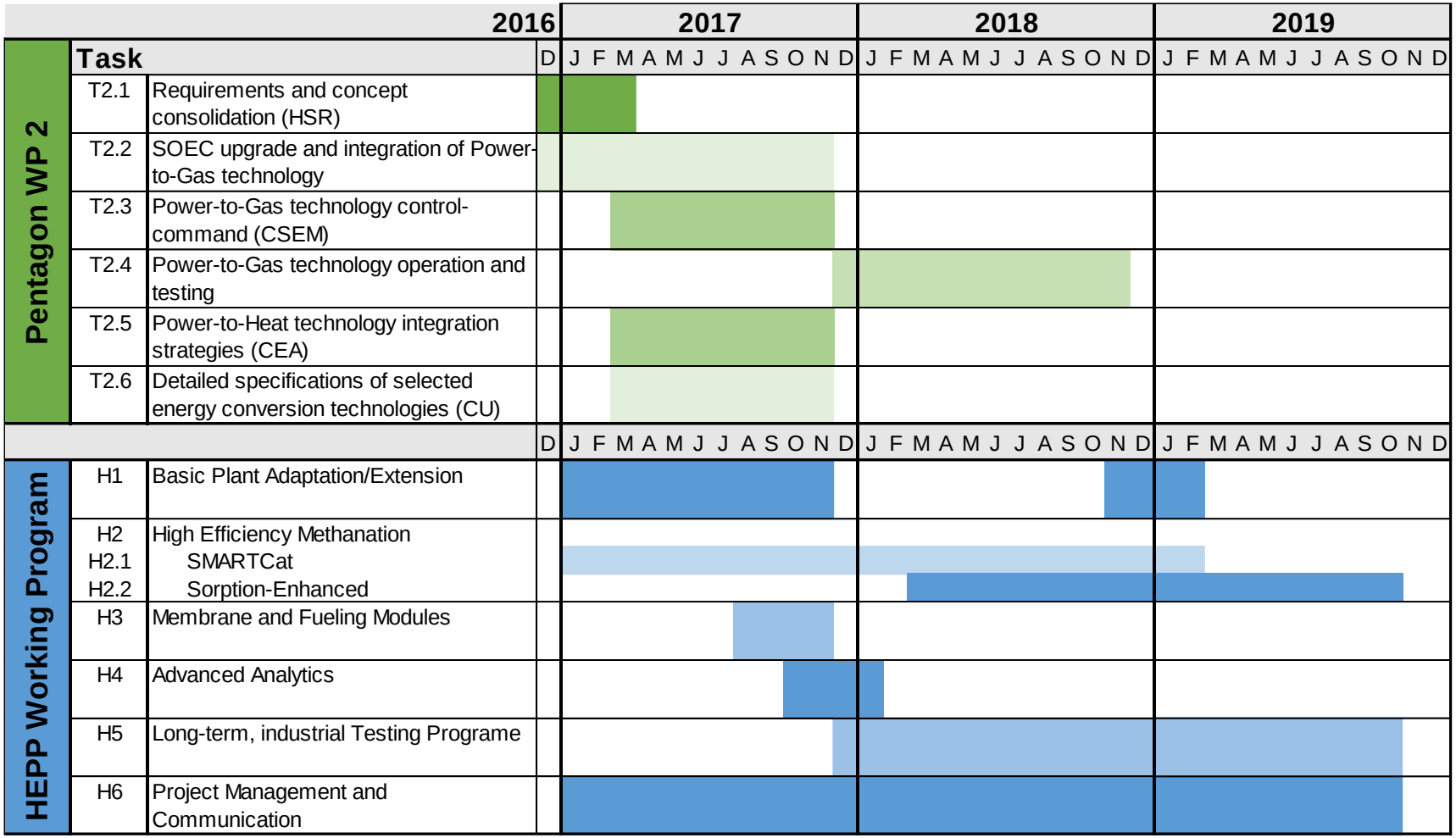
- **Das System unter industrienahen Bedingungen untersuchen**
  - Einbinden in industrielle Infrastruktur (z.B. Einspeisung des Produktgases), beantworten relevanter Fragen (z.B. Langzeitverhalten)

- **Die Basis legen für den späteren Scale-up der Technologie auf 1 MW**

HEPP baut auf die Kernanlage des Projekts PENTAGON



PENTAGON WP2 + HEPP Zeitplan



Projektpartner

Technology Pulling Partners

ENERGIE ZürichseeLinth

erdgas regio

erdgasobersee-linth transport

Audi

EPFL ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

zhaw School of Engineering

HSR HOCHSCHULE FÜR TECHNIK RAPPERSWIL FHO Fachhochschule Ostschweiz

Empa Materials Science and Technology

sgsw Sankt Galler Stadtwerke

Academic Partners

EWJR ELEKTRIZITÄTSWERK JONA-RAPPERSWIL AG

apex

erdgas Die freundliche Energie.

mems AG

felcon ag ingenieurbüro anlagenbau

Funding Partners

European Commission

Technology Pushing Partners

Zusammenfassung und Ausblick