

Prof. Dr. Kurt Wagemann

Acceptance of Power-to-X Technologies – First Results from the Kopernikus P2X Project

A New Horizon: The Role of Powerfuels in the Global Energy Transition
Berlin, 08. April 2019

Kopernikus-Project: P2X

Exploration, Validation and Implementation of "Power-to-X" Concepts

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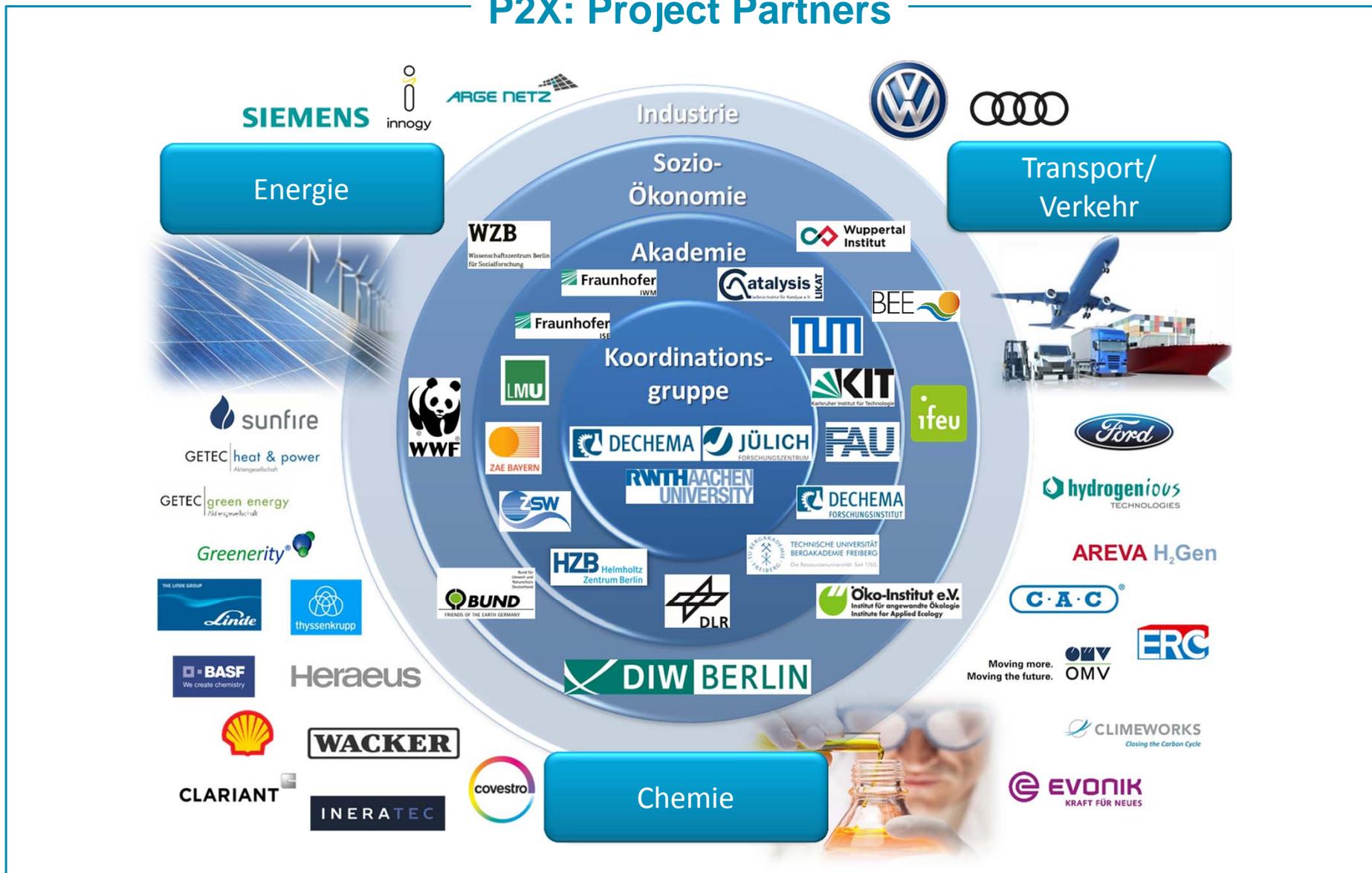
GEFÖRDERT VOM



Bundesministerium
für Bildung
und Forschung

KOPERNIKUS
P2X **PROJEKTE**
Die Zukunft unserer Energie

P2X: Project Partners

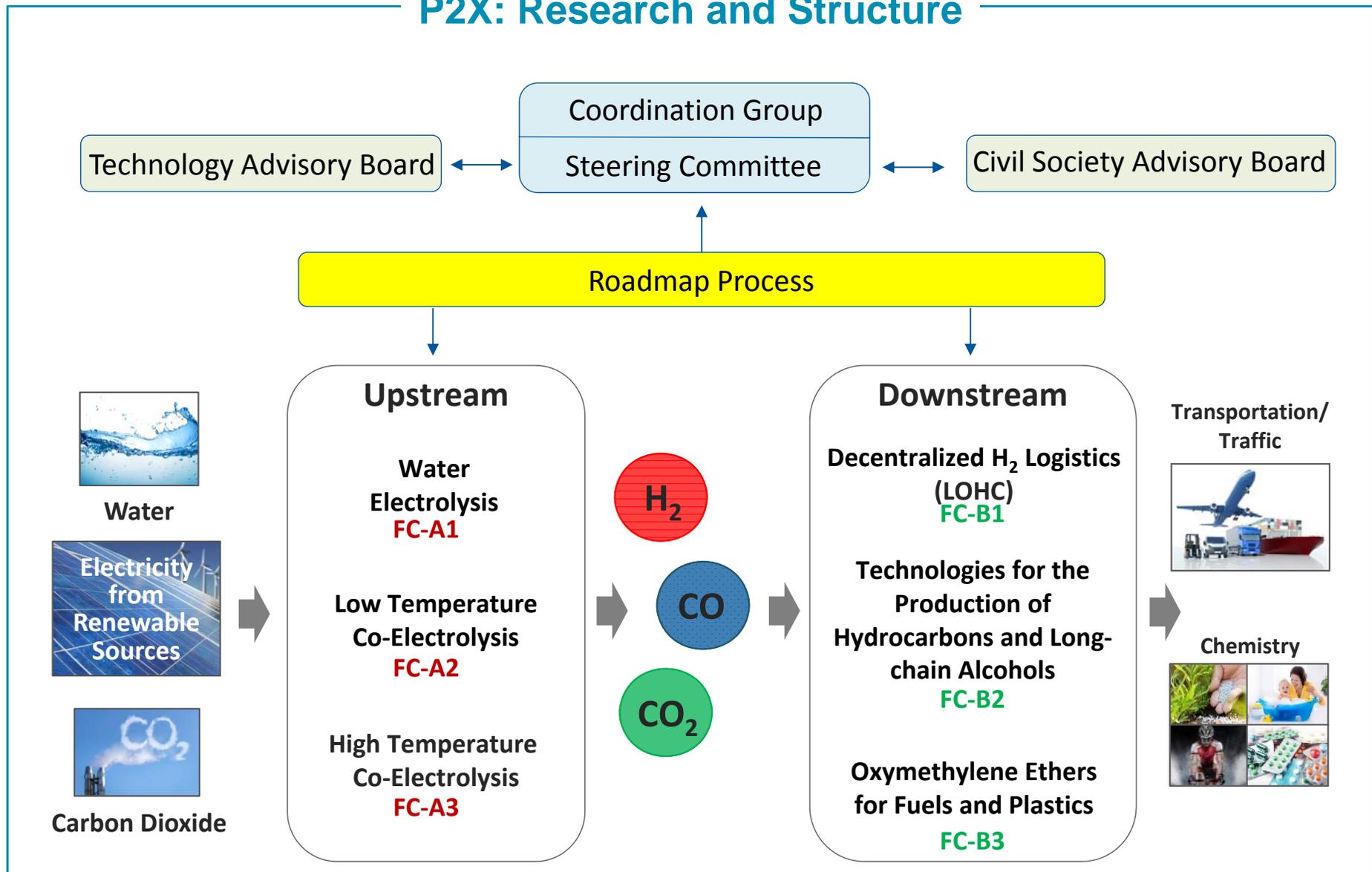


P2X: Guiding Principles

- Optimal CO₂ reduction with maximum added value
- Scaling and modularization
- Decentralized solutions and logistics
- Social needs and acceptance
- Exportability



P2X: Research and Structure



The Roadmapping Process

Content (Roadmap 1.0)

- › Political classification
- › Applied methods and their challenges
- › Intermediate results of the first analyses
 - › Environmental footprint (via LCA)
 - › Economic viability (via techno-economic assessment)
 - › **Acceptance (newly developed methodology)**
- › Conclusion and outlook
- › Controversies arising

Publications

- › Roadmap 1.0: published in August 2018
- › Roadmap 2.0: to be published in June 2019



The Challenges in Assessing the Acceptance of Power-to-X Technologies

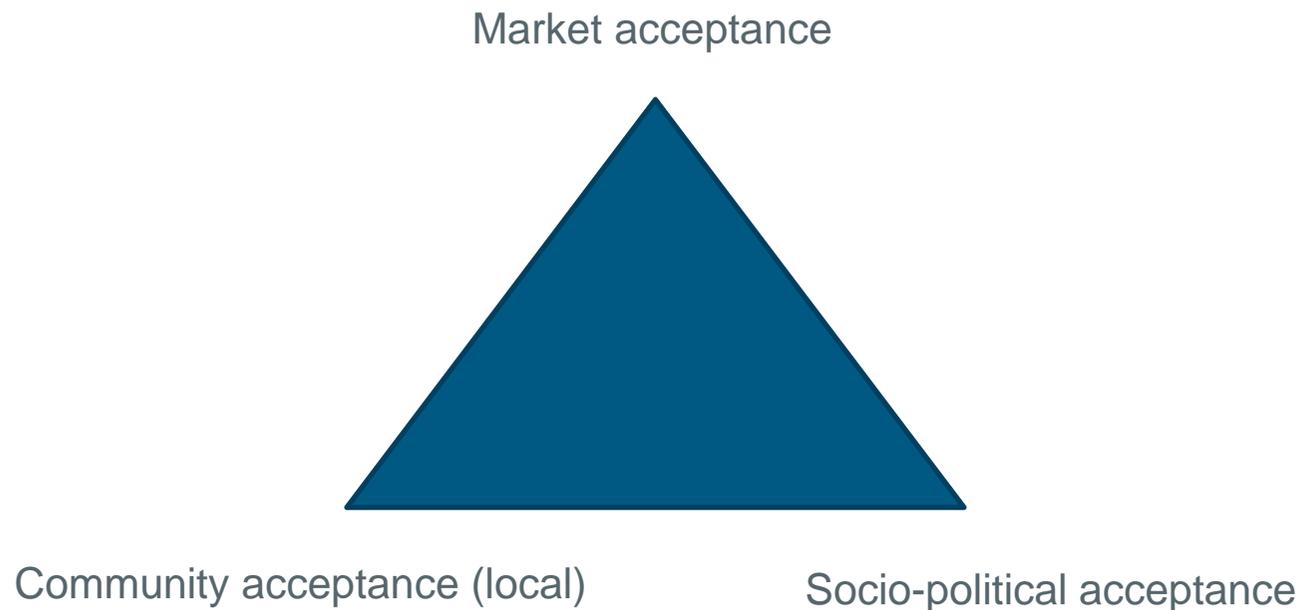
- At low TRL the public does not have sufficient information about the technology
- Production of fuels is very far up the value chain → no interaction between the consumer and the technology



No basis for assessing the level of acceptance
→ First Step: The public will have to be informed extensively

Our Approach in Kopernikus P2X (I)

- Subsequent assessment of different acceptance levels
- Establishing a matrix as a semi-qualitative assessment tool
- The matrix must be along the entire value chain



Based on Wüstenhagen, Wolsink, Börer 2007

Matrix of Acceptance

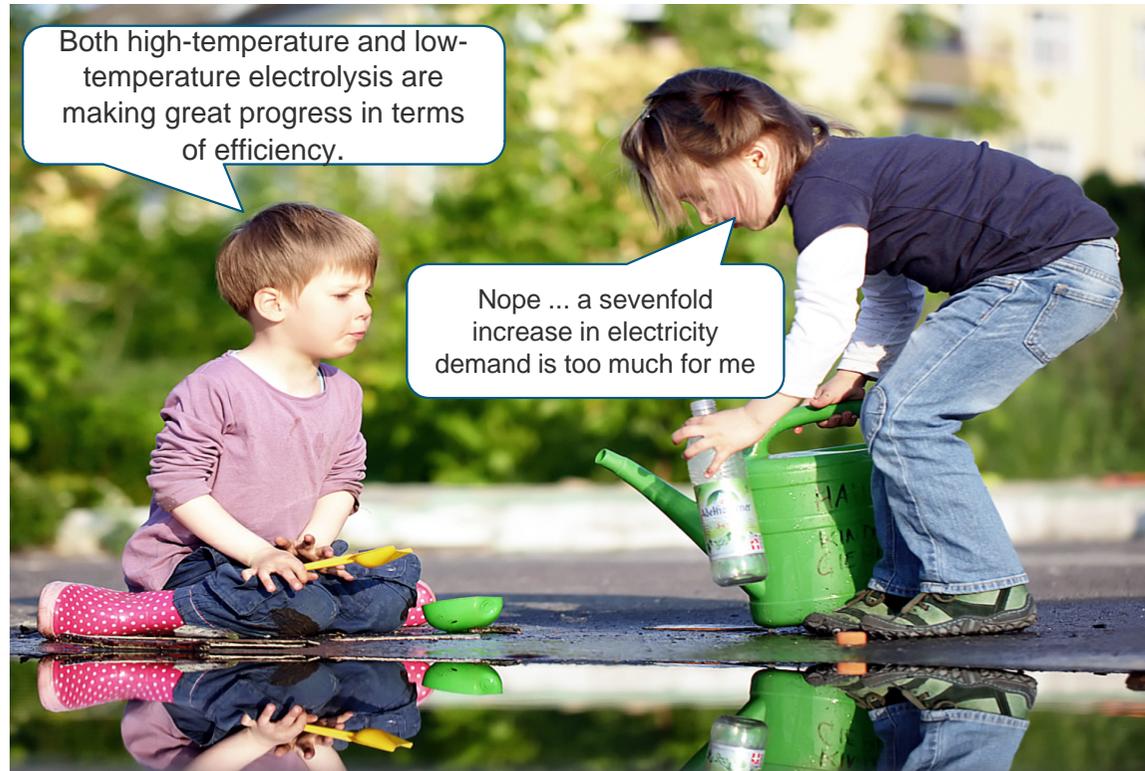
<ul style="list-style-type: none"> • Massive protests • PtX-Projects impossible 	<ul style="list-style-type: none"> • Very negative image due to a discourse regarding risk (e.g. "Tank/Teller", E10) 	<ul style="list-style-type: none"> • No private funds going towards R&D or implementation
<ul style="list-style-type: none"> • Initial experiences • Practical projects, with participatory accompaniment 	<ul style="list-style-type: none"> • Debate is balanced between chances and risks • Political openness • Corresponding research is being funded 	<ul style="list-style-type: none"> • Willingness-to-invest • Start of deployment of pilot plants
<ul style="list-style-type: none"> • Very positive attitude • Municipality aims at becoming a „PtX-region“, analogous to regions with 100% renewable energy 	<ul style="list-style-type: none"> • Positive image • Political framework is favorable towards PtX 	<ul style="list-style-type: none"> • Investments for implementations have been made • Infrastructure is implemented • New business models are developed

Our Approach in Kopernikus P2X (II)

„Invisible Kids“ (WWF, supported by DECHEMA)

Acceptance of adults largely determines the deployment of the technology and thus the future of the next generation.

→ Why not assess the acceptance among the next generation?

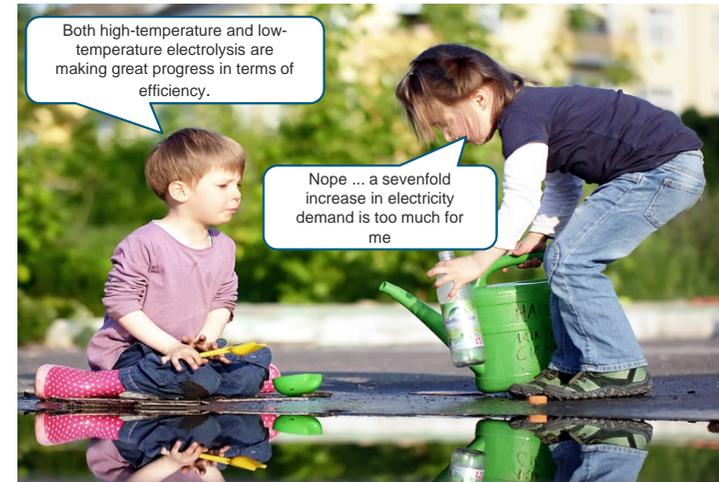


Our Approach in Kopernikus P2X (II)

„Invisible Kids“ (WWF, supported by DECHEMA)

First results:

- Open minded and positive versus P2X
- Strong changes expected by the introduction of P2X
- Greatest advantage: ecological benefit
- Generation of jobs is an important topic in Germany
- Important: Energiewende in all fields (sectors)
- Further expansion of renewable energies in Germany: high consent (about 90 percent)



Info: „Invisible Kids“ defined in 2017, interviews mid of 2018

Controversies

Among others:

- › Export of Technologies
an Import of Fuels and Chemicals
is an unreflected option.

- › It does not take into account
 - › Environmental vulnerabilities in such 3rd world regions
and
 - › Societal aspects

(Representative of project partner BUND, September 2018,
corresponding wording)