

# Power-to-X

State of science in Germany  
and the big question:  
How much for which sector?

**CAN-Workshop on energy transition –  
The role of renewable gas**

Brussels – 22nd of October 2018

Bund für  
Umwelt und  
Naturschutz  
Deutschland

# Overview

- BUND e.V. a quick introduction
- State of science: Kopernikus project P2X – Exploration, validation and implementation of P2X concepts
- P2X – How much for which sector and application?

# BUND e.V. a quick introduction

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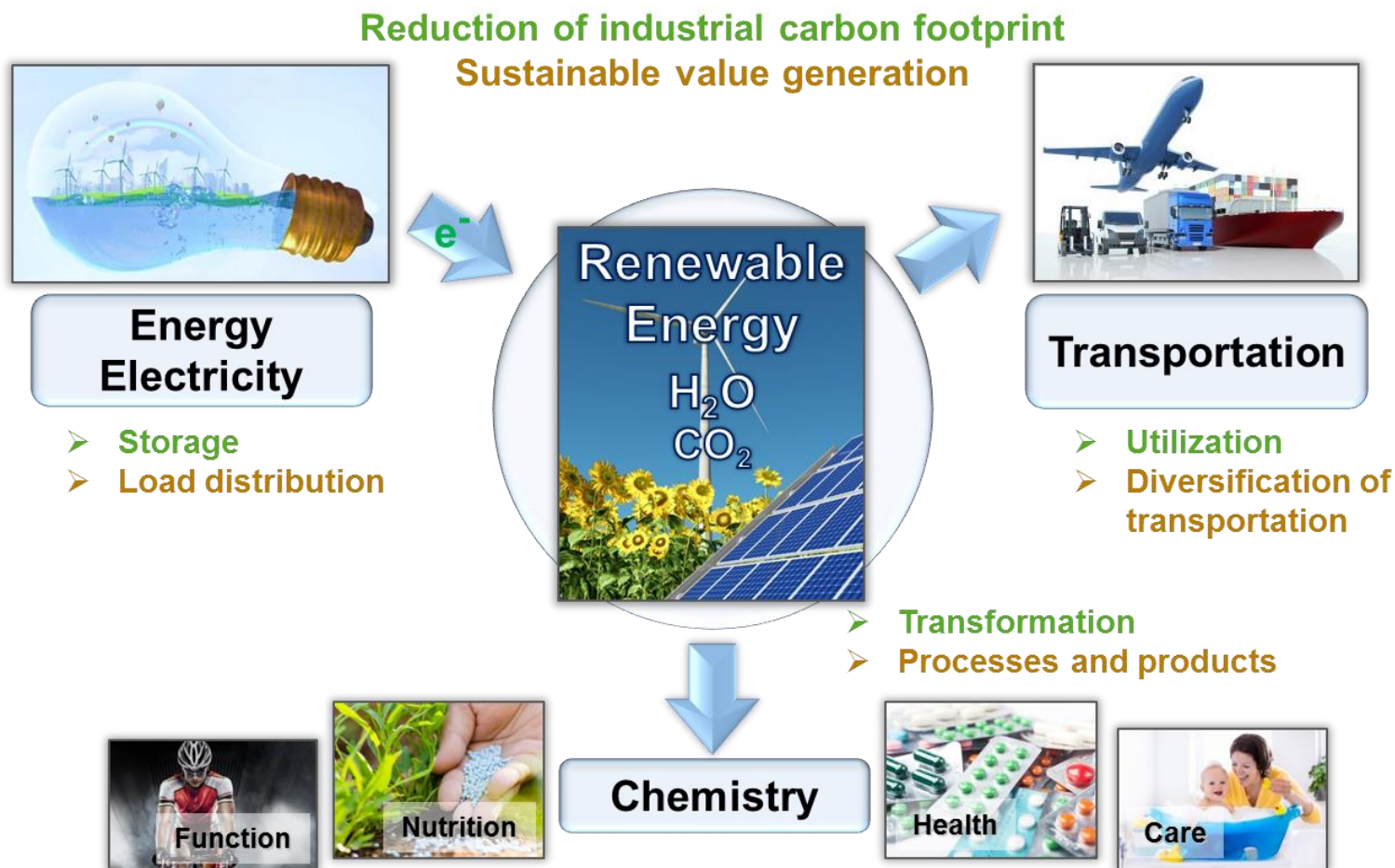
FRIENDS OF THE EARTH GERMANY

## BUND e.V.

- Federal structure with 16 regional branches and over 2000 local groups
- Membership based
- More than 560.000 (2016) members and supporters
- Democratic decision taking: annual assembly of delegates and scientific advisory
- Independent from political parties

# Kopernikus project P2X: Exploration, validation and implementation of P2X concepts

# P2X: Applications and possible contribution for decarbonization

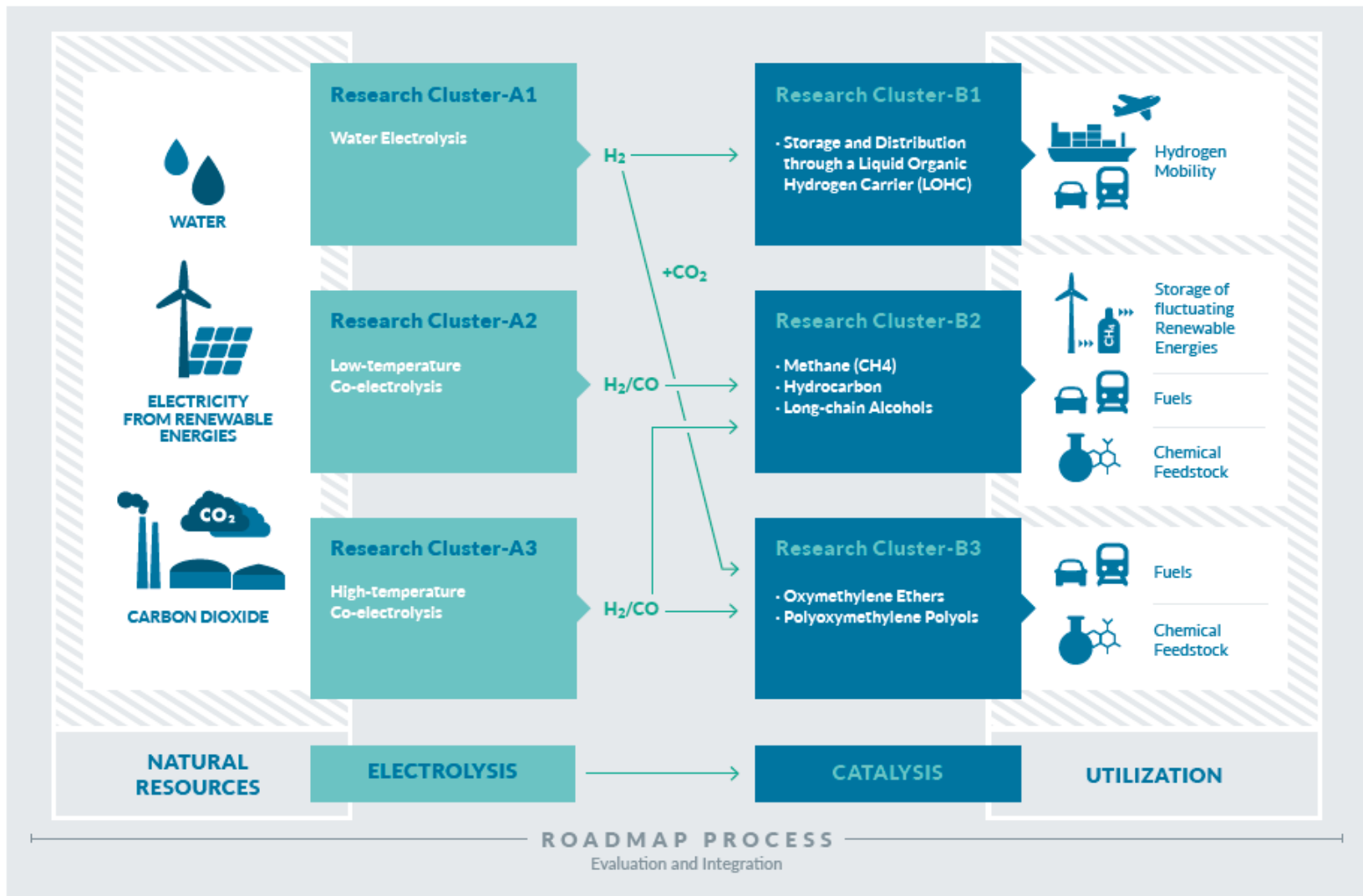


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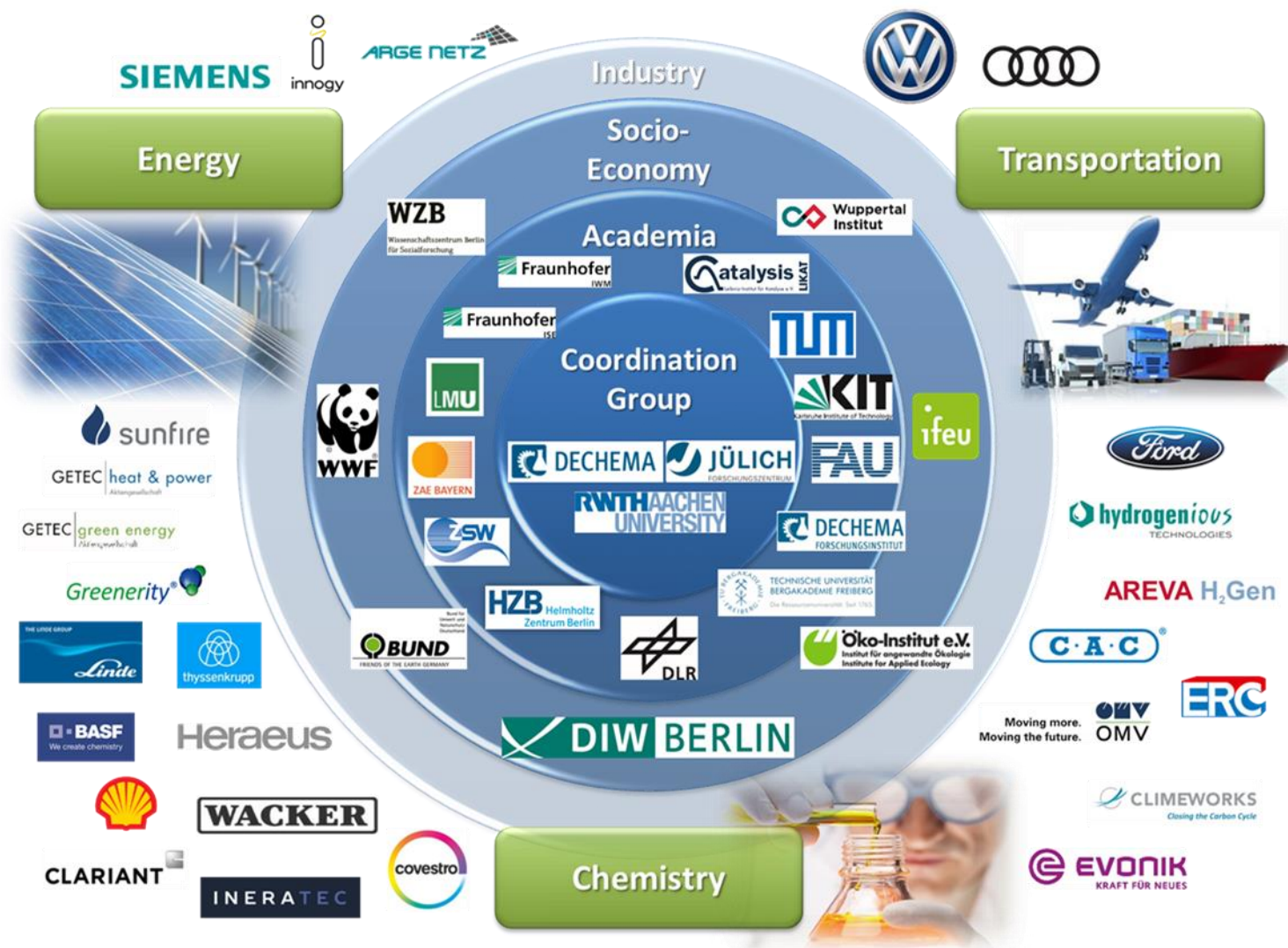
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# KOPERNIKUS PROJECT POWER-TO-X RESEARCH STRUCTURE



# Project partners





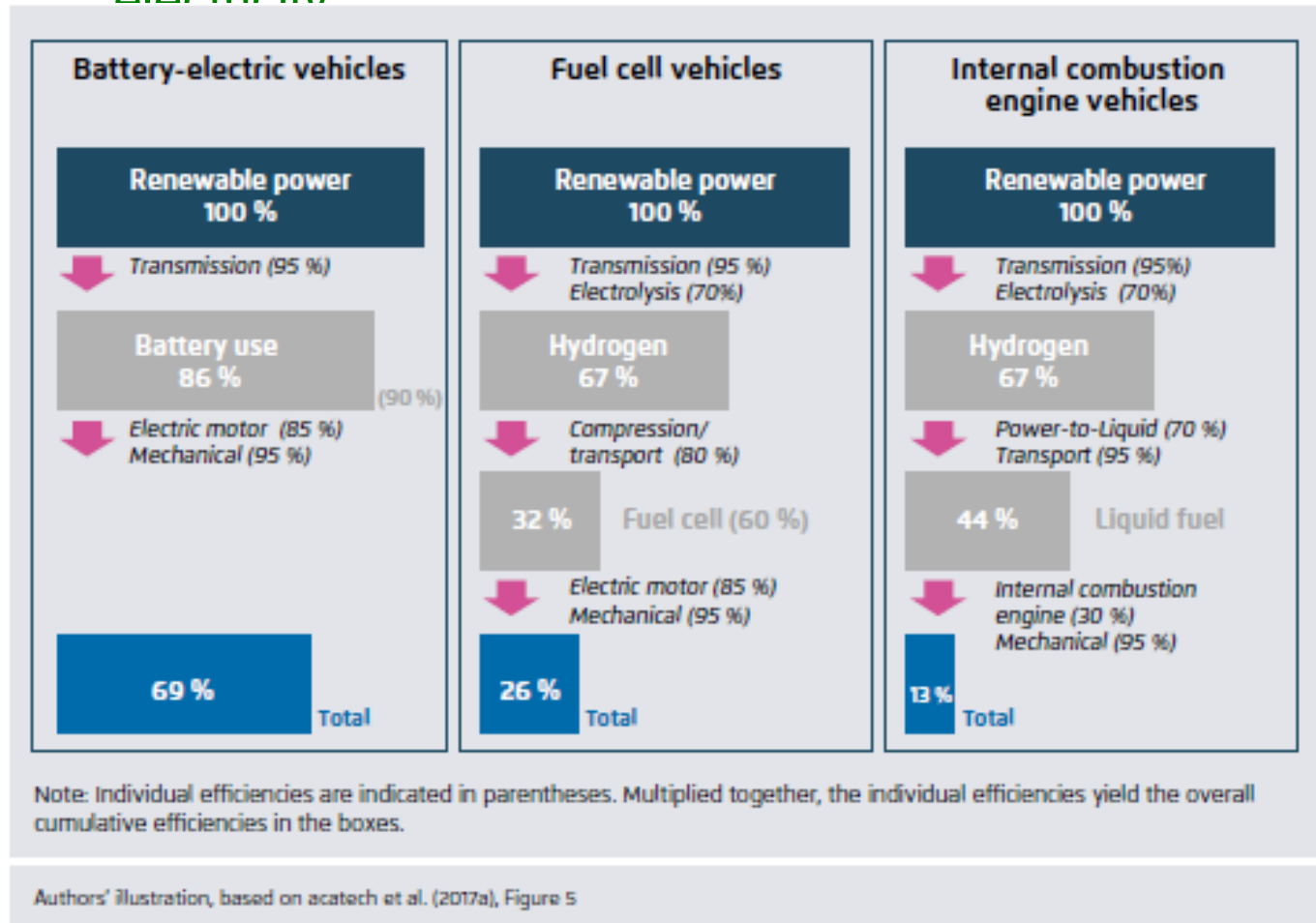
## Main (preliminary) results

- None of the technologies bring climate benefits if there are still fossil fuels in the electricity mix
- Resource questions about renewable power, CO<sub>2</sub>, water supply will be most important for a sustainable use of P2X?

## Main problems

- Roadmap doesn't answer the questions...
  - How much P2X do we need in the different sectors?
  - Where can P2X be most effectively used for CO2 reduction?
  - Where does the renewable energy for P2X come from? Where should P2X plants be based?

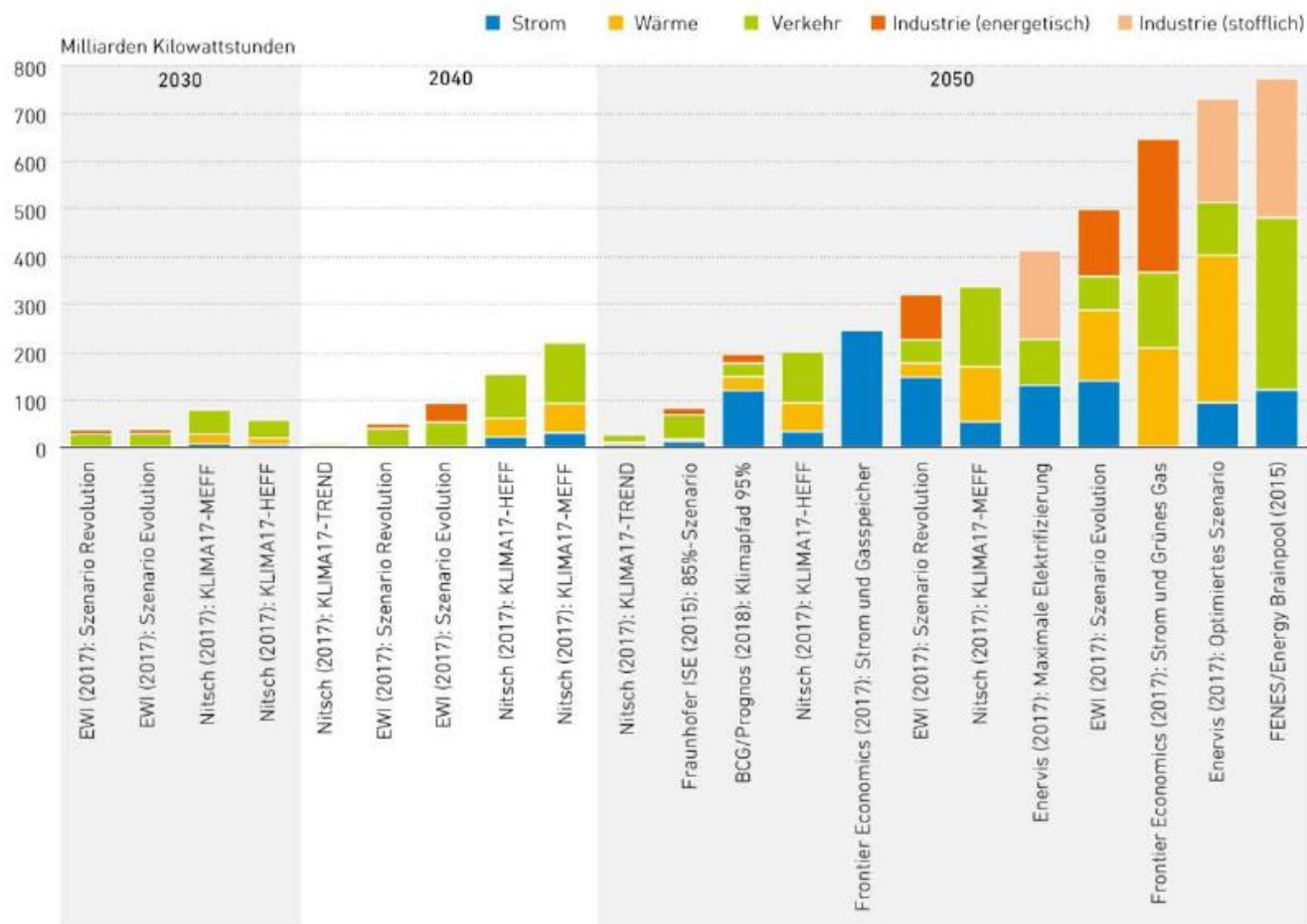
## Individual and overall efficiencies for cars with different vehicle drive technologies starting from renewable electricity



Source: Agora Verkehrswende, Agora Energiewende and Frontier Economics (2018): The Future Cost of Electricity-Based Synthetic Fuels.

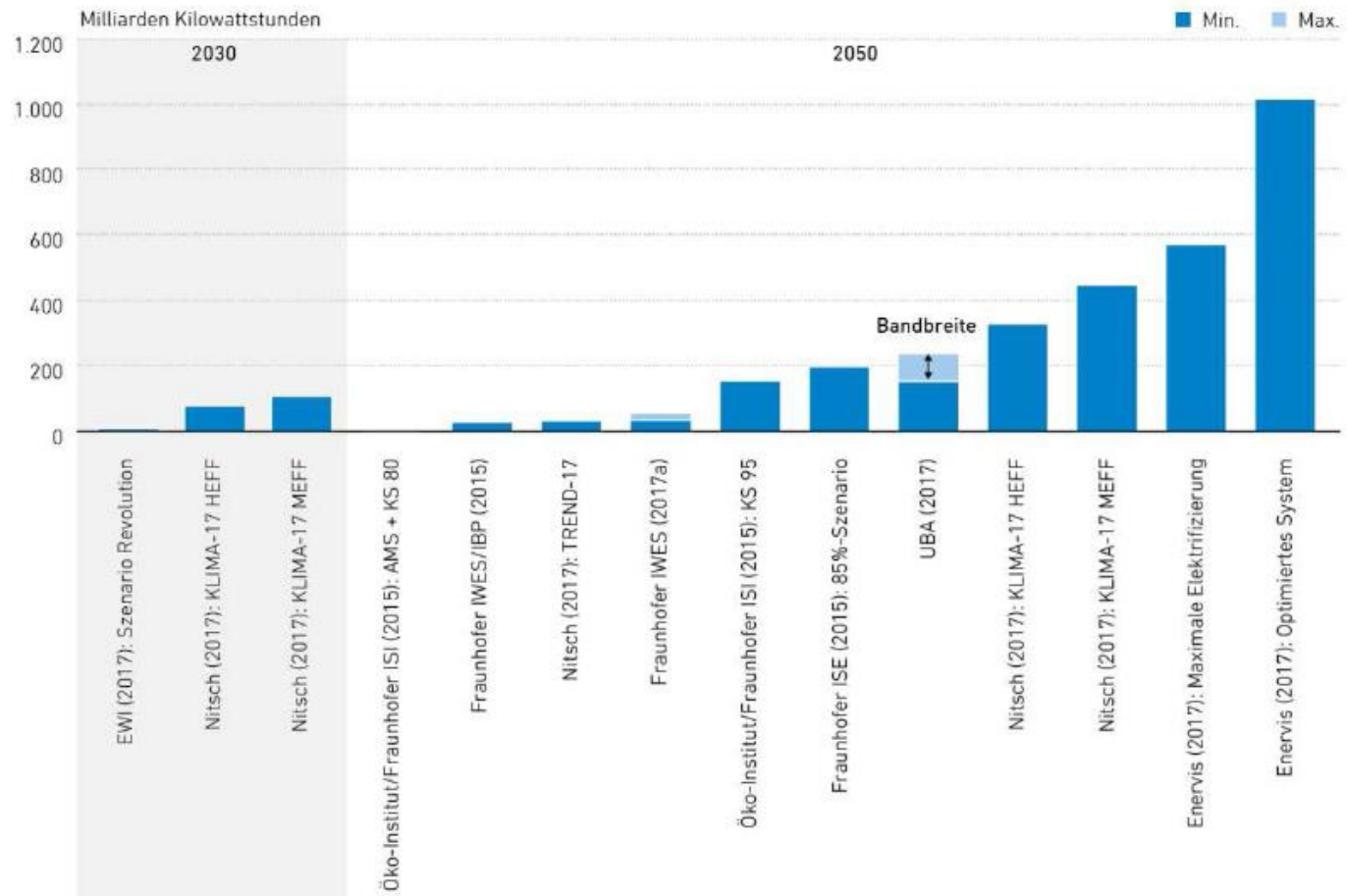
# P2X – How much for which sector and application?

# Scenario comparison: Consumption of synthetic gas (hydrogen and methane) in Germany



Source: Forschungsradar Energiewende (2018): Die Rolle erneuerbarer Gase in der Energiewende. Hrsg.: Agentur für Erneuerbare Energien

# Scenario comparison: electricity consumption for the production of synthetic gas in Germany



Source: Forschungsradar Energiewende (2018): Die Rolle erneuerbarer Gase in der Energiewende. Hrsg.: Agentur für Erneuerbare Energien

# Renewable energy demand for a low carbon chemical industry

## Ökostrombedarf für einen klimagerechten Umbau der europäischen Chemieindustrie

12.000 TWh

10.000

8.000

6.000

4.000

2.000

0

2015

2020

2025

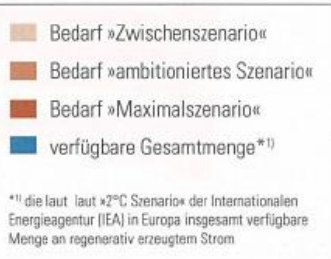
2030

2035

2040

2045

2050



Quelle: Dechema, Grafik: Thomas Schilling / PHOTON

Source: Photon 10/2017 based on Dechema (2017): Low carbon feedstock for the European chemical industry.

# Conclusions

- P2X technologies just make sense in a nearly 100% decarbonized world
- Efficiency for all value chains is low, P2X should be used restrictively for applications where there is no other (direct electric) option yet
- Industry is already lobbying strongly, the need of a NGO position on synthetic fuels gets more important



# Thanks for your attention!

## Contact:

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