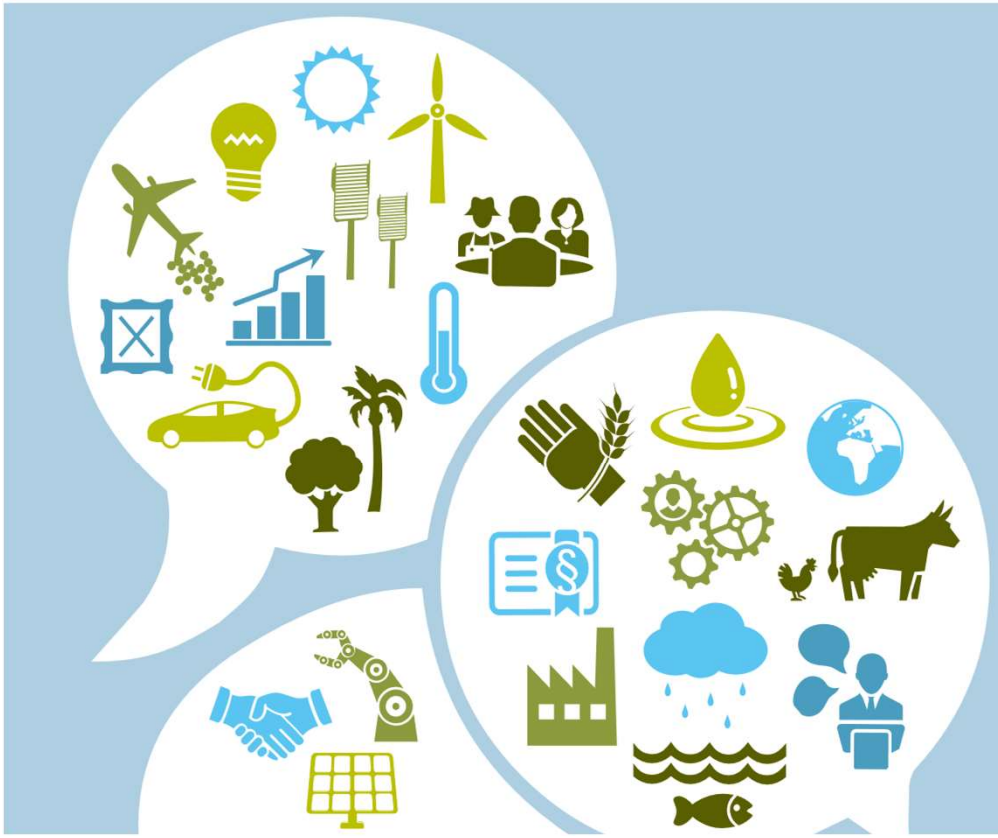
RESEARCH AND DIALOGUE FOR SUSTAINABLE SOCIETIES

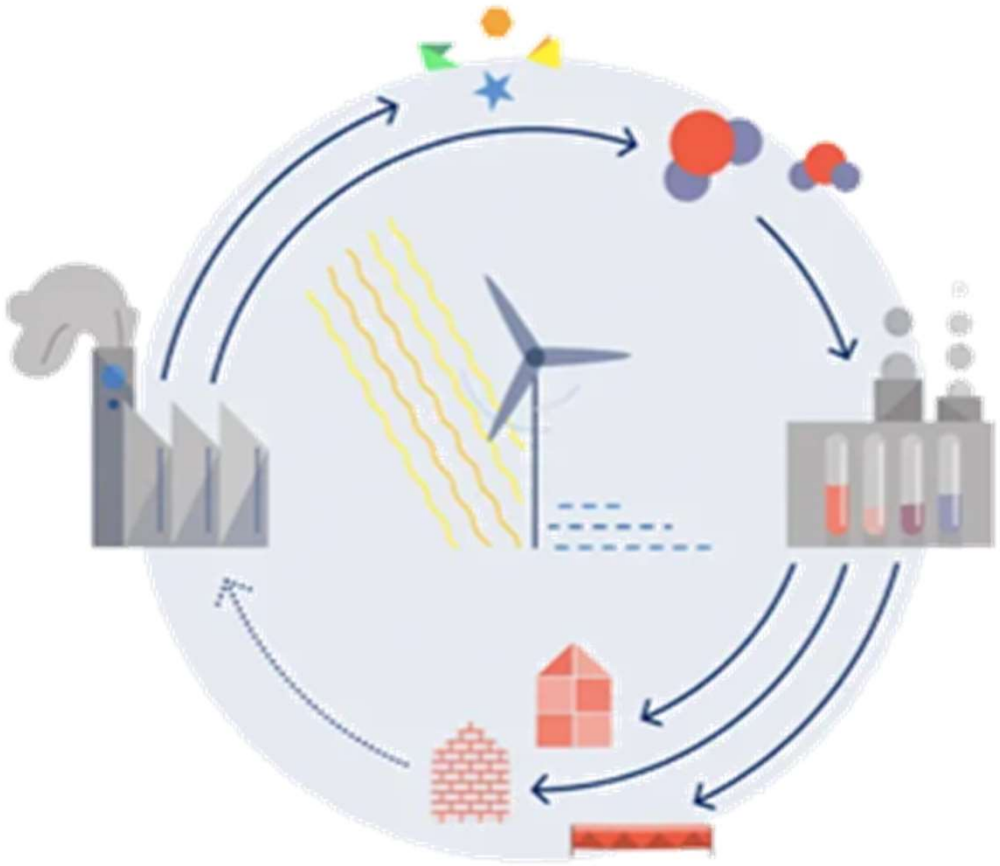


Science Base: Acceptance of CCU Technologies

Webinar „CCU - The Science Base"
CO_2 Value Europe, 4.11.2021

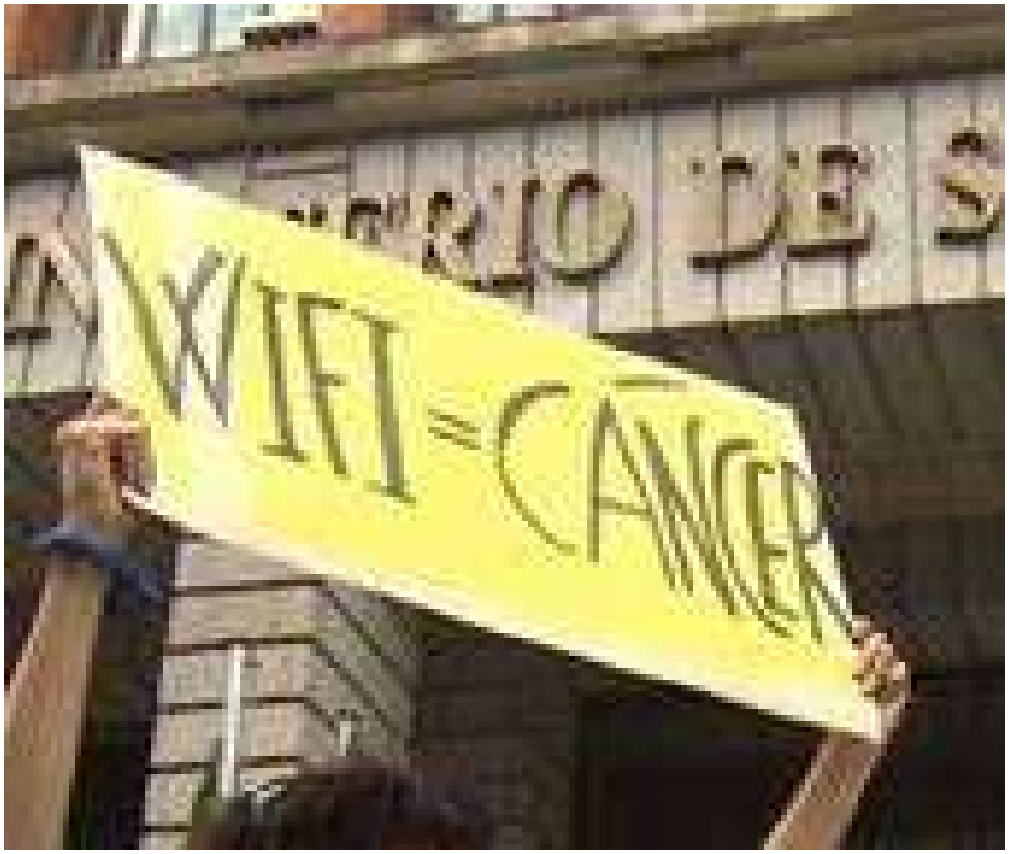
Dr. Barbara Olfe-Kräutlein
Research Group Lead
„CO_2 Utilisation Strategies and Society"

Agenda



1. Acceptance of CCU – why bother?
2. What do we know today?
    - Public acceptance
    - Policy acceptance
3. Take home messages

Acceptance – why bother?



A functioning technology innovation might not be as appealing as its developers and providers think!

Acceptance or rejection is triggered by the unexpected, not by facts

Important points for CCU acceptance:

- **Products is identical** with conventional product
- **Public funding** is needed (no business case yet)
- **Proximity to CCS** might cause problems

Whose acceptance does CCU need?

Early stage

Direct stakeholders, e.g.:
Within organisations (academic, industry, etc.)
Among policy making and funding

Goal: Create and maintain ability to act

Inter-mediate

Broader group of direct stakeholders, e.g.:
B2B Interested publics
Media Societal stakeholders

Goal: Raise awareness, expand scope of communication

Close to market

General audience:
All stakeholders
General public

Goal: Support successfull market implementation

Public acceptance – what do we know?

Very little is known > no public discourse about CCU technologies

Literature highlights specific aspects or insights

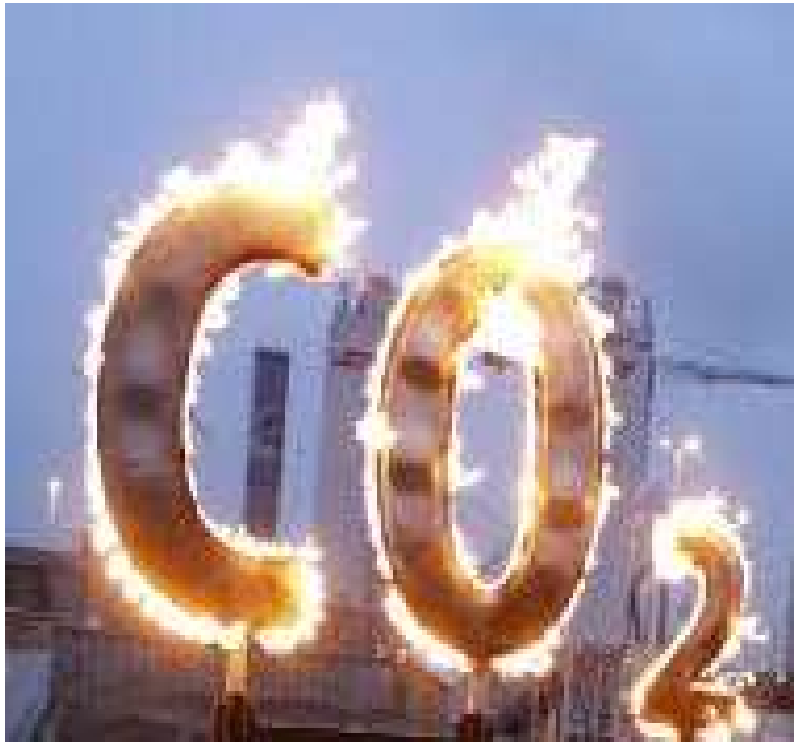
- Perception in specific groups, e.g. lay people or experts
- Perception of specific products, e.g. plastics, or aspects like „trust"

Those studies show a generally **very positive attitude** towards CCU, risk perception is currently low

Meta-analysis is missing

Risk: Registering **„Pseudo-Opinions"**
Example: Study with more than 1200 particiants, 9 percent indicate they know what CCU is

Public acceptance – what might become an issue?



- **Negative connotation of CO_2** > destruction of the planet[1]
- **Confusion with CCS/CO**[5,2] > separate the debate!
- Little knowledge about CCU[3] > need for more information [4,5]
- Misconception, pseudo-opinions and **distrust in industry actors**[5] (also in CCS[6])
- Hint: **Strong environmental attitudes** > less favorable towards CCU [4]
- **Non-permanence of storage** in most CCU applications [4] > proofs of sustainability needed!
- Weighing of products is different > acceptance issues might be relevant for one or the other application only
- Also: Product and disposal risks [8]
- **Economic issues** > price/performance ratio and product quality[5,4]
- **Societal issues** > e.g. lock-in effects[4] with outdated or unwanted infrastructures

1 van Heek et al. 2017
2 Bruhn, T., H. Naims, B. Olfe-Kräutlein 2016
3 e.g. Perdan 2017
4 Jones et al. 2015
5 Offermann-van Heek 2018
6 e.g. Yang et. al 2016
7 Jones et al. 2016
8 Arning et al. 2019

Policy acceptance – what do we know?

No peer reviewed studies about acceptance among policy makers

"Policy reports" give insights about what is considered most critical

Crucial issues in gaining more policy support:

- **Compliance with broader policy goals** and agendas, such as hydrogen strategies, energy transformation processes etc.

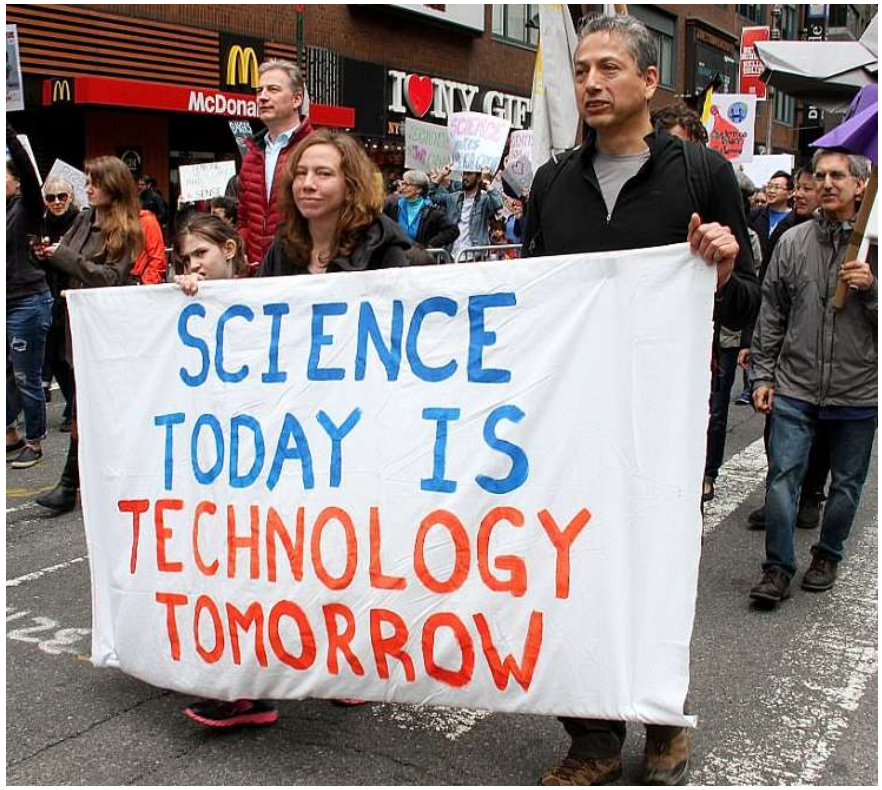
  > broader assessment is needed

- **Proven contribution to emission reduction targets** or other sustainablity objectives, such as circular economy, defossilisation of the industry or resource security

  > coherent assessment methodology needed

- **Doubts about priorities**

  > societal assessments may help



Take home messages

- **Little science-based evidence** about acceptance of CCU, no matter if among policy makers, stakeholders or a general public
- **Current situation is mostly positive**, but this might change:
  - CCU is facing increasingly **high expectations**
  - CCU is already becoming a reality today > **gaining relevance** for the population
- Public: **Honest and transparent dialogue** must be led > awareness and being informed increases acceptance
- Policy making: **Comprehensive assessment** of environmental, economic and societal aspects
- **Transparent communication** of assessment results + open, active dialogue with societal stakeholders
  - increase acceptance
  - support the successful implementation of CCU technologies in the near future

Peer-reviewed literature on acceptance of CCU

Huijts, N. M., E. J. Molin and L. Steg (2012). "Psychological factors influencing sustainable energy technology acceptance: A review-based comprehensive framework." Renewable and sustainable energy reviews **16**(1): 525-531.

Bruhn, T., H. Naims and B. Olfe-Kräutlein (2016). "Separating the debate on CO2 utilisation from carbon capture and storage." Environmental Science & Policy **60**: 38-43.)

van Heek, J., Arning, K., and Ziefle, M. (2017). "Differences between laypersons and experts in perceptions and acceptance of CO2-utilization for plastics production." Energy Proc. 114, 7212–7223.

Jones, C. R., B. Olfe-Kräutlein and D. Kaklamanou (2016). "Lay perceptions of carbon dioxide capture and utilisation technologies in the UK and Germany: a qualitative interview study.

Huijts, N. M., E. J. Molin and L. Steg (2012). "Psychological factors influencing sustainable energy technology acceptance: A review-based comprehensive framework." Renewable and sustainable energy reviews **16**(1): 525-531.

Jones, C., D. Kaklamanou, W. Stuttard, R. Radford and J. Burley (2015). "Investigating public perceptions of carbon dioxide utilisation (CDU) technology: a mixed methods study." Faraday Discussions **183**: 327-347.

Jones, C. R., B. Olfe-Kraeutlein, H. Naims and K. Armstrong (2017). "The social acceptance of carbon dioxide utilisation: A review and research agenda." Frontiers in Energy Research **5**.

Jones, C. R., B. Olfe-Kräutlein and D. Kaklamanou (2016). "Lay perceptions of carbon dioxide capture and utilisation technologies in the UK and Germany: a qualitative interview study. Paper Presented at the 14th International Conference on Carbon Dioxide Utilisation (ICCDU), Sheffield, UK.".

Jones, C. R., R. L. Radford, K. Armstrong and P. Styring (2014). "What a waste! Assessing public perceptions of Carbon Dioxide Utilisation technology." Journal of CO2 Utilization **7**: 51-54.

Contact

Dr. Barbara Olfe-Kräutlein
Research Group Lead
CO_2 Utilisation Strategies and Society
Institute for Advanced Sustainability Studies e.V. (IASS)

barbara.olfe-kraeutlein@iass-potsdam.de

Institute for Advanced Sustainability Studies e.V.
Berliner Straße 130
D – 14467 Potsdam
Web: www.iass-potsdam.de