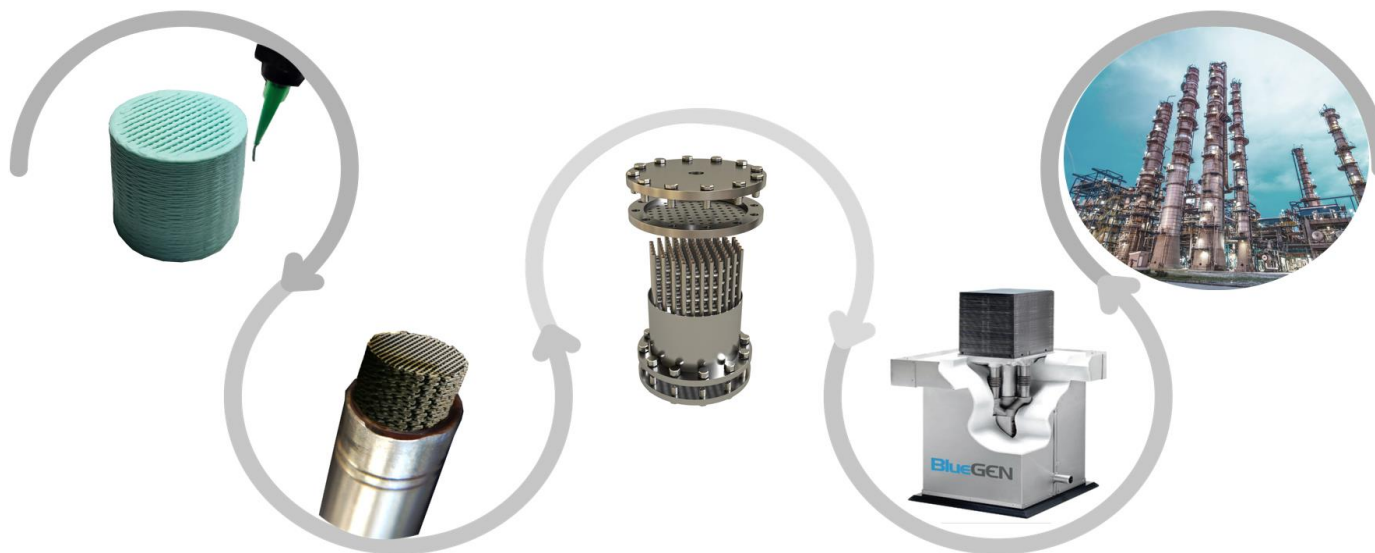


CO₂ utilisation focused on market relevant Dimethyl Ether production, via 3D printed reactor and solid oxide cell based technologies



Social Acceptance of the project CO2Fokus

Dr. Adriana Díaz, ECODESIGN company GmbH

7. CCUS Forum „Zielkonflikte von CCU und CCU im ökologischen,
ökonomischen und gesellschaftlichen Kontext“
15.12.2023





Environmental assessment



Product development



Environmental communication



Workshops & Training



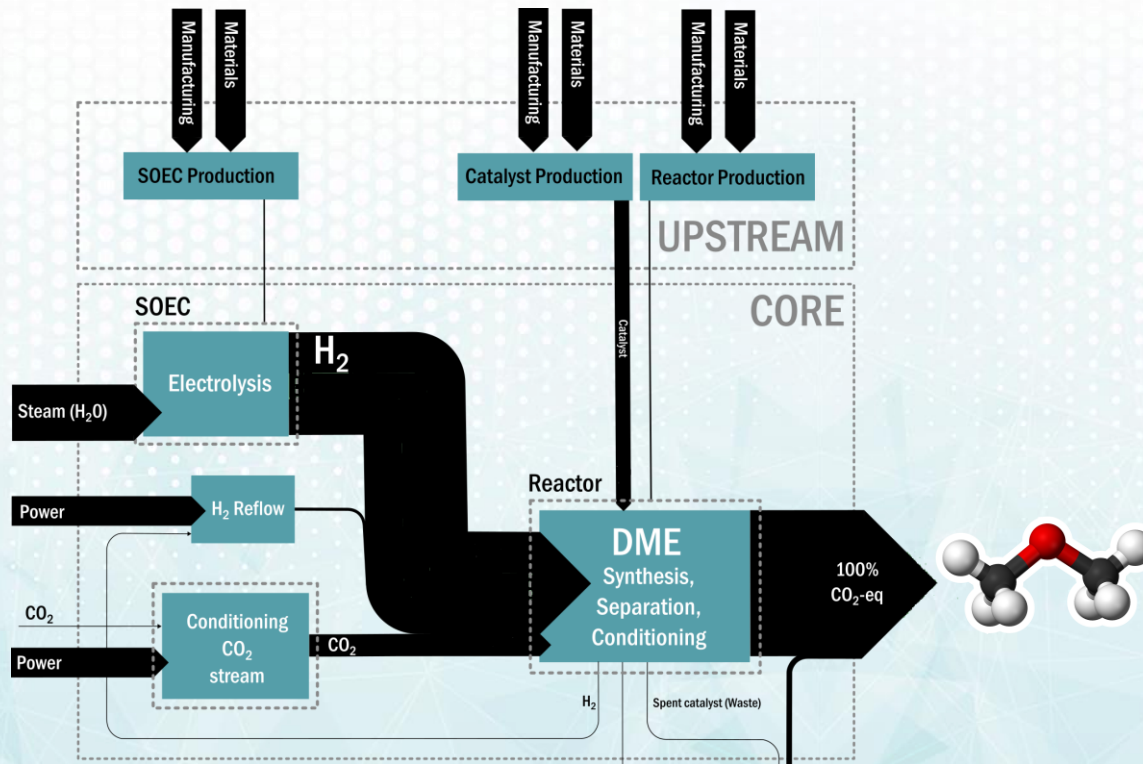
R&D services

- We show a different view of the product
- Guide on the way towards eco-products
- Help addressing new clients
- Support with compliance
- Build up Ecodesign competence..

... aiming at competitive advantage.

The CO₂Fokus concept

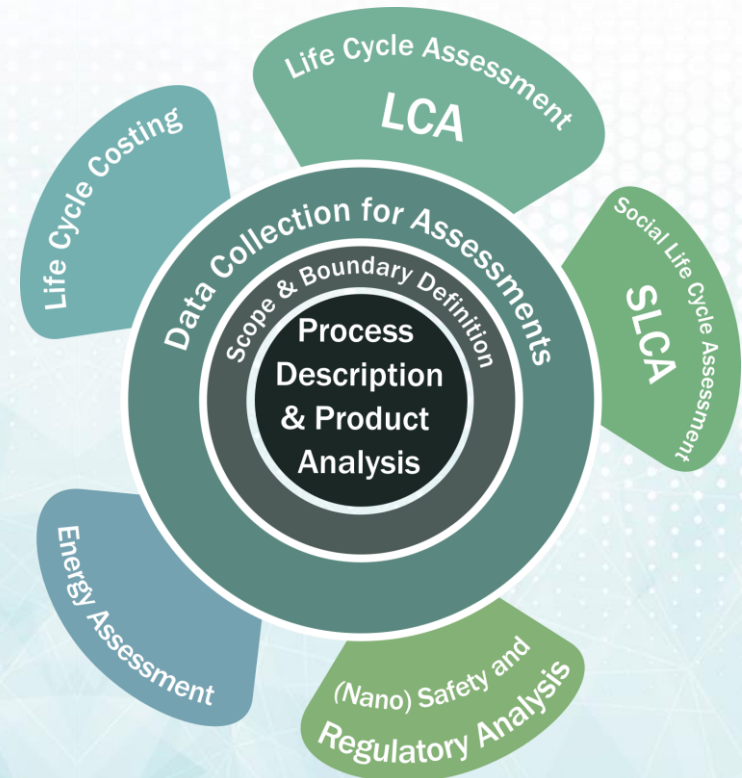
Producing Dimethyl Ether (DME) by the direct catalytic hydrogenation of CO₂



Life cycle assessment (LCA), socio-economic assessment and feasibility studies.

Key tasks completed during the project :

- Energy assessment
- Economic Assessment
- Life Cycle Assessment – LCA
- Socio-Economic Assessment, **Social readiness & acceptance**
- Analysis of nano-safety and regulatory requirements

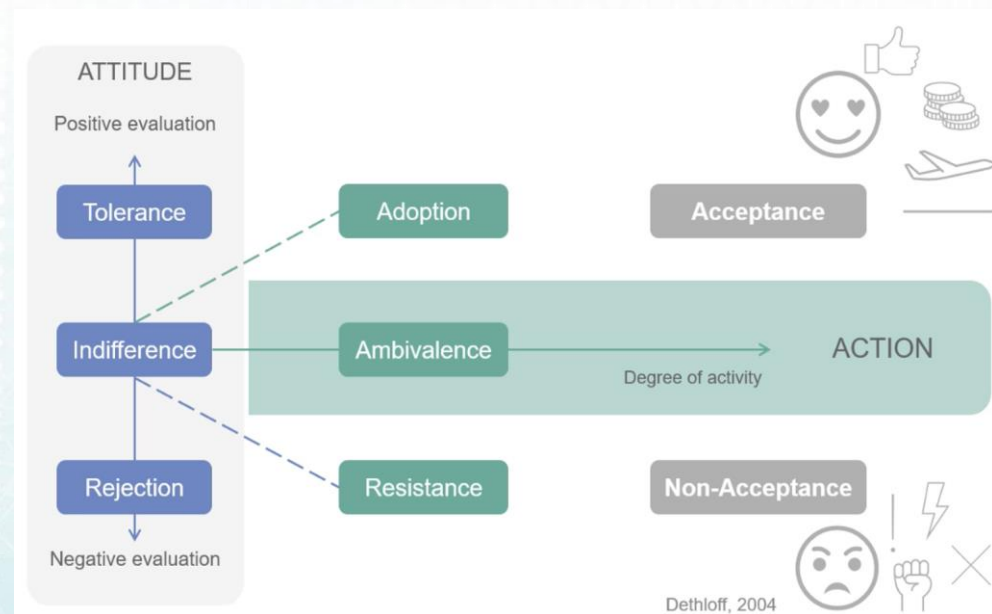


Social readiness and acceptance

The positive public perception of a new technology, product, service, e.g., in a town, country, society.

A lack of social acceptance:

- Hinders regulatory approval
- Limits the funding and/or the choices of sites (e.g., for CCS, CCU projects, plants)
- Is an obstacle to the spread of innovation.

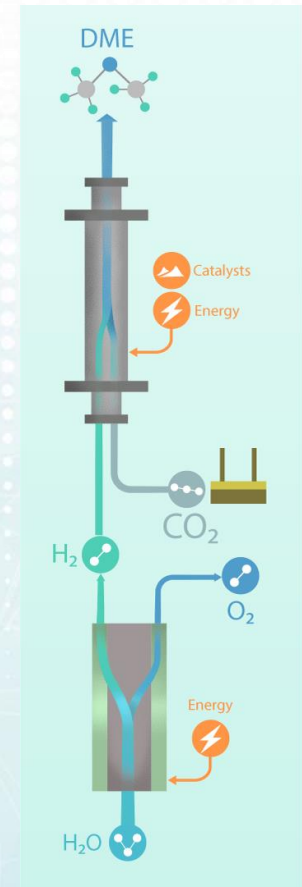


Social acceptance is a decisive factor for the success of new and innovative products and technologies.

Social acceptance in CO2Fokus - Methodology

- Literature review of social acceptance studies on CCS and CCU
- Survey to get impressions, concerns and to identify clusters of topics and risks, eg., on safety, cost, and environmental
- Analysis of the degree of concern and readiness.
- Recommendations for communication and exploitation.

Social acceptance analysis was carried out together with Life Cycle Engineering SpA (<https://www.lcengineering.eu/>)



Literature review

16 studies analyzed

Acceptance studies on carbon capture storage, carbon capture and utilization showed that:

- While people believe that CCU will have economic benefits, there **is skepticism over the perceived long-term environmental benefits.**
- Public **awareness on CCU is very low** - there is a desire to learn more about the technology.
- **CCU risk perceptions were low** - mostly health and environmental concerns.
- **CCU acceptance is, in general, positive.**
- **CCS is perceived as an uncertain, end-of-pipe technology**, perpetuating fossil-fuel dependence.
- Much **lower willingness to pay for CCS** than for renewable energy.
- Willingness to support industrial CCS **only if “Not in my Backyard”- NIMBY!**

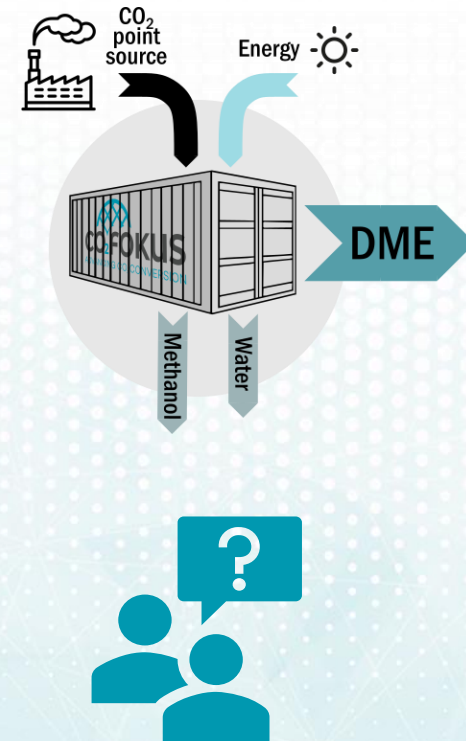
Structure of the survey

Started with the project video explaining the CCU concept of CO2Fokus

Multiple choice questions about:

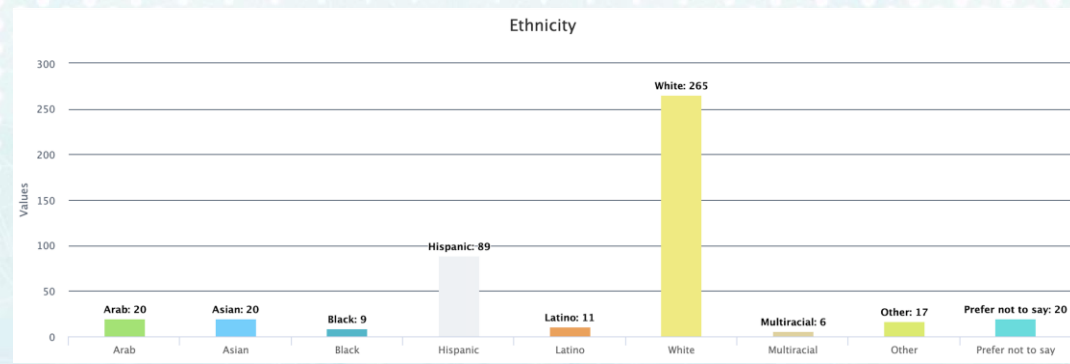
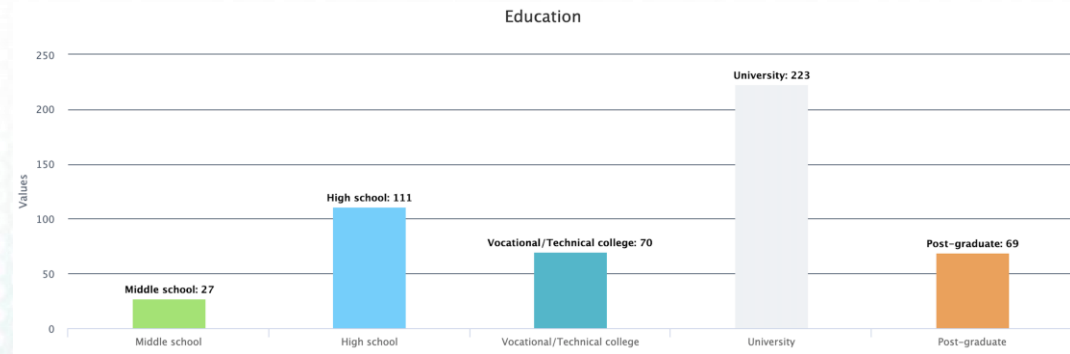
- The level of knowledge on CCU technology, and in relation to CCS
- The impression on CCU and on the use of CO₂
- Open section to write about perceived risks

Online survey tool (Pollfish) used for screening results over demographic aspects like age, location and education.



Sample population of the survey

AGE		
<input checked="" type="checkbox"/>	18 - 24	115 23.00%
<input checked="" type="checkbox"/>	25 - 34	183 36.60%
<input checked="" type="checkbox"/>	35 - 44	111 22.20%
<input checked="" type="checkbox"/>	45 - 54	66 13.20%
<input checked="" type="checkbox"/>	> 54	25 5.00%
COUNTRY		
<input checked="" type="checkbox"/>	Austria	13 2.60%
<input checked="" type="checkbox"/>	Belgium	19 3.80%
<input checked="" type="checkbox"/>	Germany	54 10.80%
<input checked="" type="checkbox"/>	Spain	106 21.20%
<input checked="" type="checkbox"/>	Finland	3 0.60%
<input checked="" type="checkbox"/>	France	52 10.40%
<input checked="" type="checkbox"/>	Croatia	32 6.40%
<input checked="" type="checkbox"/>	Italy	122 24.40%
<input checked="" type="checkbox"/>	Netherlands	17 3.40%
<input checked="" type="checkbox"/>	Sweden	42 8.40%
<input checked="" type="checkbox"/>	Turkey	40 8.00%

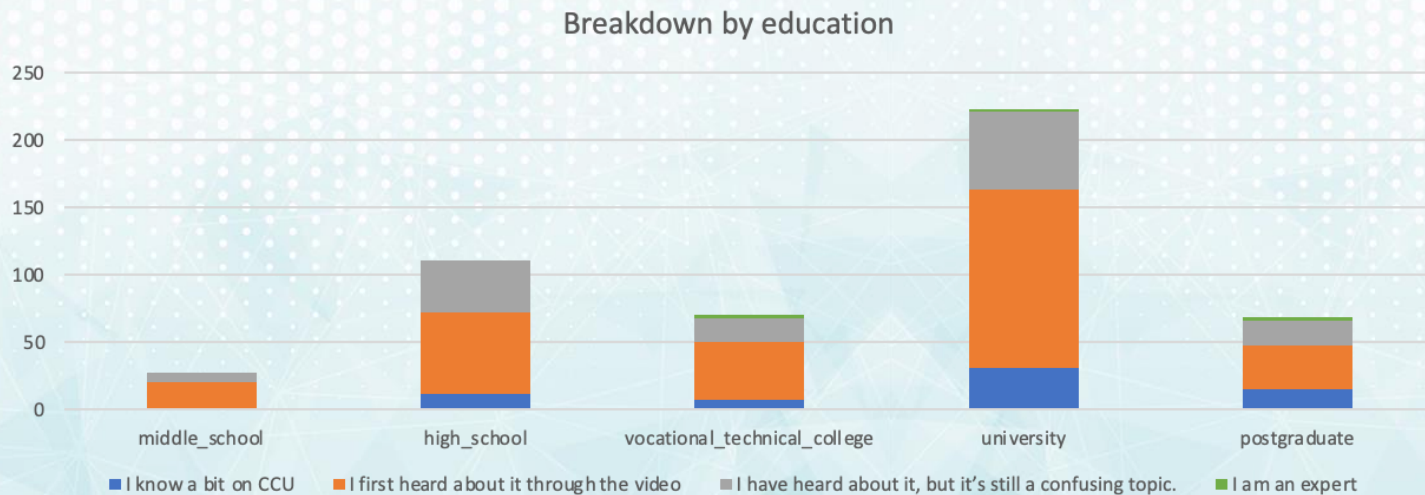


- ✓ 500 respondents in 11 countries
- ✓ Age groups from 18 to over 54 years
- ✓ Various education levels and ethnic groups.

Selected results – CCU knowledge

How well do you know CCU (carbon capture and utilization)?

The majority first heard about CCU through the project video.



Selected results – CCU versus CCS

Would you say that carbon capture and utilization (CCU) is a similar technology to carbon capture and underground storage (CCS)?

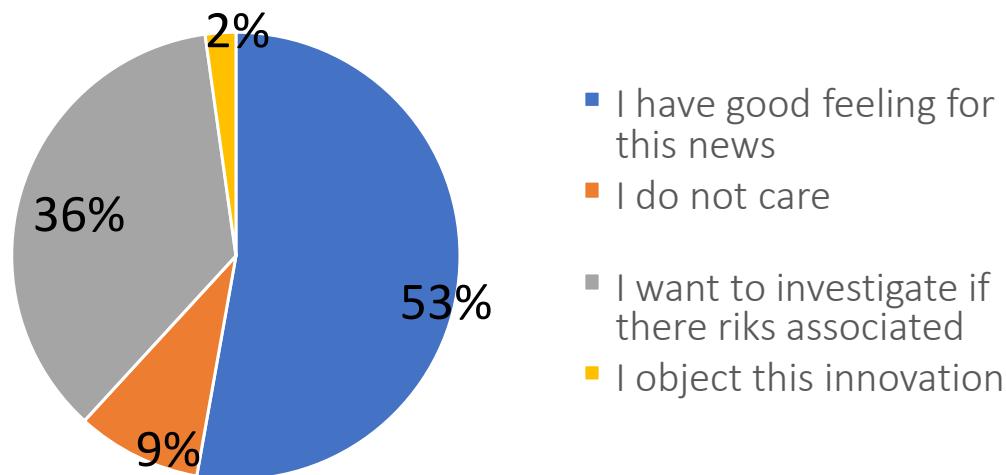
The answers highlight a possible confusion - The feedbacks reveal concerns regarding CCS.

#	Answers	Respondents (%)	Answers (%)	Count
A1	They are very different processes because CCU does not provide for any storage of CO ₂ .	39.20%	29.97%	196
A2	I think the underlying technologies are similar and carry similar risks	38.80%	29.66%	194
A3	CCU is safer than CCS	25.80%	19.72%	129
A4	CCS is safer than CCU	4.40%	3.36%	22
A5	CCU is more innovative than CCS	22.60%	17.28%	113

Selected results - No “NIMBY”

You get to know that such a technology (CCU) is going to be built in your town. What is your reaction?

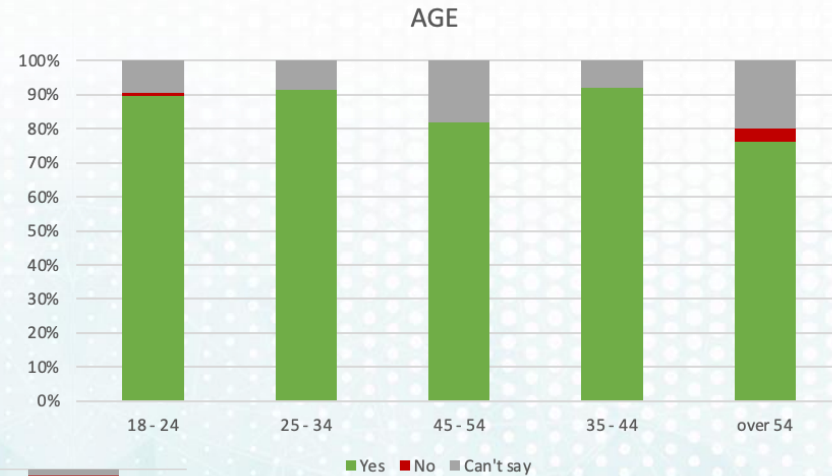
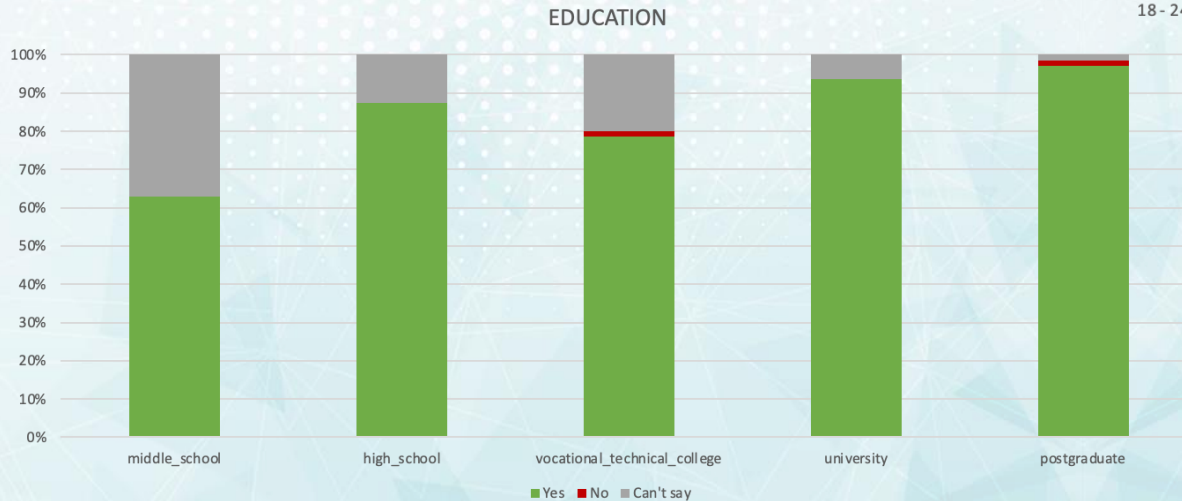
Majority of people showed a positive attitude.



Selected results – Impression on technology

Do you think this technology is beneficial?

89% of answers were positive, whereas less than 1% were negative.



Selected results – Impression on product

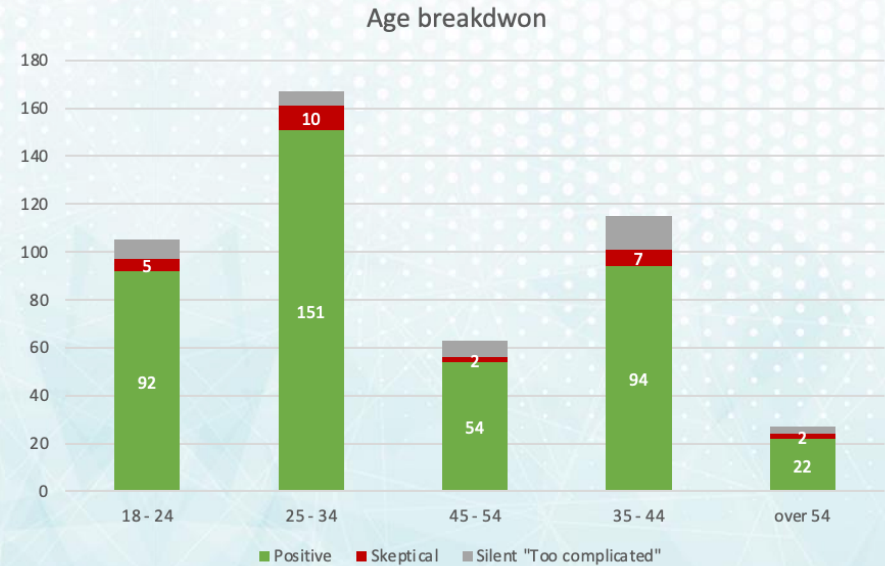
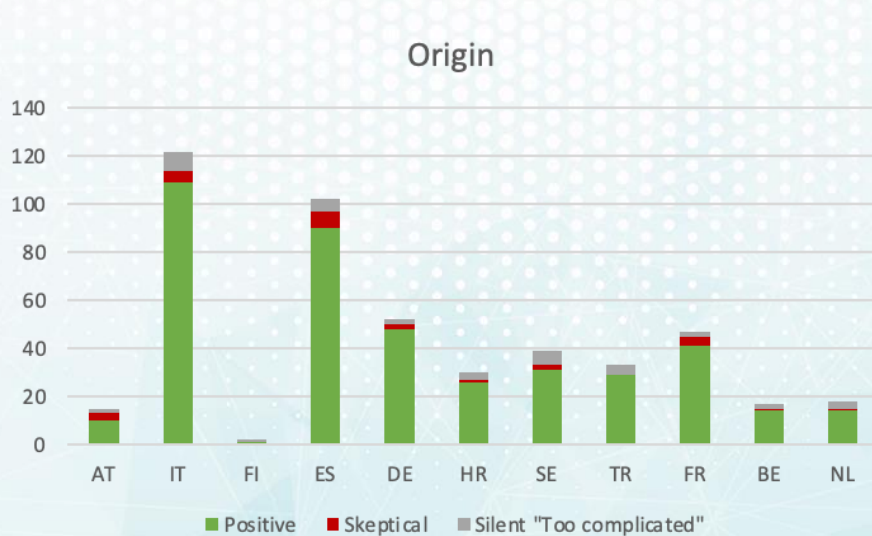
Does knowing that a product has been made by recycling CO₂ impress you?

Majority of respondents replied that the information is remarkable.

#	Answers	Answers (%)	Count
A1	Yes, it's a remarkable information.	51.40%	257
A2	Yes, but I would like to know the overall carbon footprint of the product.	36.00%	180
A3	I would not pay attention to it.	7.00%	35
A4	I think there is a risk for the health of users.	3.60%	18
A5	I think there is a risk for the environment.	2.00%	10

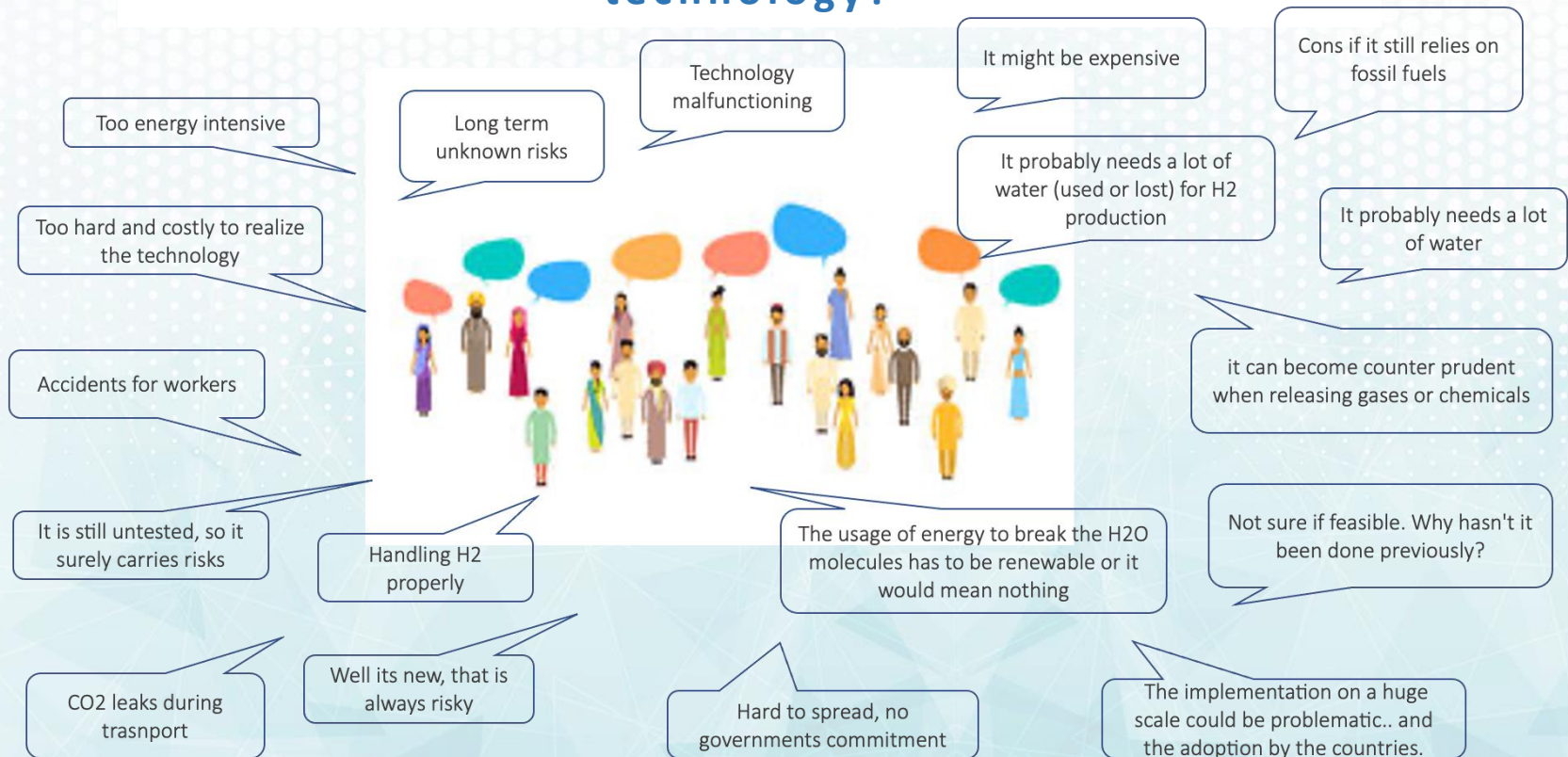
Selected results - Acceptance

People are looking forward to new technology to tackle climate change, are also willing to accept some risks and uncertainties when they feel that the objective is cutting emissions.



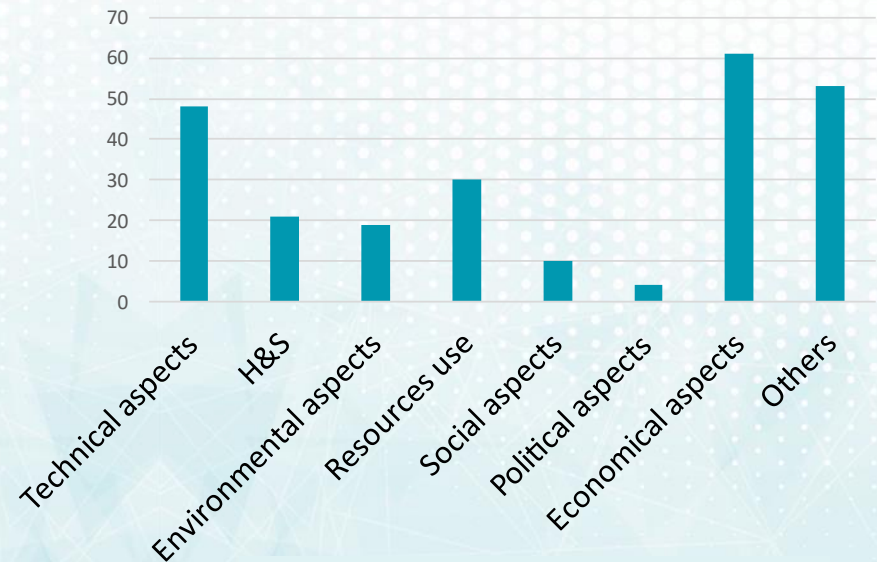
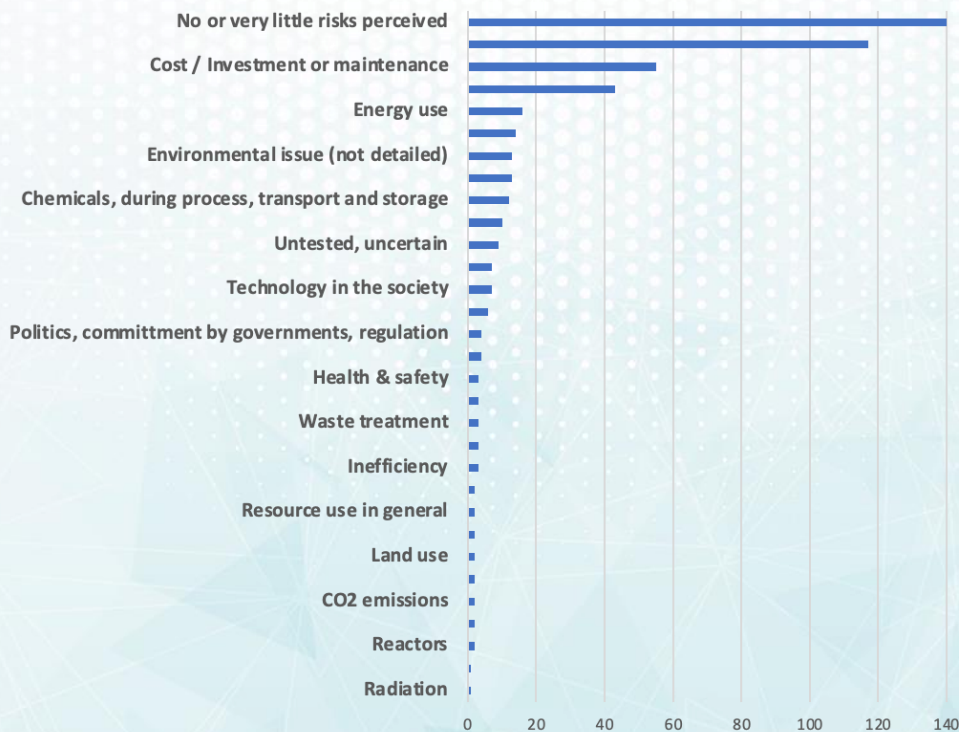
Understanding the perceived risks

**Do you think there are risks?
What do you think are the risks of this technology?**



Perceived risks

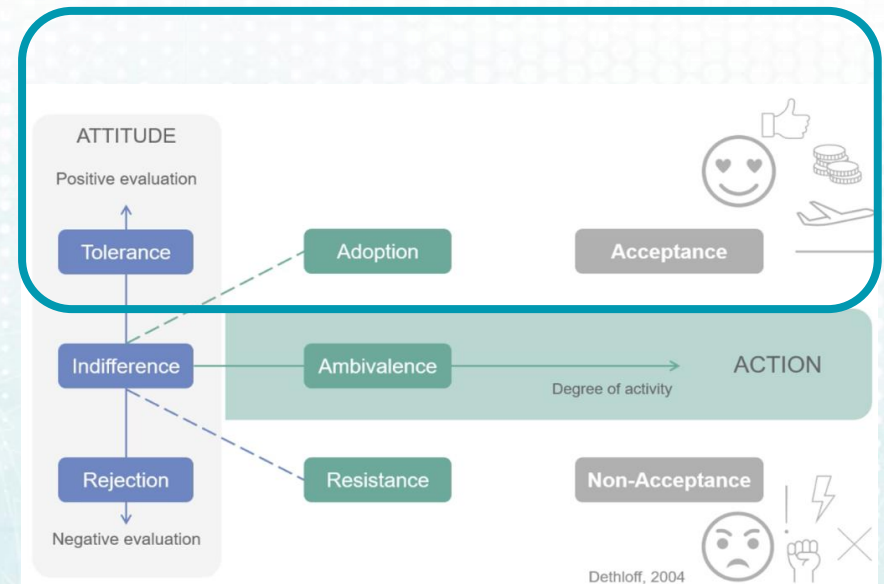
Do you think there are risks? What do you think are the risks of this technology?"



Perceived risks in clusters

Summary of CO2Fokus Social acceptance

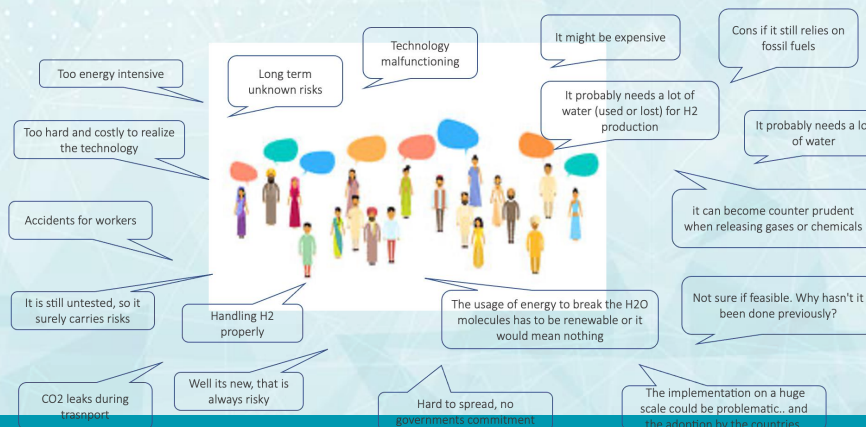
- The topic CCU is very technical and hard to comprehend.
- Majority of answers were positive and optimistic.
- People are looking forward to new technology to tackle climate change, so are willing to accept some risks for the purpose.
- Perceived risks were feasibility of the technology, health & safety, and environmental issues.



Recommendations

- Provide information to avoid rebound effect: *little information* → *increased concerns* → *higher perceived risks* → *more disinformation*.
- Create opportunities for **active** discussion and engagement of stakeholders at different project phases.
- Address the perceived risks and concerns.
- Align the communication strategies - transparency and improvement to secure acceptance.

Social acceptance is an integral component of the technology development path.



Thank you for your attention

Web: <https://www.co2fokus.eu/>

CO2Fokus YouTube video:

<https://youtu.be/H2wwVGx9NzI?si=ZiLaNp1zSApKbVvJ>

LinkedIn: <https://www.linkedin.com/company/co2fokus/>

Contact:

Adriana Díaz, ECODESIGN company GmbH

diaz@ecodesign-company.com

<https://www.ecodesign-company.com/en/>