

PUBLIC PERCEPTION OF HYDROGEN: RESPONSE TO AN OPEN-ENDED QUESTION

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Outline

1. Background

- The Norwegian context
- Public perception of hydrogen
- A public opinion survey in Europe

2. Methods

- Survey-item design
- Data collection & data analysis

3. Results

4. Conclusions & further work



The Norwegian context

- Hydrogen production for industrial use: Norsk Hydro since 1929
- Today, 225 000 tonnes annual production for industrial use: primarily in ammonia, methanol and fertiliser production [1].
- The Hydrogen Roadmap in 2021: plans for production & use of hydrogen in a larger context.
- Emerging demonstration initiatives in the public domain.



Public perception of hydrogen

- predictor of support

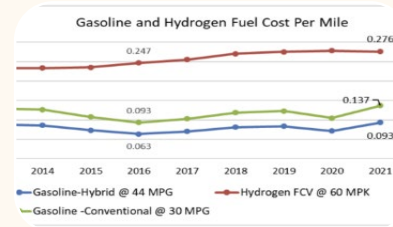
perceptions: knowledge, beliefs, concerns, affect, attitudes



Safety



Performance aspects &
Infrastructure



Costs



Environment &
sustainability



A public opinion survey in Europe (2022)



An EU-wide survey of public opinions exploring [2] :

- awareness, acceptance & uptake of hydrogen technologies
- perceived safety & sustainability
- 27 member states
- N=1000 in each state (except Malta, Cyprus)

Norway was not included in this survey.



Survey-item design

‘What comes to mind when you hear or read the word ‘hydrogen’?

Please write down the first thoughts that occur to you. We welcome all type of responses, either a couple of sentences, or just a few words if you prefer.

[Norwegian Citizen Panel, wave 25]



Data collection

The Norwegian Citizen Panel



research-purpose online panel



Representative samples of
citizens of 18 years and above



2-3 surveys yearly

Survey item: *Spontaneous hydrogen associations*



Fielding period:

Oct 31- Nov 28, 2022 (wave 25)



Respondents:

N= 2197

(submitted to 2204 participants, i.e. response rate: 96,4%)



language:

Norwegian



Digital Social Science
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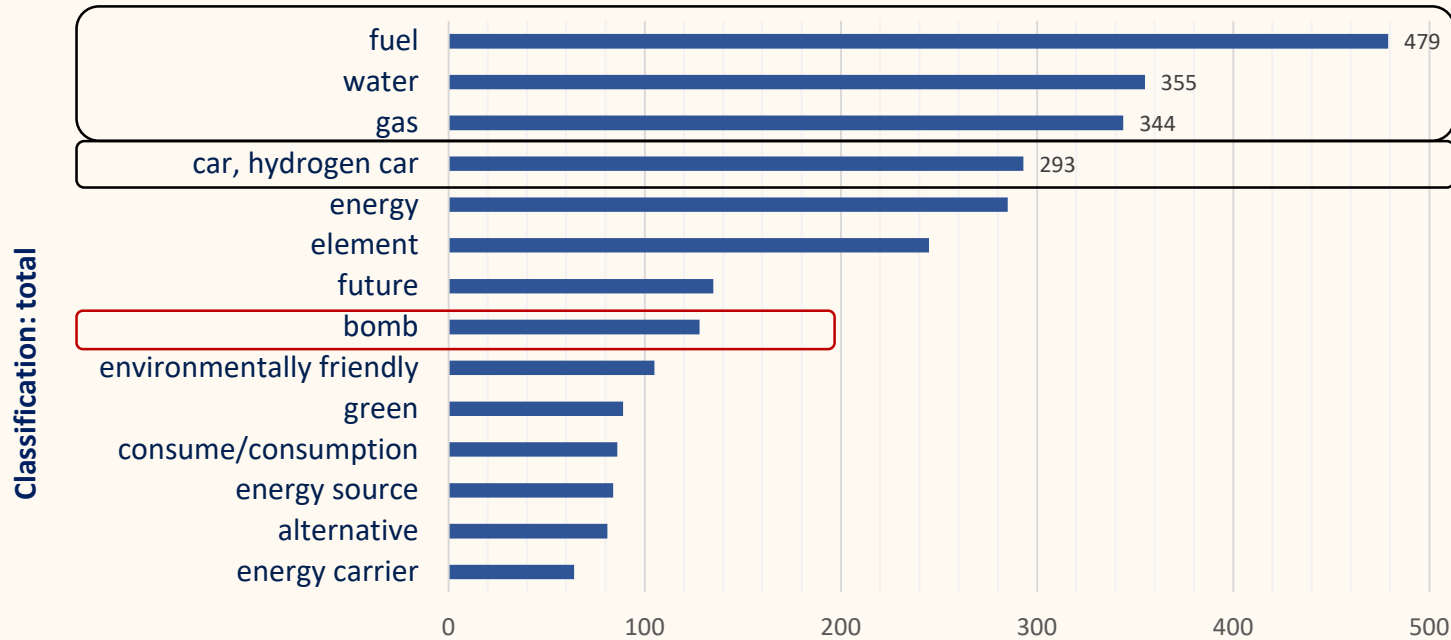


Data analysis

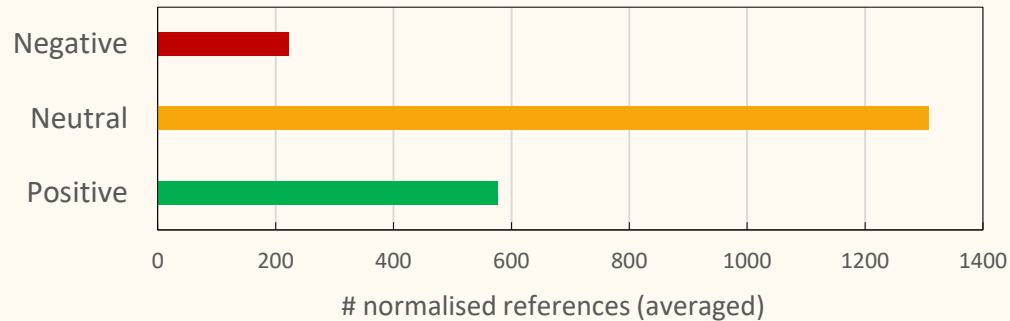
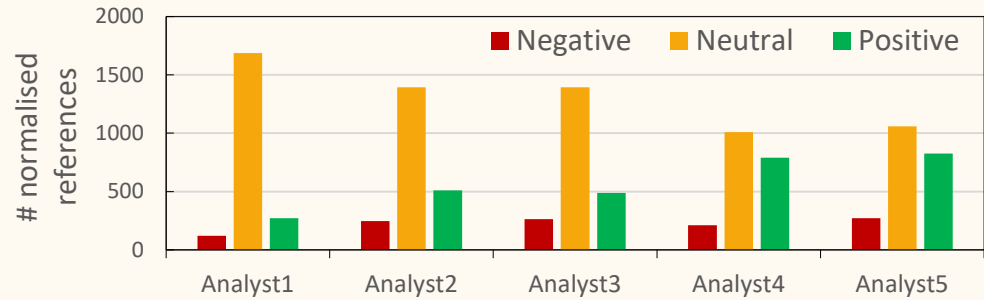
- **Sentiment analysis: positive, neutral, negative**
 - Weighted membership in the various sentiments
 - Independent classifications, 5 analysts
 - Average distribution
- **Word frequency assessment**
 - Total responses
 - Negative, neutral, positive classifications | area of agreement
 - Quanteda package in R
- **Awareness & misconceptions**



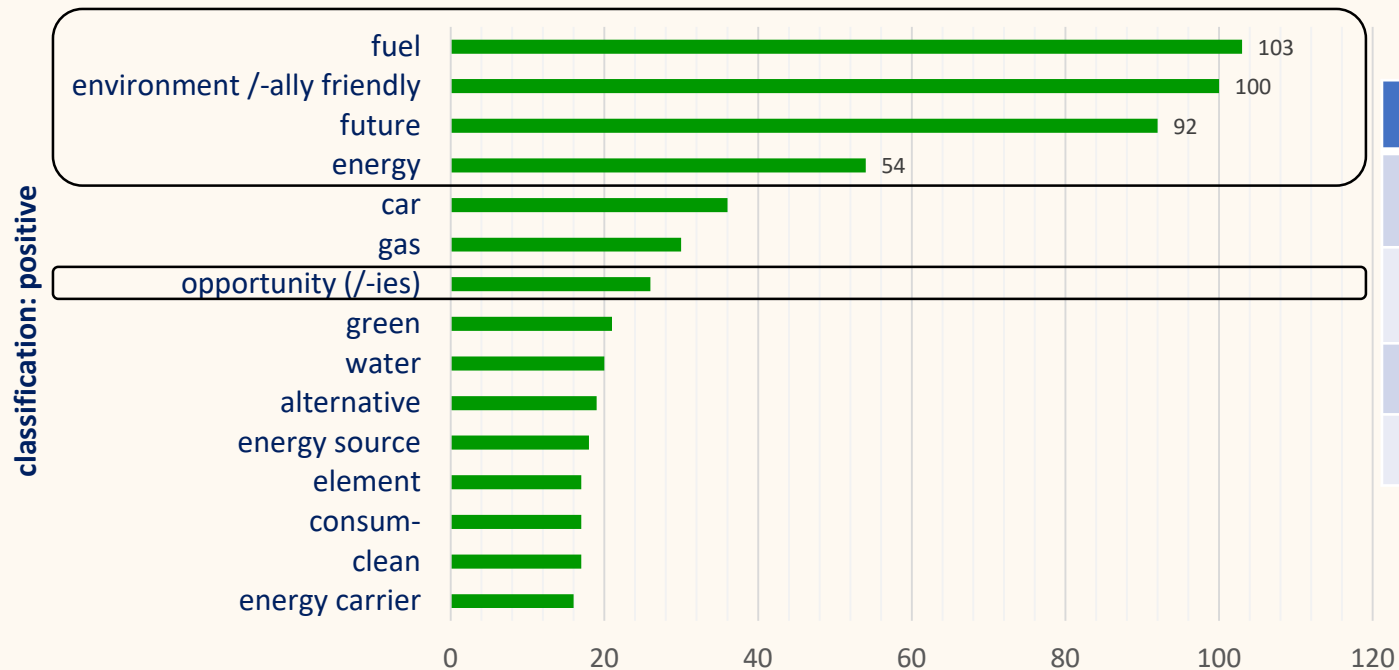
The 15 most frequent terms: total responses



Reported sentiments

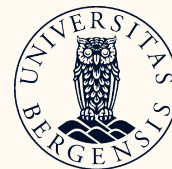


Frequent terms by sentiment: **positive**

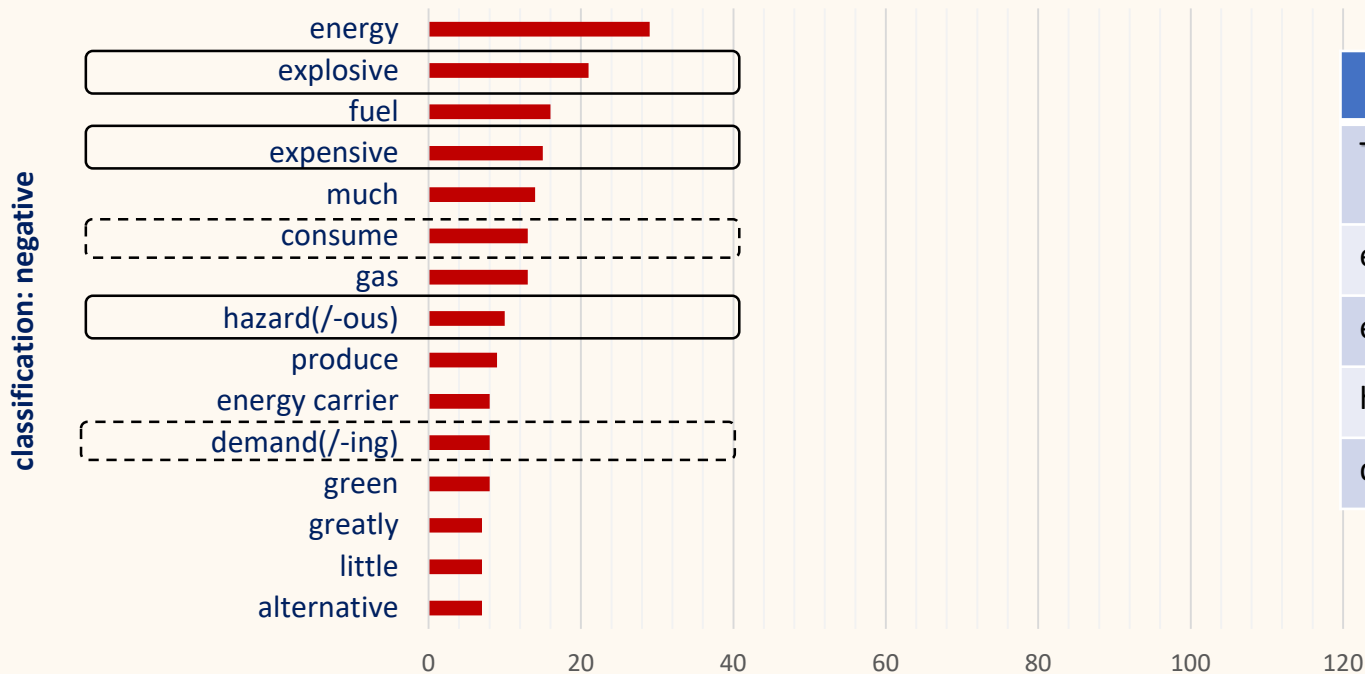


Classification: total

Term	Frequency [% of N]
environment/ -ally friendly	157 [7.1%]
future	135 [6.1%]
opportunities	35 [1.6%]



Frequent terms by sentiment: **negative**



Classification: total

Term	Frequency [% of N]
explosive	59 [2.7%]
expensive	19 [0.9%]
hazard(/-ous)	26 [1.2%]
demand(/-ing)	28 [1.3%]



Awareness & misconceptions



Water, Gas
15%



Hydroelectric
power
0.8%



Safety aspects
4.2%



H-Bomb
5.8%



Energy carrier
2.9%

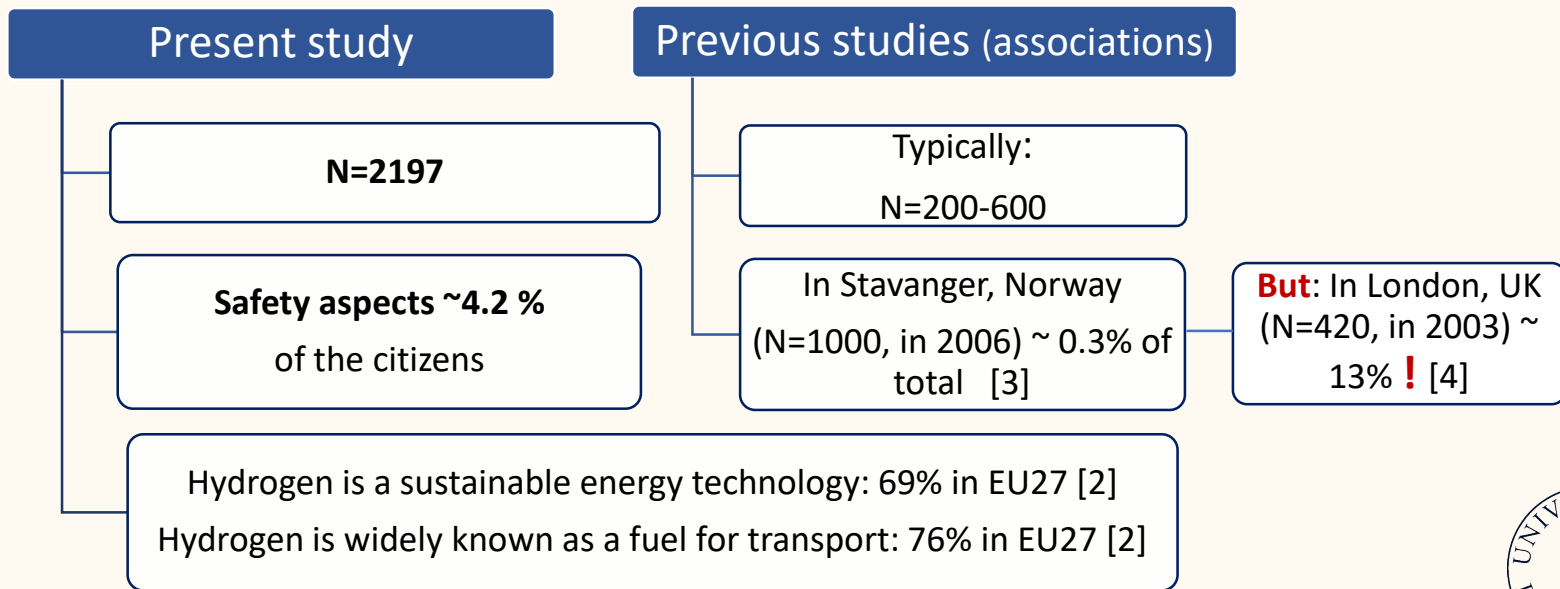


Energy source
3.7%



Comparable findings with previous studies

- A few observations



Key messages

- The social perception of hydrogen in Norway is fairly positive.
- Hydrogen is perceived primarily as an environmentally friendly fuel, associated with the future.
- The extent of awareness of hydrogen as a fuel for transport appear to be high.
- Safety concerns were (moderately) present in the responses.
- Certain misconceptions were reported:
 - hydrogen as an energy source (3.7%) Vs hydrogen as an energy carrier (2.8%)
 - hydrogen bomb (5.8%)



Further work

- Analyse the responses in relation to socioeconomic characteristics and preferences: *gender, age, employment type, political leaning etc.*
 - *length of responses*
 - *safety aspects*
 - *misconceptions*
 - ...
- Longitudinal study: to explore the development of spontaneous hydrogen associations in the Norwegian population over time.

Suggestions:

- Introduce the questionnaire of the public opinion survey (EU27) in the Norwegian Citizen Panel to facilitate comparisons in European level.



Thank you !

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Rereferences

- [1] Sammenhengende verdikjeder for hydrogen. En utredning på oppdrag for Olje- og energidepartementet, 2023. Oslo Economics, OE-rapport 2023-35, Available from:
<https://osloeconomics.no/wp-content/uploads/2023/05/verdikjeder-for-hydrogen.pdf>
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- [3] Tarigan, A. K. M., Bayer, S. B., Langhelle, O. and Thesen, G., Estimating determinants of public acceptance of hydrogen vehicles and refuelling stations in greater Stavanger, *International Journal of Hydrogen Energy*, **37**, No.7, 2012, pp. 6063-6073.
- [4] O'Garra, T., Mourato, S. and Pearson, P., Analysing awareness and acceptability of hydrogen vehicles: A London case study, *International Journal of Hydrogen Energy*, **30**, No. 6, 2005, pp. 649-659.





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