



# **DRIVING TRANSFORMATION**

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# Societal acceptance of green hydrogen production in Germany

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Convened by:

# Agenda

1. Background
2. Research questions
3. Methodology
4. Results
5. Summary

# Background

- Production of green hydrogen is currently still costly in Germany  
→ Economically viable production is not possible so far
- One political goal of the German federal government: Replacement of fossil fuels with green hydrogen
- Societal acceptance:
  - High acceptance among the population is crucial in order to be able to realize local green hydrogen projects at all
  - Currently, citizens positively receive green hydrogen, but there are often barriers to acceptance when it comes to the required electricity production from renewable sources for green hydrogen production



# Applications of green hydrogen



**Steel industry**



**Chemical industry**



**Cement industry**



**Road traffic**



**Air traffic**



**Maritime traffic**

Image sources: colourbox.de

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# “PhD-Research questions”

- What factors influence the societal acceptance of green hydrogen production in Germany?
- What recommendations can be given to project leaders and policymakers regarding the implementation of green hydrogen projects?
- How should future hydrogen projects be designed to be accepted by local residents?



# “BECC-Research question”

- What factors influence the societal acceptance of green hydrogen production in Germany?
- What recommendations can be given to project leaders and policymakers regarding the implementation of green hydrogen projects?
- How should future hydrogen projects be designed to be accepted by local residents?



# Methodology

- German-wide online survey on the acceptance of green hydrogen production in Germany
- Content:
  - Evaluation of various statements about green hydrogen using Likert scales
  - Choice-Based Conjoint (CBC) experiment for optimizing future green hydrogen projects in Germany
  - Acceptance levels according to Hofinger (2001), Sauer et al. (2005), Langer et al. (2018)
  - Green Consumption Values (GCVs) and socio-demographic data
- Survey period: September 2022 to February 2023
- Distribution of the survey via social media and calls in local newspapers
- Response: n=1,203 (cleaned dataset)
- Statistical analysis using Sawtooth Version 9.15





# Design of the choice experiment



Attribute	Level
Participation	No participation Alibi participation Information Consultation Cooperation Financial participation
Origin of renewable electricity for hydrogen production	Local production on-site Own federal state Germany Europe Outside of Europe
Fire or explosion risk	low medium high
Impact on the landscape's appearance or visual impact	low medium high
Annual, personal heating cost savings	0 € 100 € 250 € 500 €



# Design of the choice experiment

Which of the combinations described here for local production of Green Hydrogen and renewable energy near your place of residence would you be most likely to accept? Or would you choose not to accept any of the described combinations? Please click on "Select" for each and then click "Next."

(1 out of 10)

Origin of renewable electricity for hydrogen production	from the same state	Germany	Europe
Fire or explosion risk of the facility	medium	low	high
Information or participation opportunities for citizens	Cooperation	Consultation	Alibi participation
Influence of renewable energy installations on the landscape in my immediate vicinity	high	medium	medium
Your personal annual heating cost savings with the help of hydrogen as part of the energy transition	0€	0€	100€
	Select	Select	Select

I would not choose any of these alternatives.

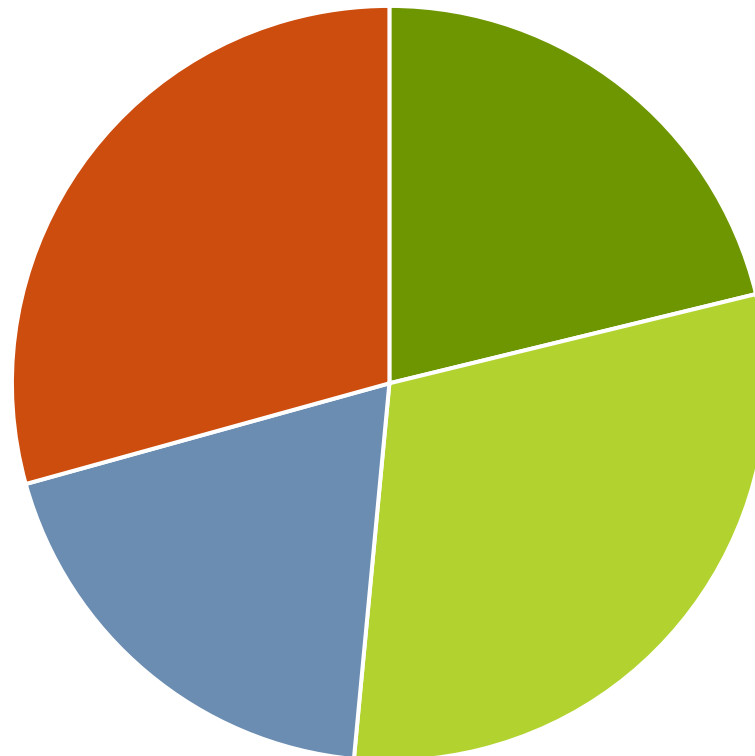
Select

Source: own elaboration

# Results of Latent Class Analysis

## Cluster Sizes (%)

n= 1,203



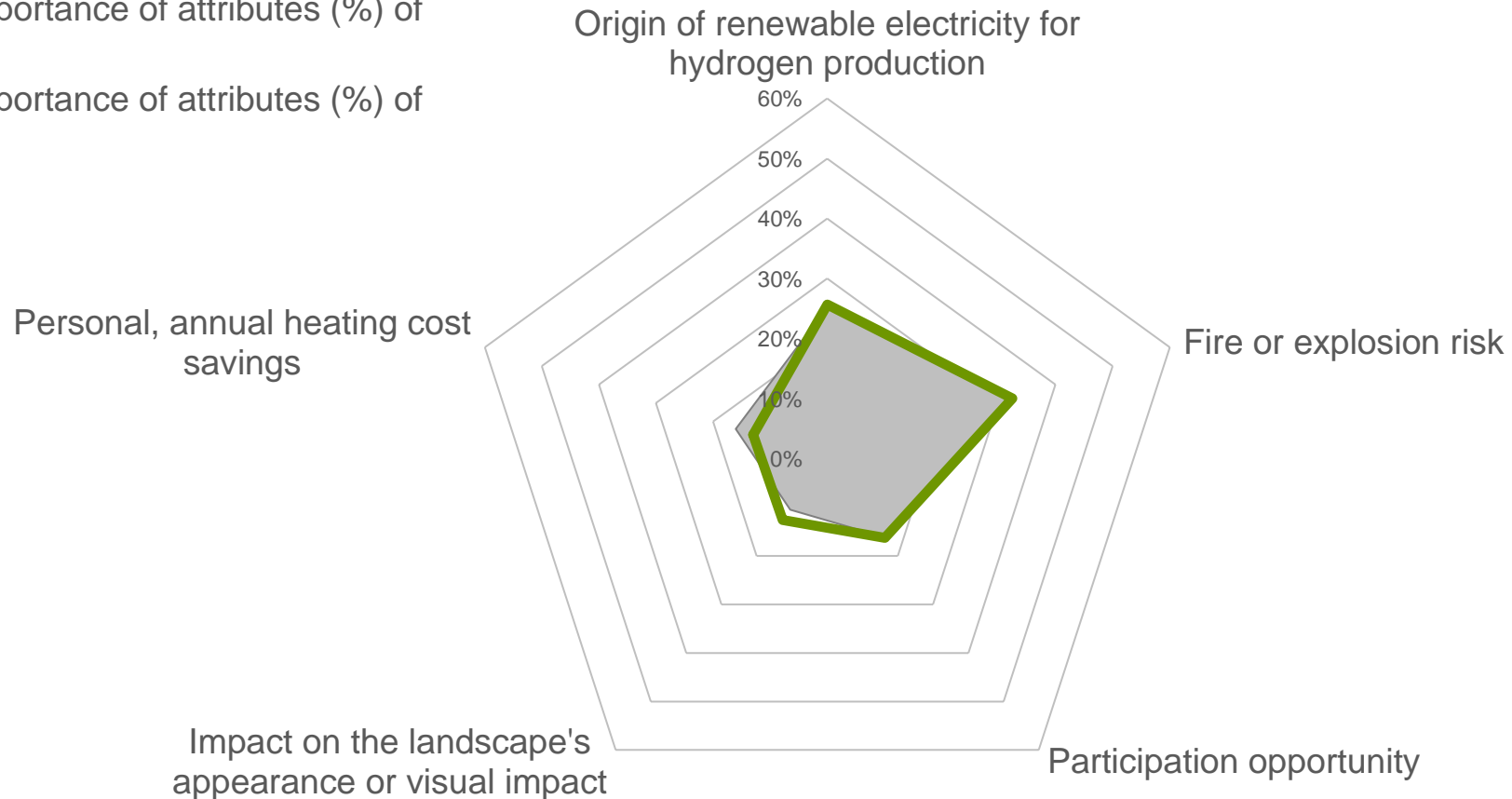
- Unconvinced citizens (Cluster 1)
- Security-conscious citizens (Cluster 2)
- Regional electricity consumers (Cluster 3)
- Financial beneficiaries (Cluster 4)



# Cluster 1: Unconvinced citizens

- Average importance of attributes (%) of the sample
- Average importance of attributes (%) of Cluster 1

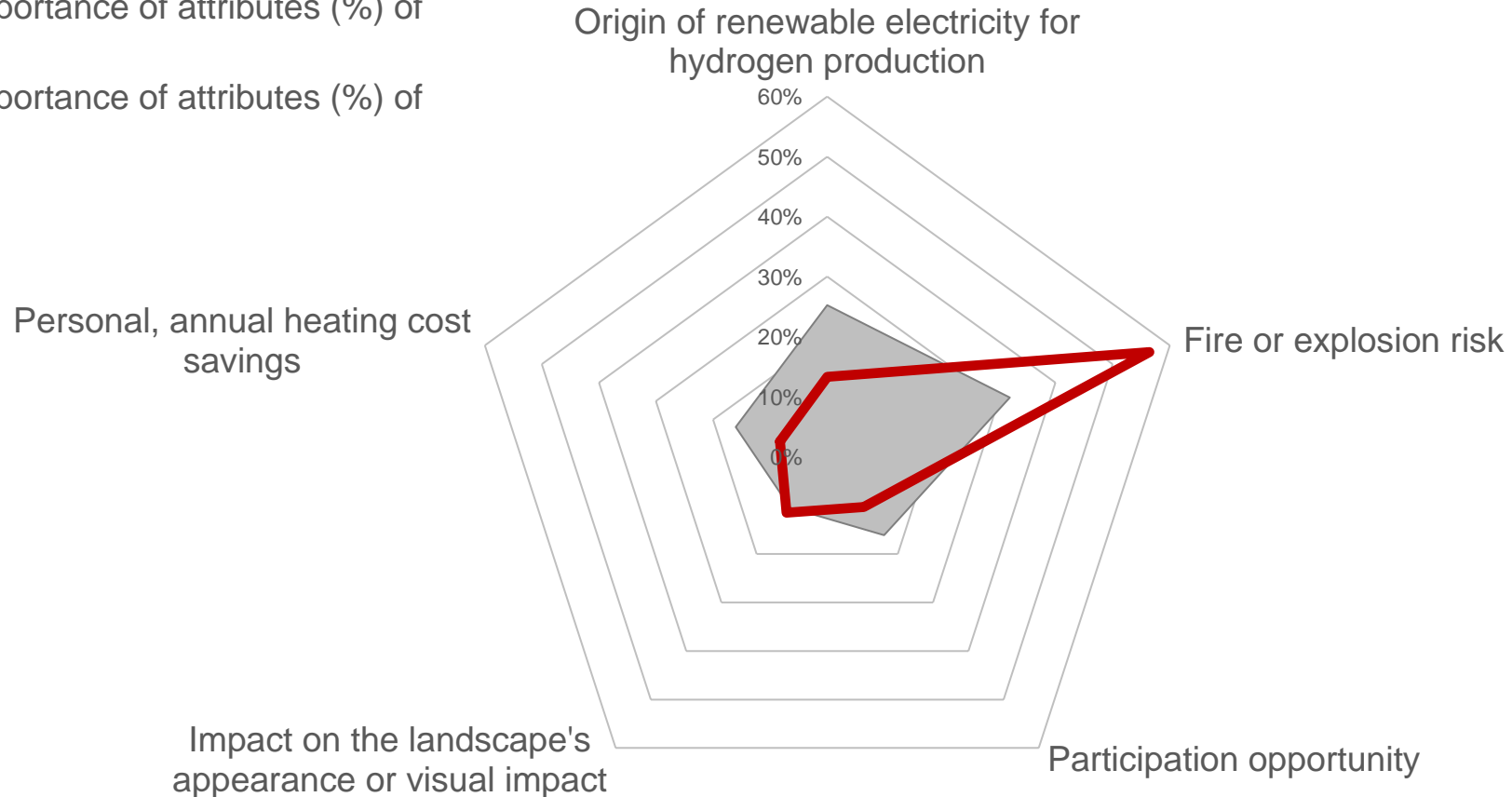
n (Cluster 1)= 255  
n (sample)= 1,203  
none-option= 236.77



# Cluster 2: Security-conscious citizens

- Average importance of attributes (%) of the sample
- Average importance of attributes (%) of Cluster 2

n (Cluster 2)= 365  
n (sample)= 1,203  
none-option= 41.93



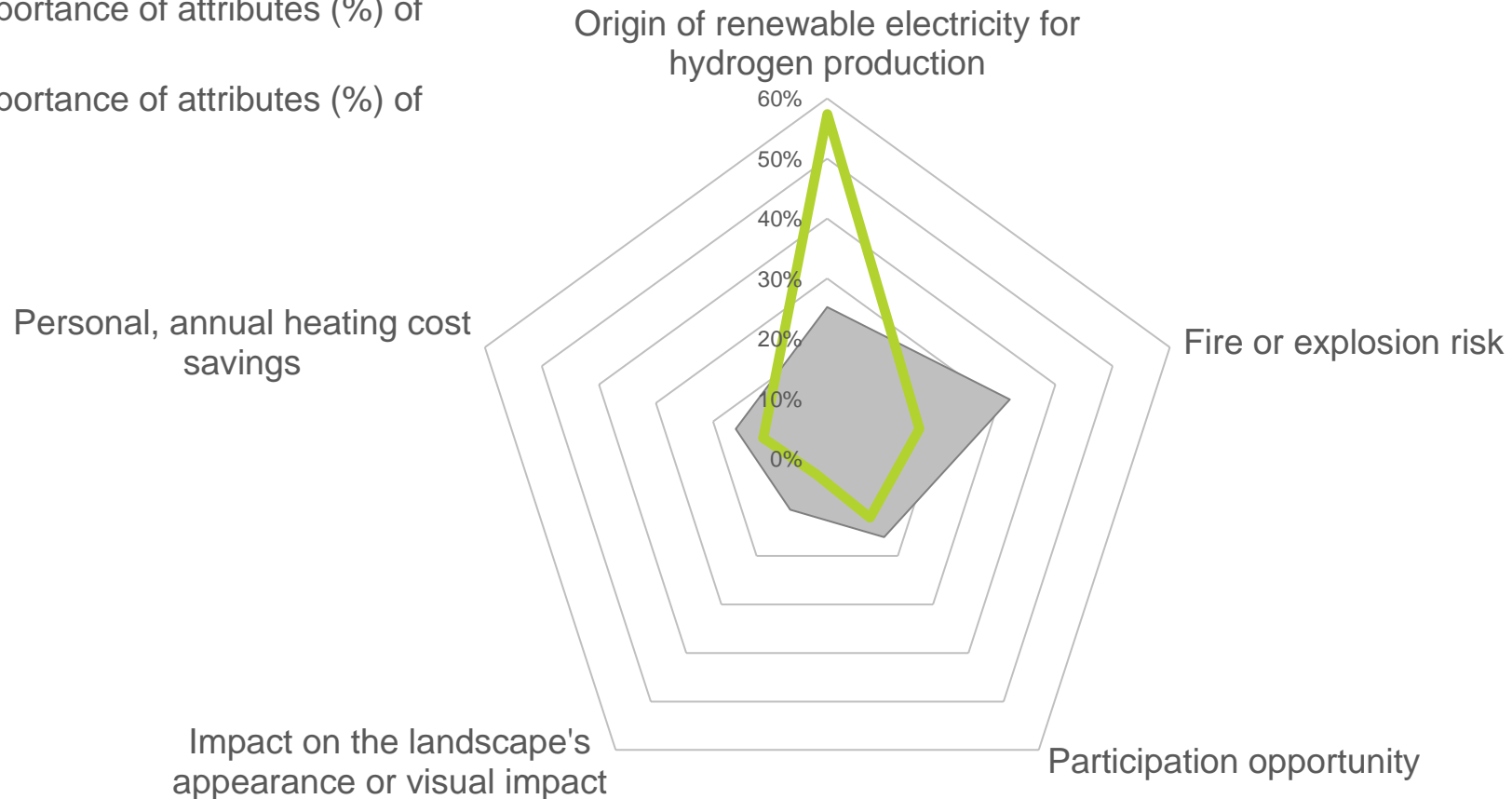
Source: own elaboration



# Cluster 3: Regional electricity consumers

- Average importance of attributes (%) of the sample
- Average importance of attributes (%) of Cluster 3

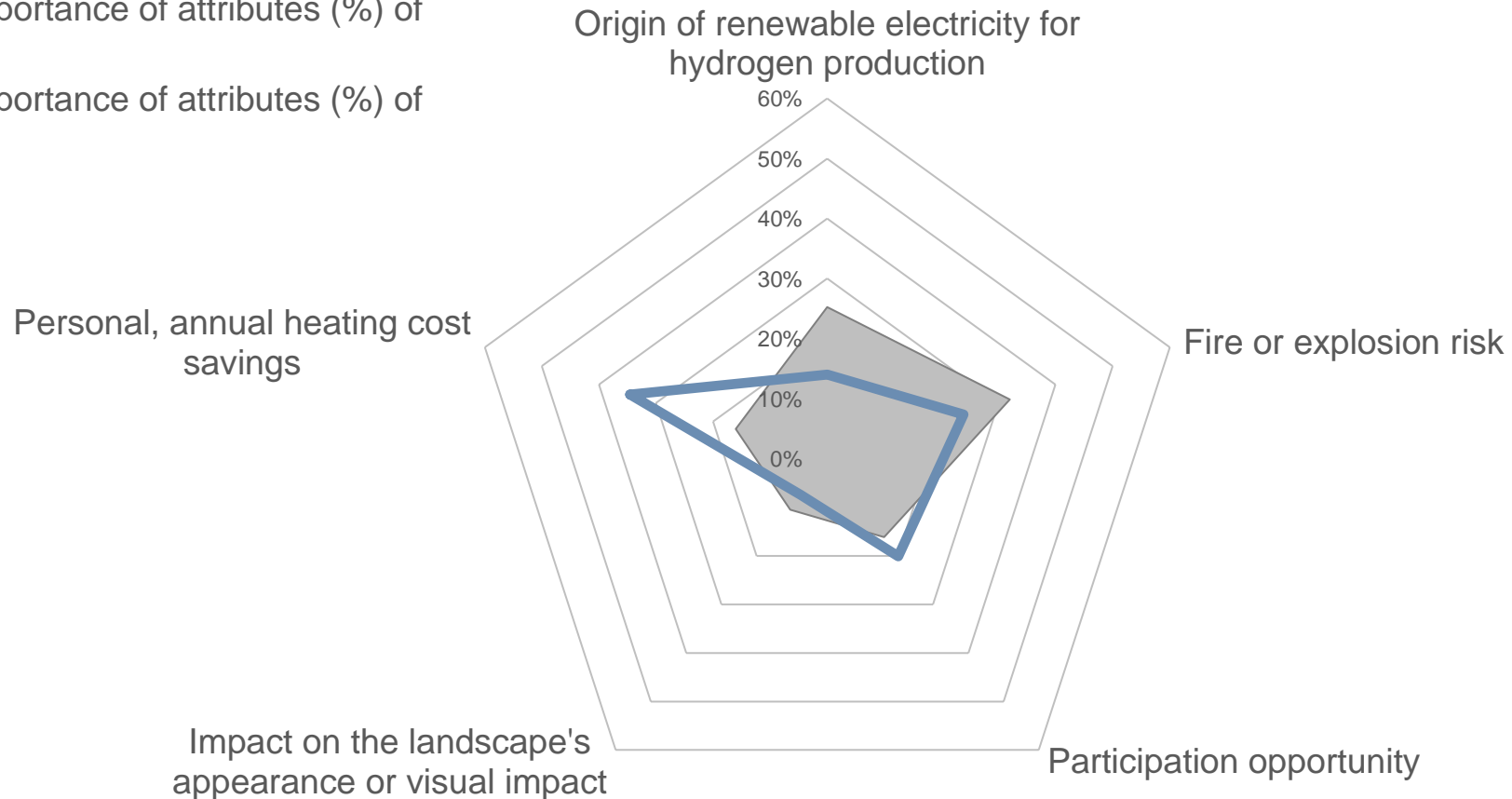
n (Cluster 3)= 231  
 n (sample)= 1,203  
 none-option= -58.62



# Cluster 4: Financial beneficiaries

- Average importance of attributes (%) of the sample
- Average importance of attributes (%) of Cluster 4

n (Cluster 4)= 352  
n (sample)= 1,203  
none-option= -395.73

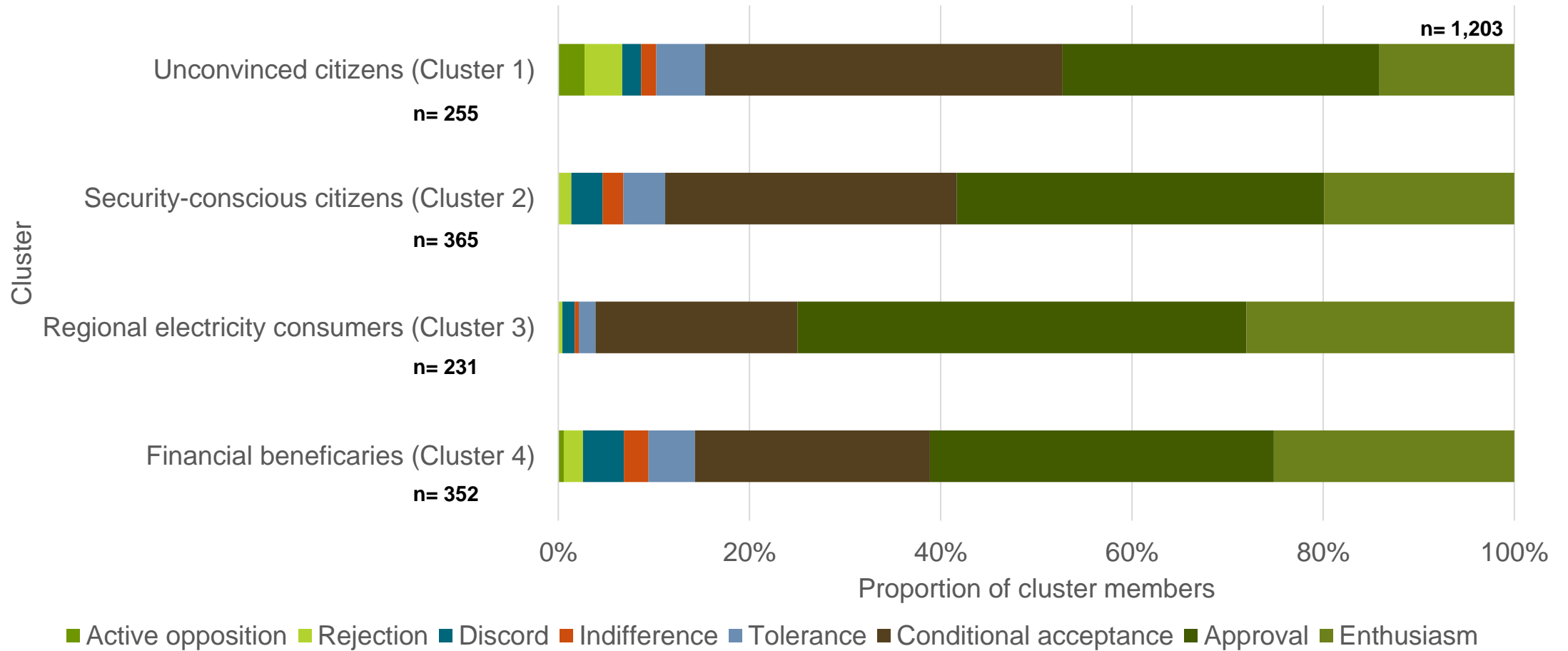




*Imagine you had to join a group of people regarding your personal opinion and acceptance of the production of green hydrogen. This time, however, green hydrogen is produced **near your place of residence**. Which of the following groups would you personally choose?*



# Acceptance levels by clusters



Source: own elaboration according to Hofinger (2001), Sauer et al. (2005), and Langer et al. (2018)



# Summary

- *Fire or explosion risk, annual heating cost savings, origin of renewable electricity for hydrogen production* separate the sample into 4 clusters
- Participation? Financial participation in green hydrogen projects!
- Impact on the landscape's appearance: not a big topic for the acceptance
- High acceptance of green hydrogen production currently goes hand in hand with a lack of knowledge among the population  
→ **comprehensive and targeted public relations work is necessary**



# Thanks for your attention!



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