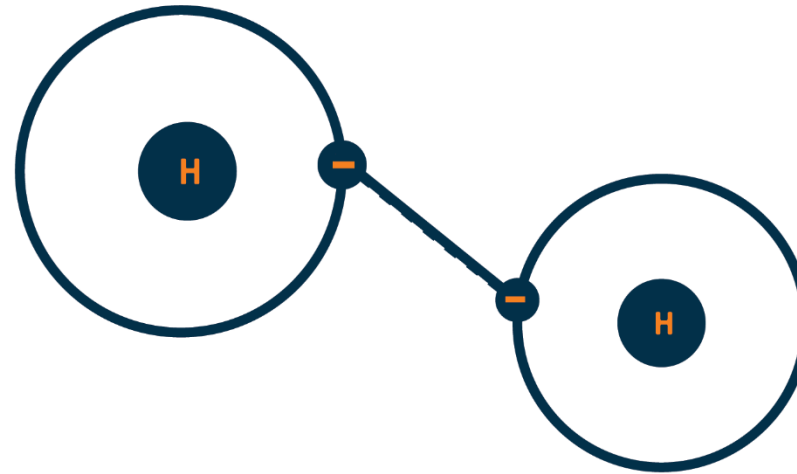




MOVING TOWARDS **HYDROGEN** BASED MOBILITY

Exploring the demand for hydrogen in the Foodvalley region



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Introduction

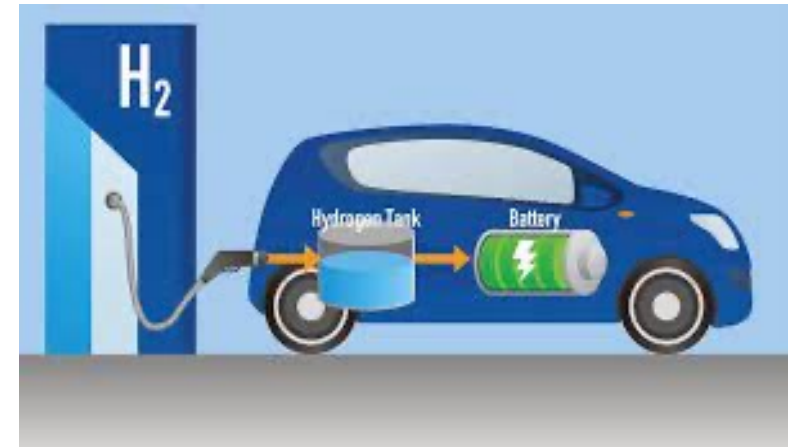
Horses



Fossil Fuels



Renewables



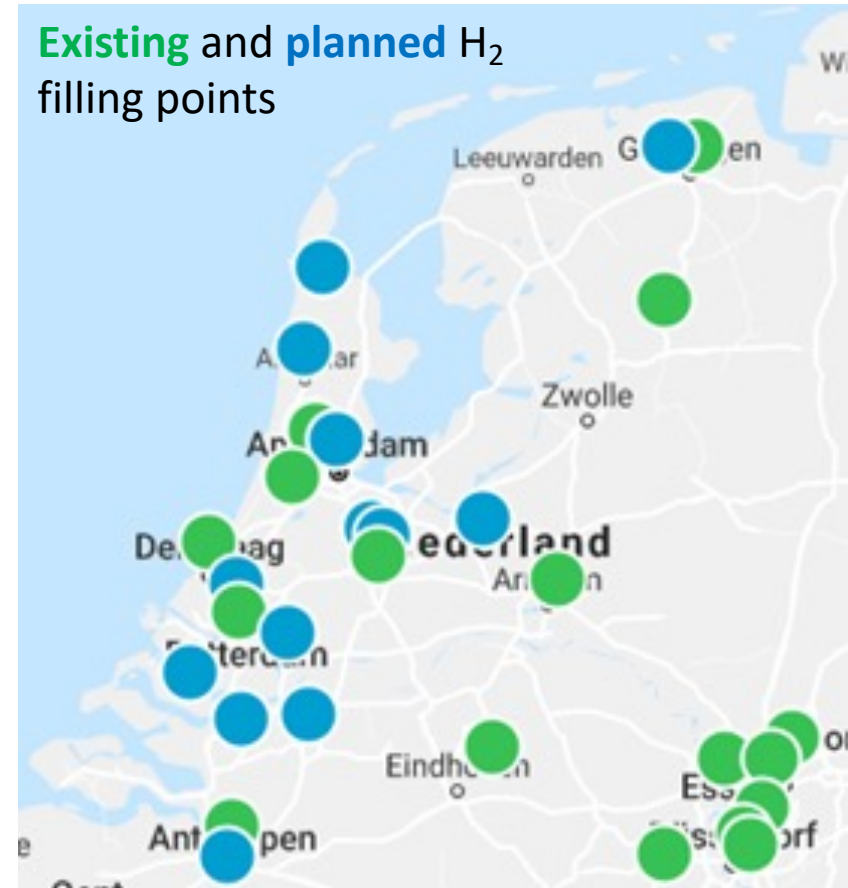
We have a long history of mobility. But now the climate puts a constraint on our ambitions...

Introduction



The energy transition

- Mismatch between demand & supply of renewable electricity
- Ambition to use H₂ as energy carrier
- Use of H₂ for mobility still very limited
- Workplace Hydrogen



Problem definition & Aim



Hydrogen economy in the Foodvalley region

Current state:

- Energy neutral by 2050
Subsidies/Policy measures (**Rijksoverheid, 2021**)
- Low-emission zones / Free-emission zones by 2050

Next steps:

- Where should investments go?
- Supply waits for demand & demand waits for supply



➡ **Start with assessing the demand**

Problem definition & Aim



- **Knowledge gap of the commissioner: Uncertainty in companies' willingness to adopt H₂**
 - Motivations
 - Obstructions
 - Location, quantity & timing of H₂ demand



Ask (potential) H₂ consumers



Research questions

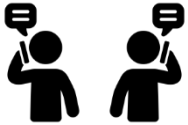
- 1. What are obstructions and motivations for the mobility sector in the Foodvalley to transition to the use of hydrogen fuel?**
- 2. How is the demand for hydrogen expected to evolve in the mobility sector in the Foodvalley region in the coming 5 years?**
 - How is the hydrogen demand geographically spread in the Foodvalley region?
 - What is the difference in hydrogen demand between different mobility sectors?
 - How will the hydrogen demand evolve in time; can specific moments of growth in demand be expected and identified?
 - What is the interest and expected output of potential small-scale hydrogen suppliers?

Methods

Data gathering



Questionnaire (Dillman, 2014; Clarke, 2002)



Interviews

Data analysis



Thematic analysis (Maguire & Delahunt, 2017)



Statistical analysis



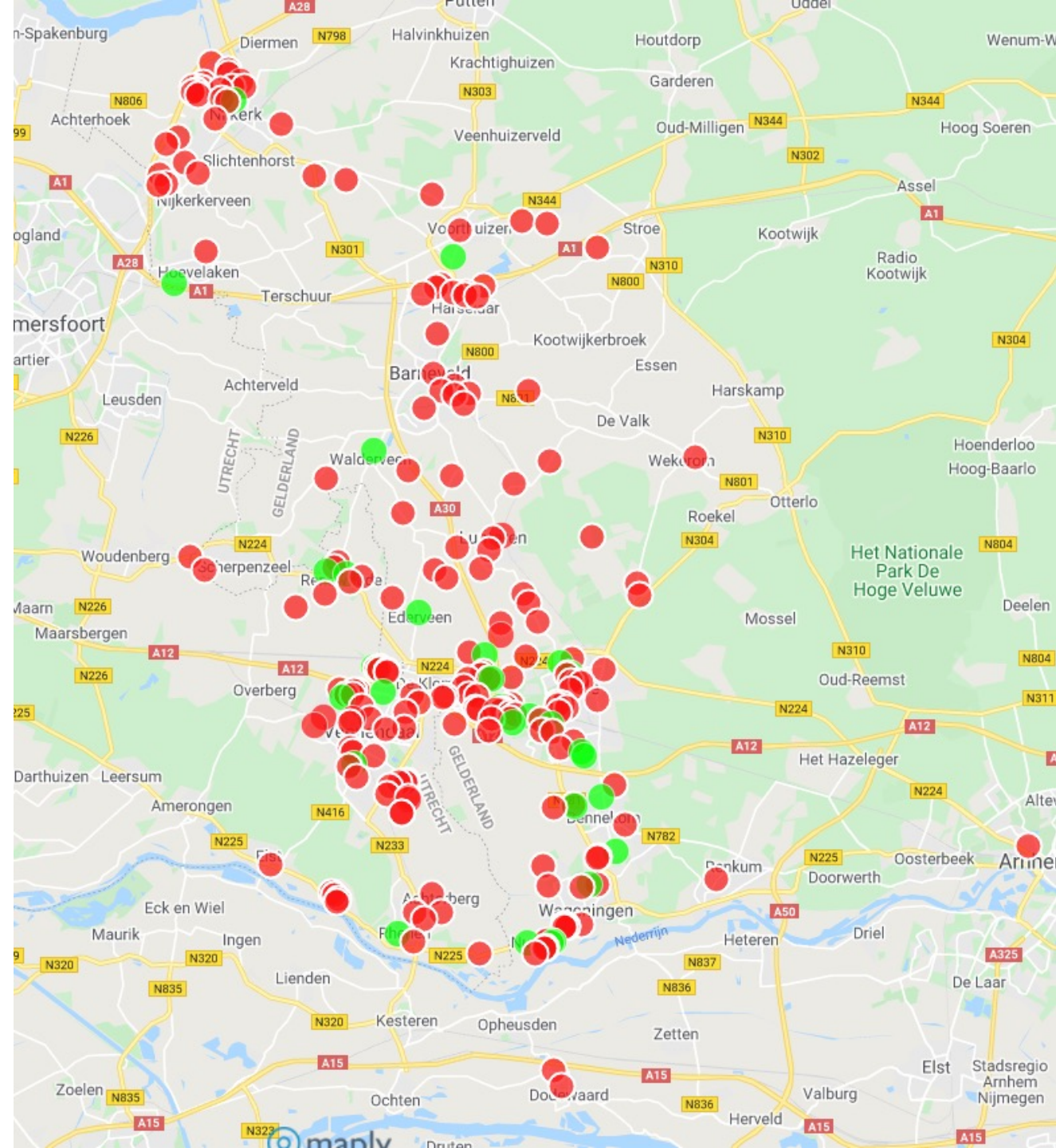
Visual representation

Results

Respondents

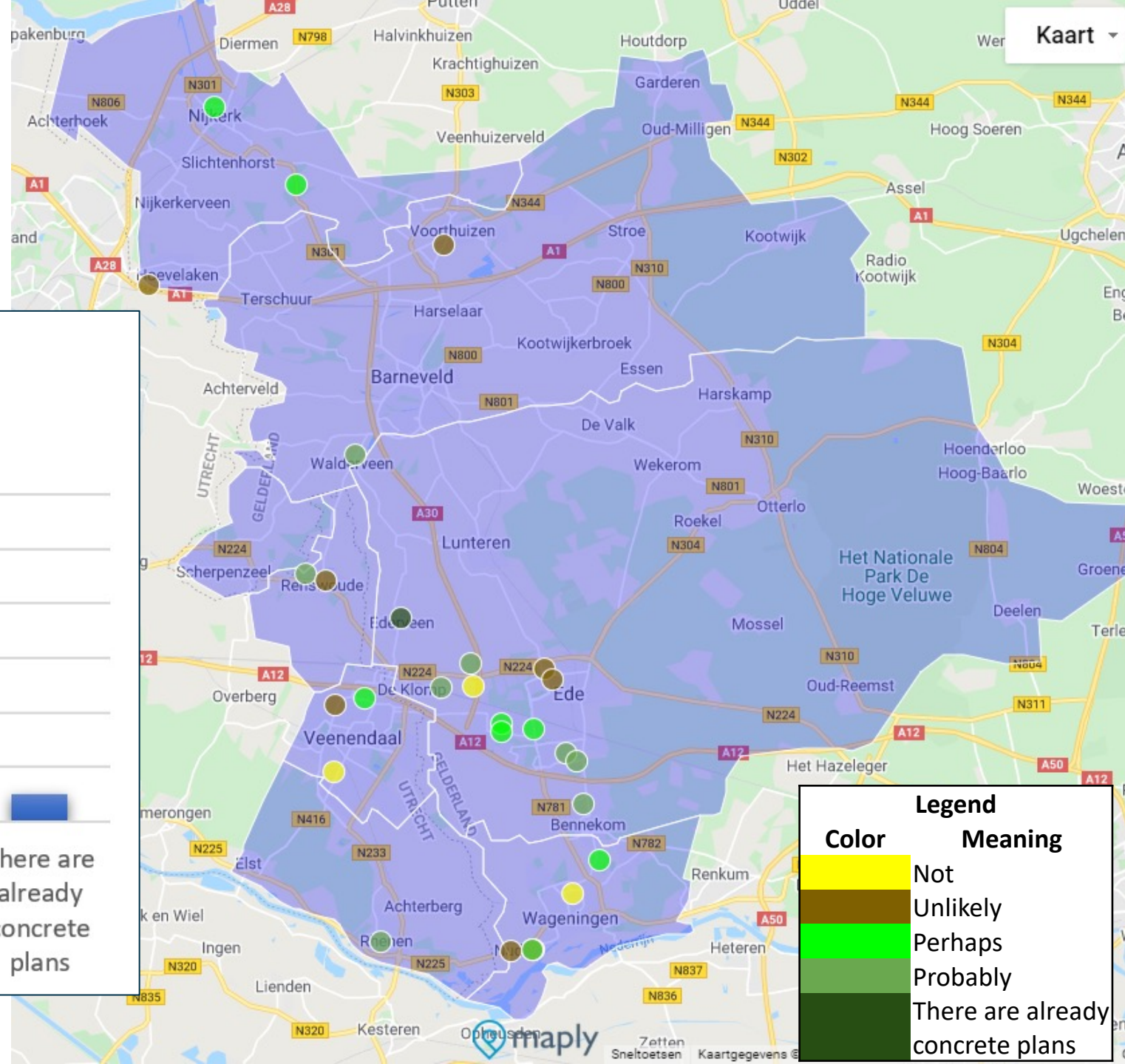
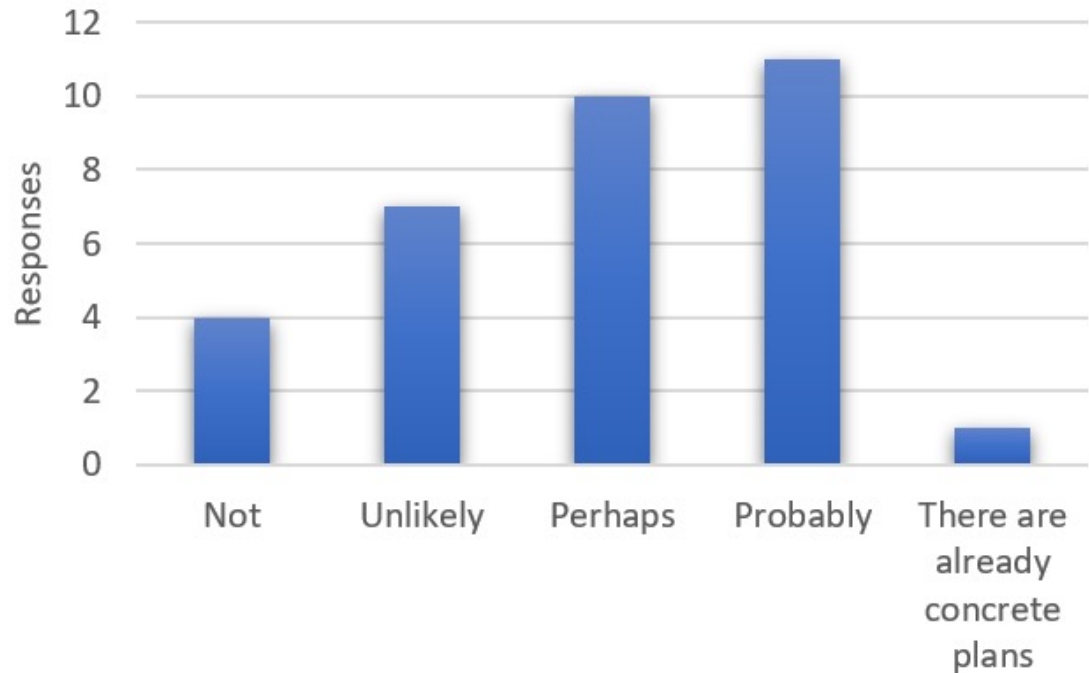
● Reached out to

● Responded



Results

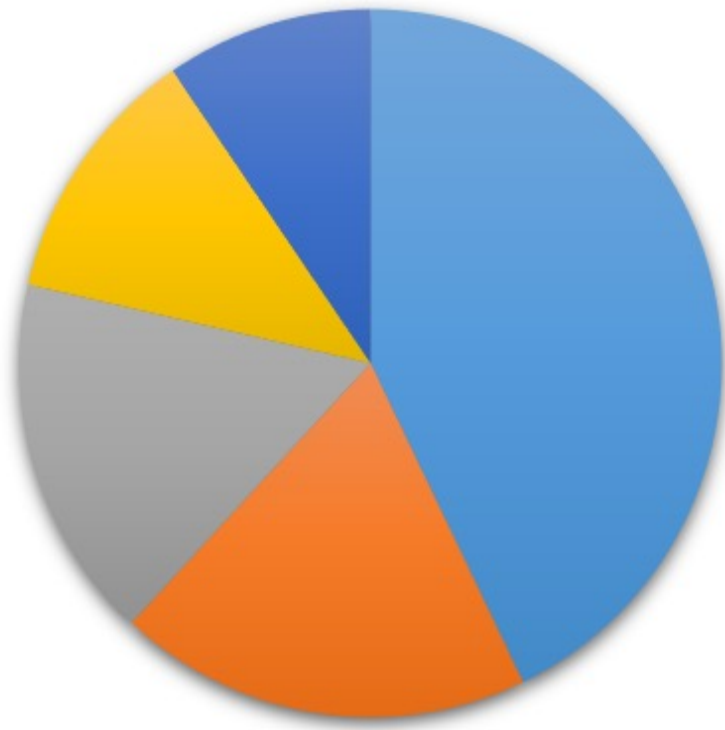
Likelihood to change if H₂ is available



Results



Motivations



Environment

Profits

Other

Superior
performance

Range



Obstructions



Costly

Other

No availability
hydrogen

Dangerous

No vehicles

No subsidy

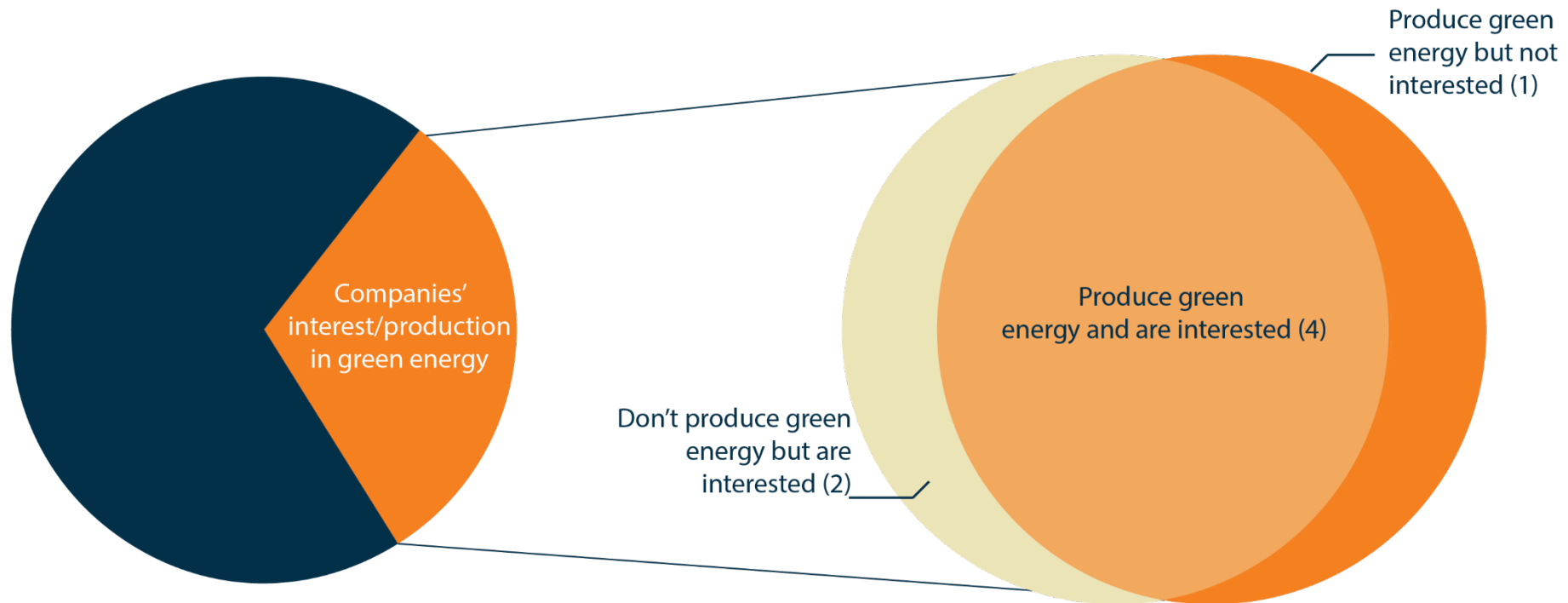
Results

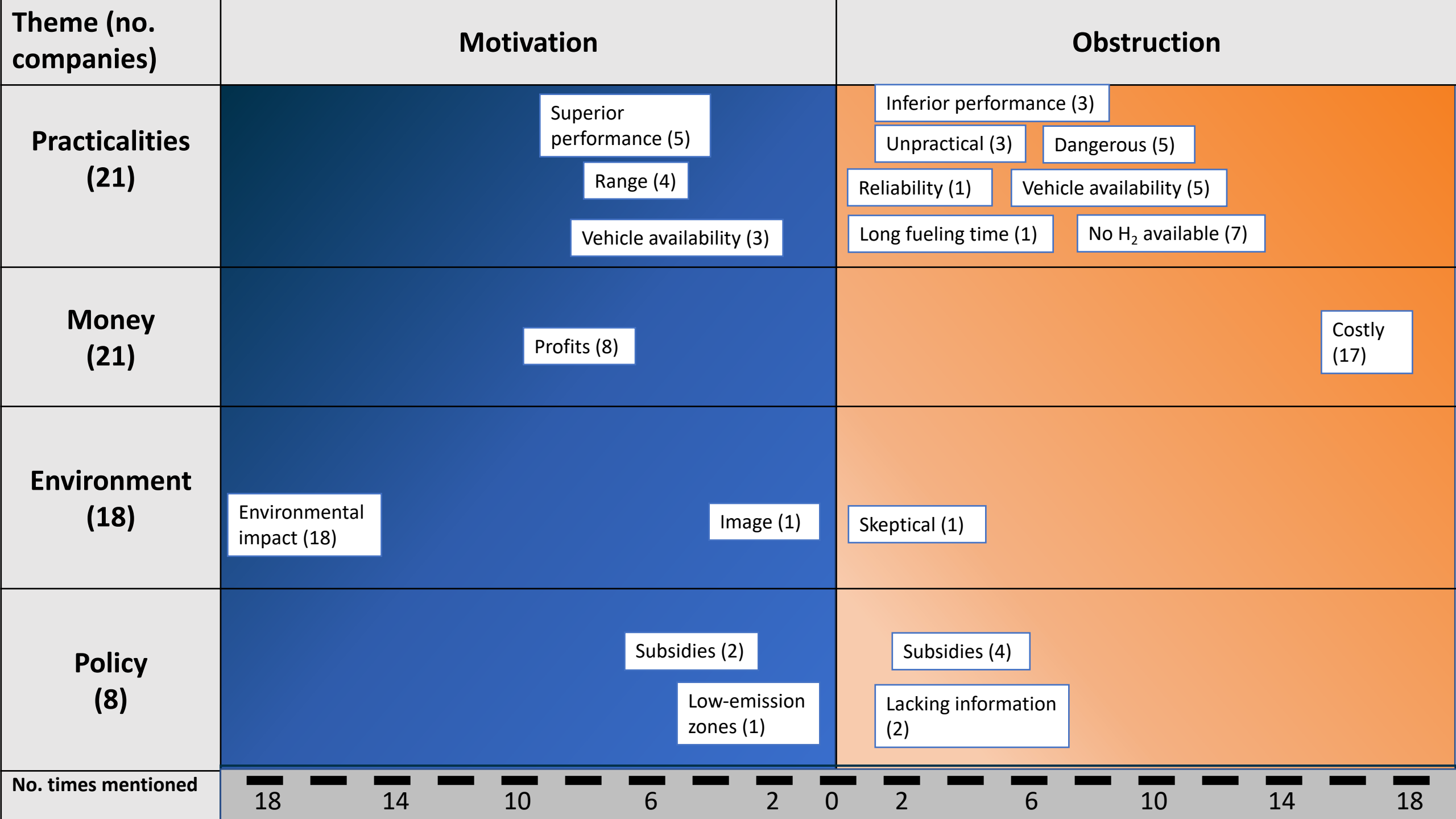


Green energy



Hydrogen Production

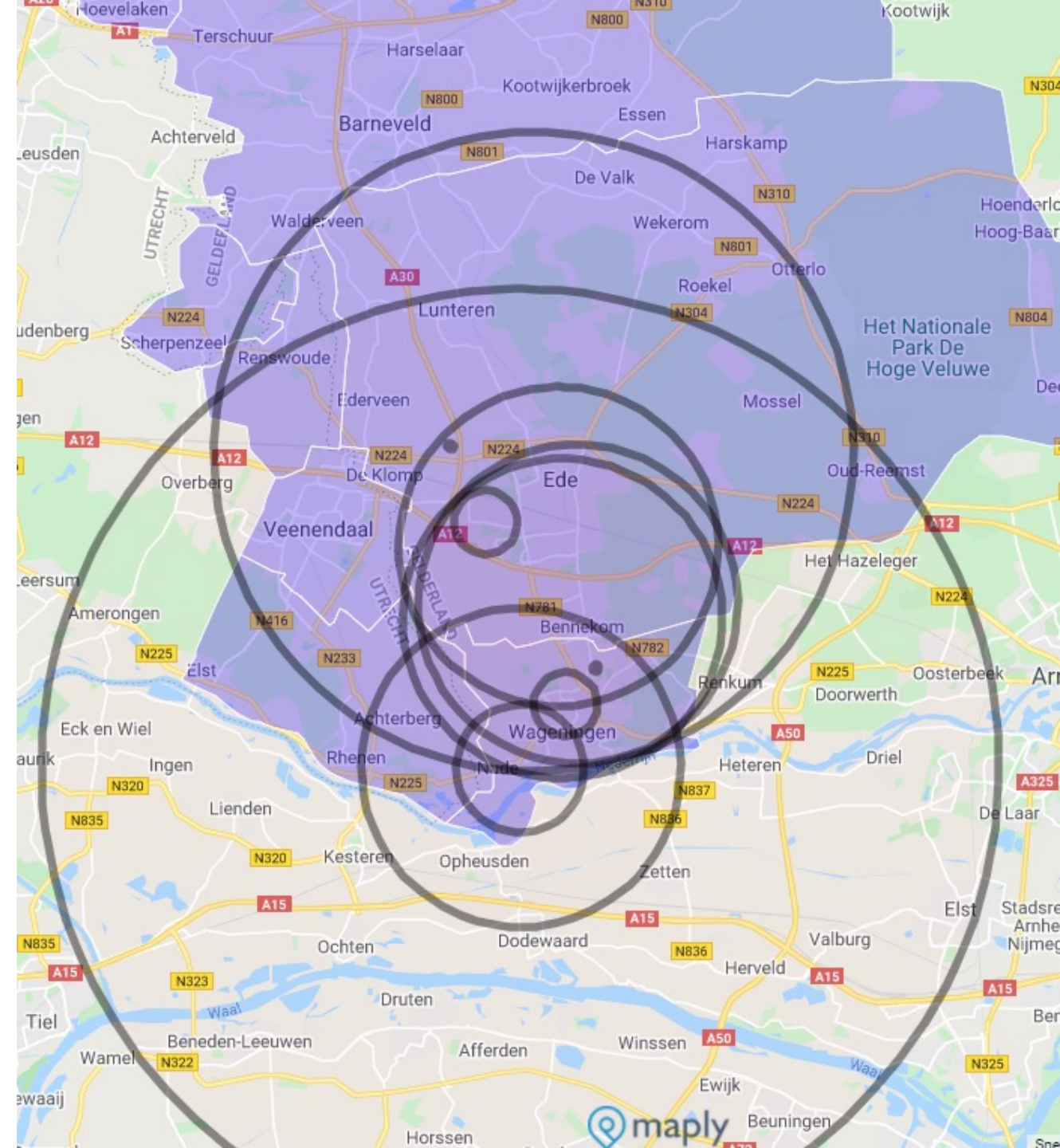




Results



**Distance willing to travel
to a filling point**



Results

Thematic analysis



Practicalities



Money



Environment



Policy

(Braun & Clarke, 2006; Maguire & Delahunt, 2017).

Conclusion

- From the questionnaire – 35% (12 companies) are likely to change to H₂ in the coming years, if H₂ becomes sufficiently available
- Uninterested: 32% of the respondents
- The rest is uncertain

Companies	Factors	Motivation	Obstruction
	Interested	Environment	Availability H ₂ & vehicles
	Not interested		Costs

Discussion & Limitations



Framing questions and selection of sectors



Interpretation of qualitative data



Limited sample size



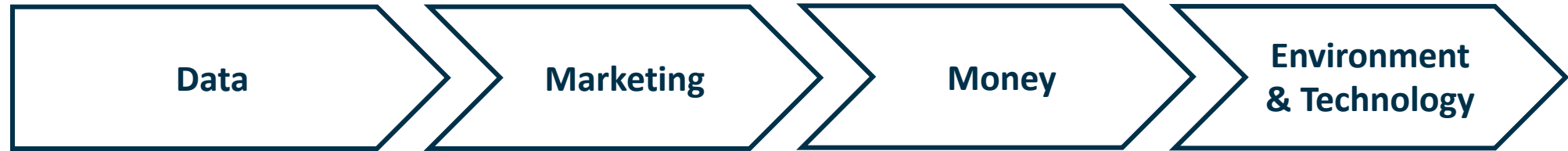
Time constraints

STEP GUIDE

Data gathering

- 1 COLLECT INFORMATION**
Focus group
Literature Review
- 2 COLLECT COMPANIES**
Power analysis
- 3 DEVELOP QUESTIONNAIRE**
- 4 TRIAL RUN**
- 5 REFINE**
- 6 RANDOM ASSIGNMENT**
- 7 APPLY AND COLLECT**

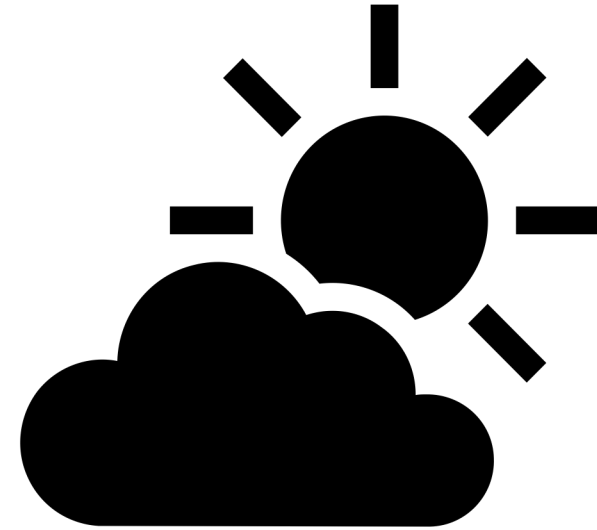
Recommendations & Advice



Recommendations & Advice




- Forecast the demand for hydrogen
- Forecast the suppliers' transition
- Demand w.r.t different sectors
- Filling stations
- Diversify and continue forward



Recommendations & Advice



- Website marketing tool - Implementing CRM techniques
- Social media/Email/Niche print marketing
- Information Points

Number of vehicles	<input type="text" value="5"/>
Travelled Distance per vehicle (km)	<input type="text" value="200"/>
Current Vehicle 	
<input checked="" type="checkbox"/> Passenger cars	<input type="checkbox"/> Sedan
<input type="checkbox"/> Buses and coaches	<input type="checkbox"/> Coupe
<input type="checkbox"/> Commercial vehicles	<input type="checkbox"/> Sports car
<input type="checkbox"/> Trailers	<input type="checkbox"/> Station Wagon
<input type="checkbox"/> 2 and 3 wheeled vehicles	<input type="checkbox"/> Hatchback
<input type="checkbox"/> Wheeled tractors	<input checked="" type="checkbox"/> SUV
<input type="checkbox"/> Mobile machinery	<input type="checkbox"/> Min Van
	<input type="checkbox"/> Pick up truck

<input checked="" type="checkbox"/> Petrol
<input type="checkbox"/> Electric
<input type="checkbox"/> Hybrid

Consumption cost
(updated with current market prices)

Consumption emissions +
Full LCA on vehicles

	Petrol	Electric	Hydrogen
*€	xxx	xxx	xxx
**CO ₂	xxx	xxx	xxx

*Simplified estimation based on average consumption of vehicles

** CO₂ consumption includes Life Cycle Assessment of the vehicles (batteries and engine disposal)

Recommendations & Advice



Subsidies and policies



Recommendations & Advice



- Alternative refilling methods
- Impact on climate change
- Life Cycle Assessment

Are there any questions?

