



University of St.Gallen

Institute for Economy and the Environment

# 12<sup>th</sup> Consumer Barometer of Renewable Energy

## Technical Report

Elizabeth Côté, Dr. Beatrice Petrovich, Prof. Dr. Rolf Wüstenhagen

St. Gallen – December 01, 2022

[www.kuba.iwoe.unisg.ch](http://www.kuba.iwoe.unisg.ch)

In collaboration with:

**RAIFFEISEN**



energieschweiz

amag

From insight to impact.

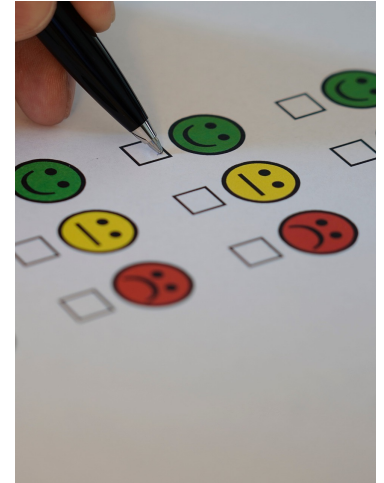
# Outline

1. Data and methods
2. Diffusion of “early electrifier” technologies
3. Citizen perceptions of the energy and climate crises
4. Conclusions

# 1. Data and methods

# Method, data collection, and sample

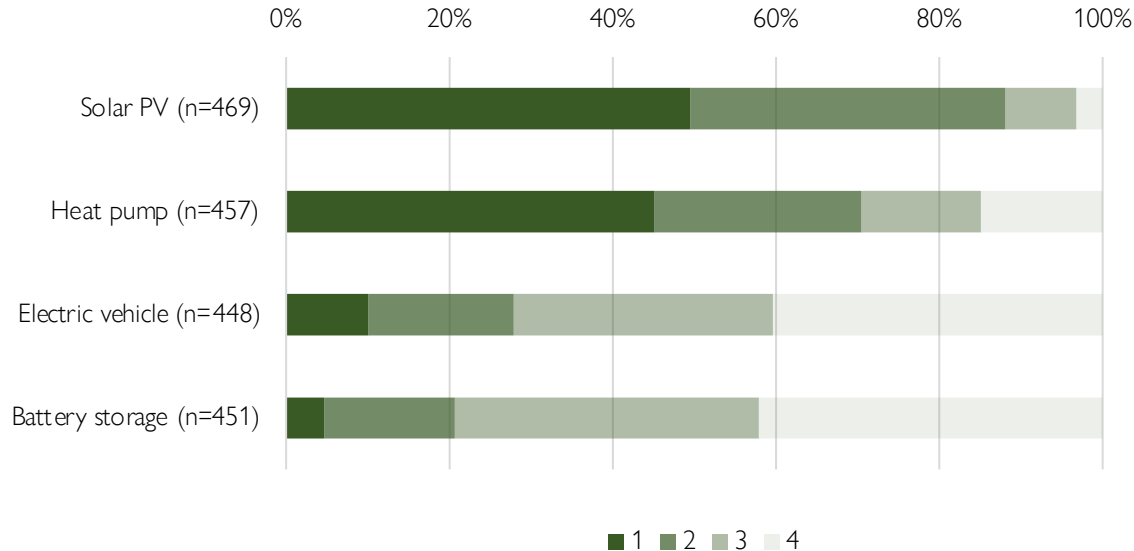
- Online survey conducted between **Oct. 24, 2022** and **Nov. 03, 2022**
- Recruitment of respondents from one of the largest Swiss online consumer panels (>110,000 active panelists, see <https://www.intervista.ch/>)
- **“Main sample”** (n=1,051) of Swiss resident population
  - Stratified sampling according to gender, age, level of education, language region (German & French), and political party preference
  - Objective: representative findings for questions relating to the general population
  - Where applicable, analyses based on subsamples of homeowners vs. tenants
- **“Early electrifier booster”** (n=275) (not included in main sample)
  - Ownership of and/or intention to purchase an electric vehicle (EV) and/or solar photovoltaic (PV) system within the next 2 years
  - Objective: focussed analysis of key target segment for diffusion of distributed clean energy technologies



## 2. Diffusion of “early electrifier” technologies

# “Early Electrifiers:” Sequence of purchase intentions

“Please indicate the sequence in which you have purchased (or would purchase) the following technologies.”

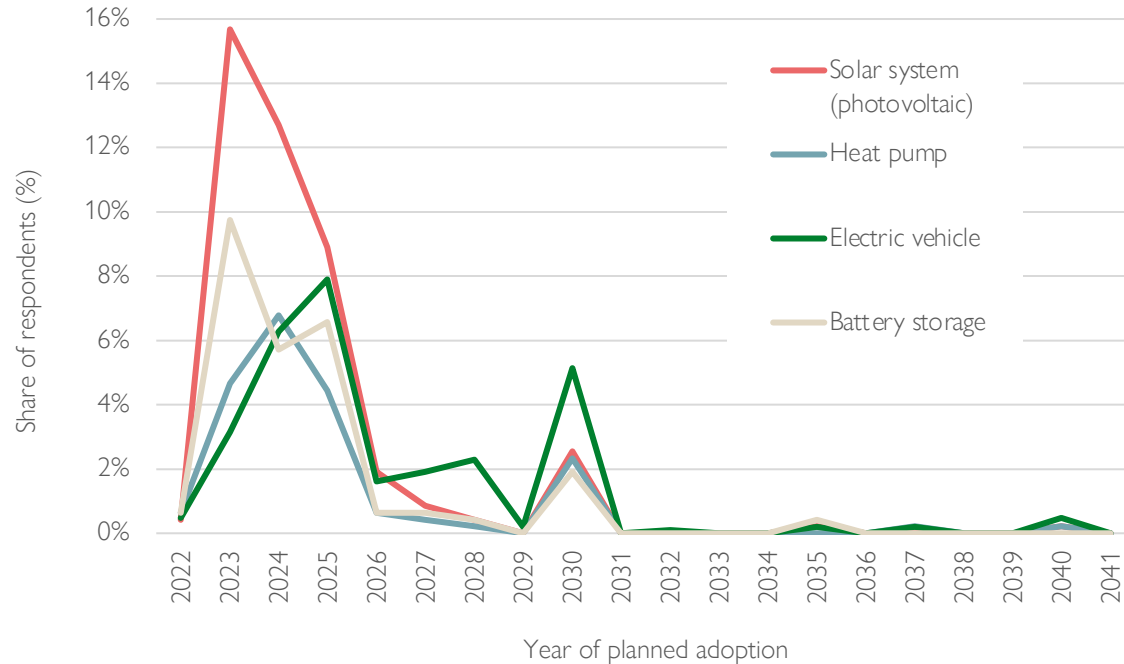


- Most Swiss homeowners prioritize a solar system (49%) or a heat pump (45%).
- EVs and battery storage tend to be purchased after the other early electrifier technologies.

**Figure 1.**

Order in which homeowners (n=472) have adopted or would adopt clean energy technologies.

# Clean energy technology adoption trends over time



- Adoption intentions over time reflect the popularity of solar PV, with **16%** (38%) of homeowners expressing their intention to invest within the next 12 (36) months.
- **18%** of all respondents intend to buy an EV in the next 3 years.

**Figure 2.**

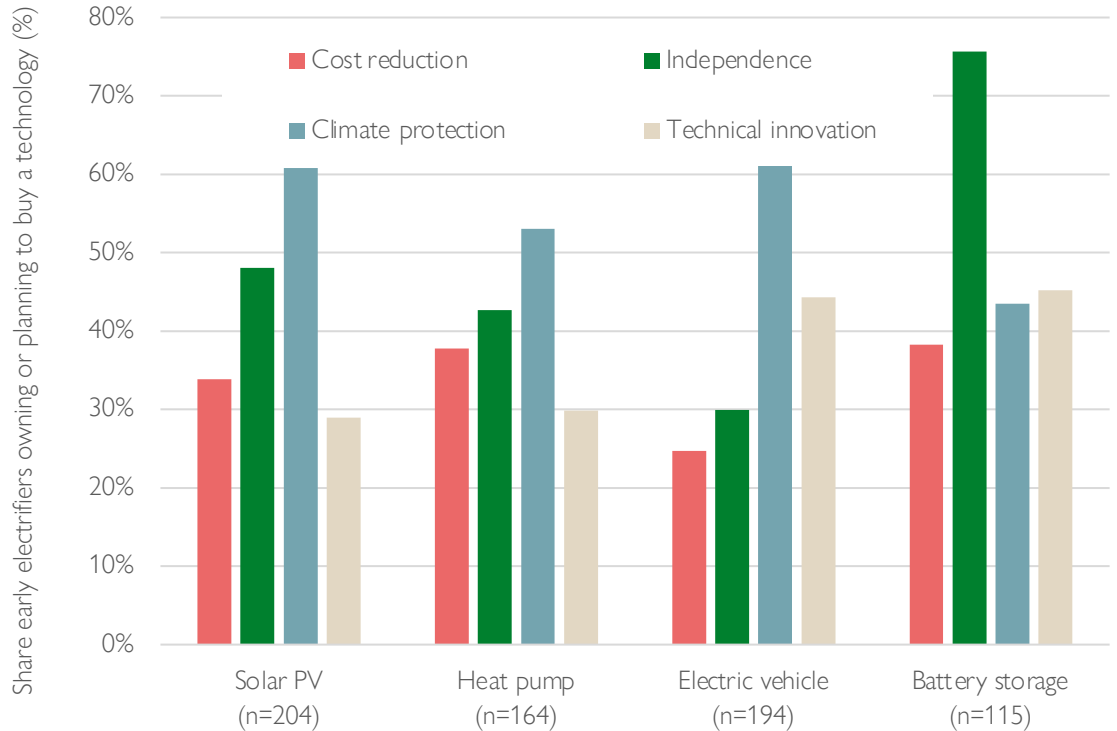
Share of respondents planning to adopt a clean energy technology, per year.

**Note:** Clean energy technology adoption trends for solar PV, heat pumps, and battery storage are based on homeowner responses (n=472), whereas EV adoption trends are based on the full sample (n=1,051).

# Drivers of adoption decisions

- While **climate protection** is a key driver of solar system, heat pump, and EV adoption, **independence** drives battery storage purchases.
- **87%** of technology owners reported that most people in their surrounding have a positive attitude towards these technologies, underscoring the importance of **peer effects** in adoption decisions.

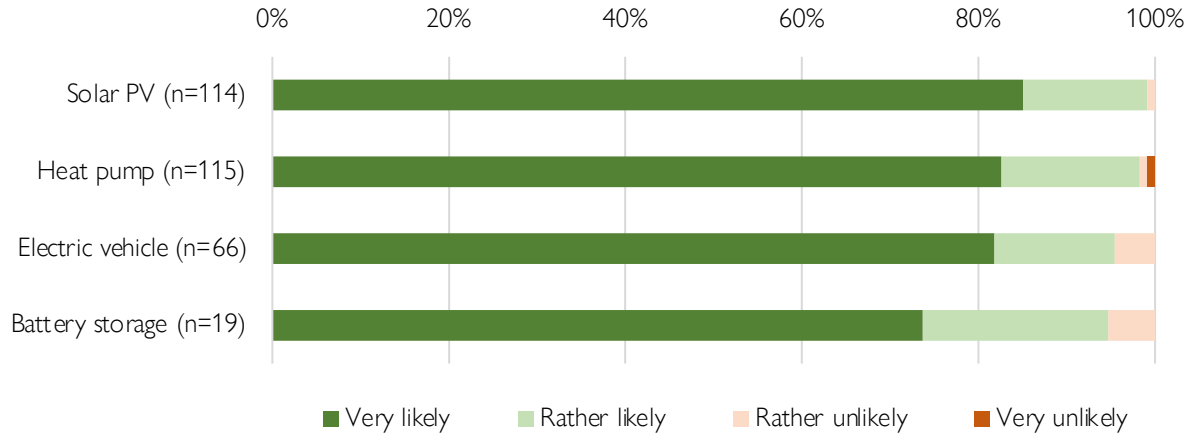
**Figure 3.**  
Share of early electrifiers (n=275) owning or interested in purchasing a technology considering a factor as very important for their purchasing decision.





# Customer satisfaction with clean energy technologies

- **High level of customer satisfaction** among early electrifiers, the large majority of whom are likely to recommend it to a friend or colleague.
- **85%** of solar PV adopters are “very likely” to recommend the technology further.

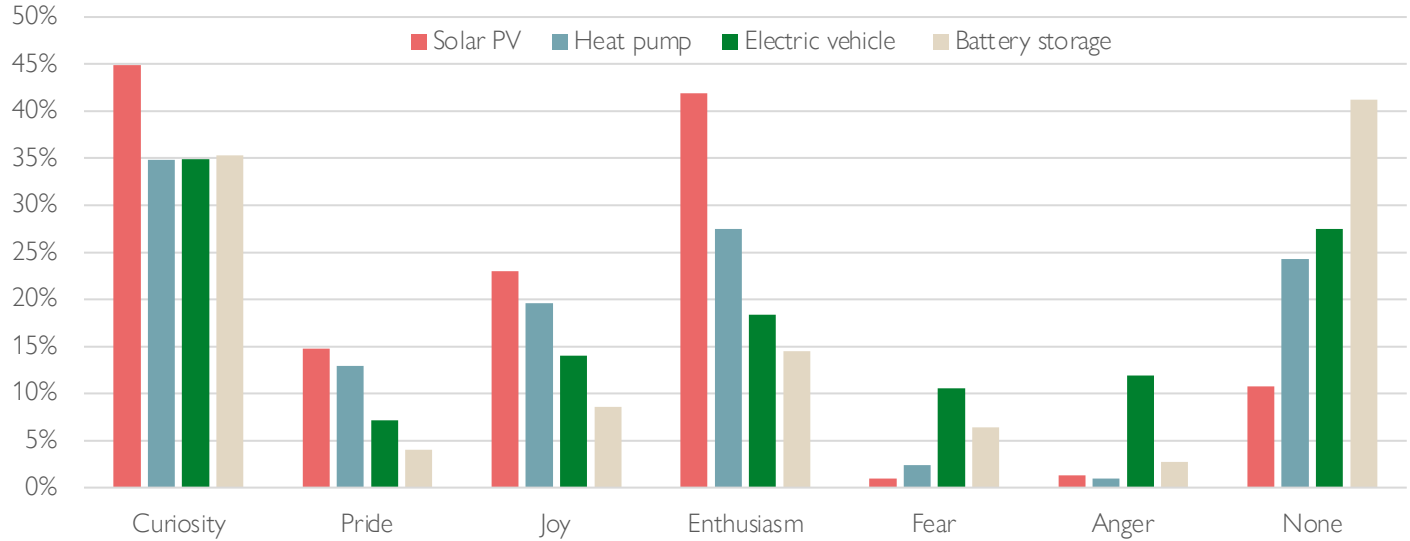


**Figure 4.**

Share of early electrifiers (n=275) owning a technology who would likely recommend this technology to a friend.

# Emotions triggered by clean energy technologies

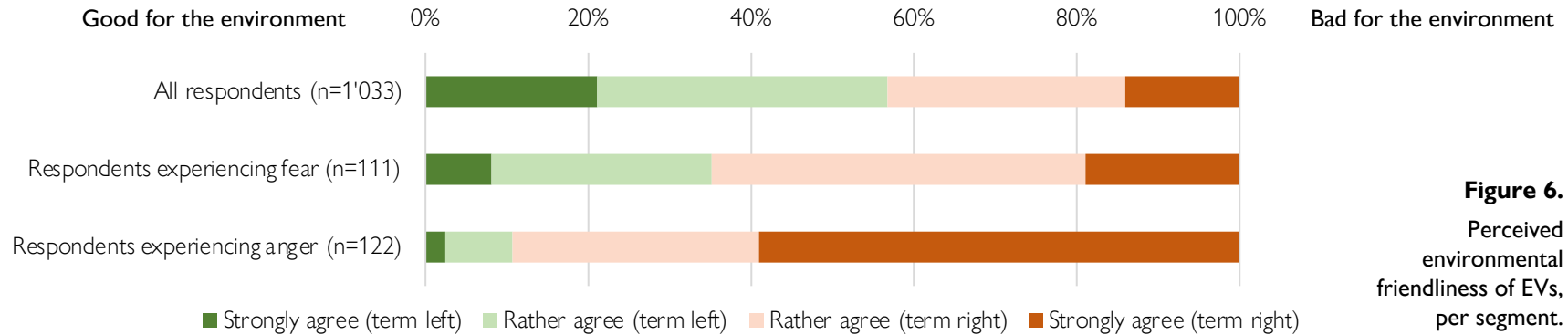
- Solar systems arouse by far the strongest positive feelings, with 42% of respondents feeling **enthusiasm** when thinking of solar energy. They are followed by heat pumps, electric cars, and battery storage.
- A **minority** of respondents encounter electric vehicles with **fear** and **anger** – 11% and 12% respectively.



**Figure 5.**  
Share of respondents (n=1,051) experiencing respective emotion when thinking about clean energy technologies.

# Emotions triggered by clean energy technologies (cont'd)

- Among the minority indicating negative emotions vis-à-vis electric vehicles, **65%** of respondents expressing **fear** and **89%** of those expressing **anger** tend to view EVs as being rather bad for the environment.
- Respondents expressing fear also indicated concern about rising electricity costs and uncertainty with regards to power supply as factors explaining their attitude towards EVs, whereas respondents expressing anger seemed to voice broader discontent with EVs as well as a range of other aspects of the energy transition.

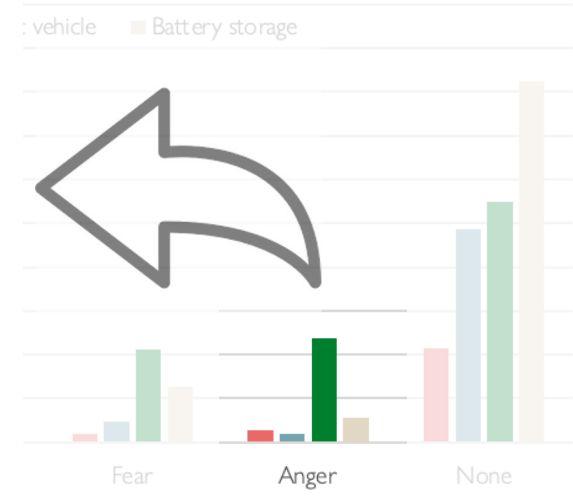
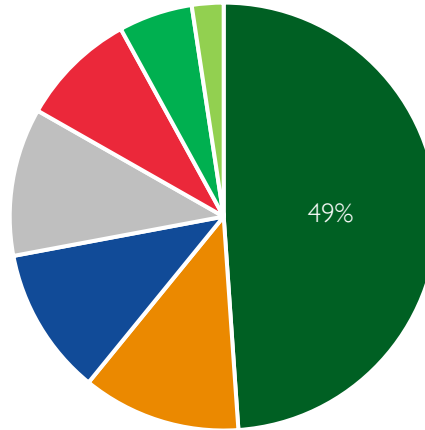
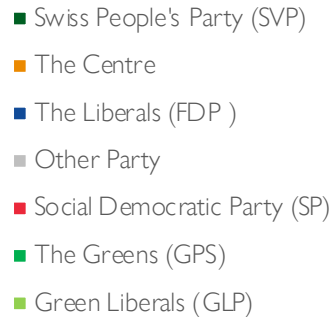


**Figure 6.**  
Perceived environmental friendliness of EVs, per segment.

# Emotions triggered by clean energy technologies (cont'd)

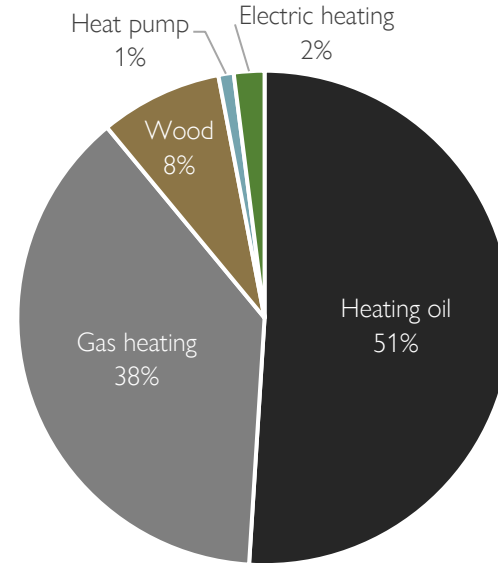
- 49% of the respondents expressing anger vis-à-vis electric vehicles are supporters of the Swiss people's party (SVP). Green liberal party supporters are the least likely to be angry at EVs.
- No major differences are observed based on other sociodemographic variables.

**Figure 7.** Share of respondents (%) expressing anger vis-à-vis EVs, by political orientation (N=125).



# Heating: From fossil fuels to heat pumps

- **89%** of those homeowners who are interested in purchasing a heat pump currently use fossil fuels to heat their home.
- **67%** of respondents using oil for heating are tenants.
- **52%** (44%) of those homeowners who currently have an oil (gas) boiler consider adopting a heat pump as their next heating system.



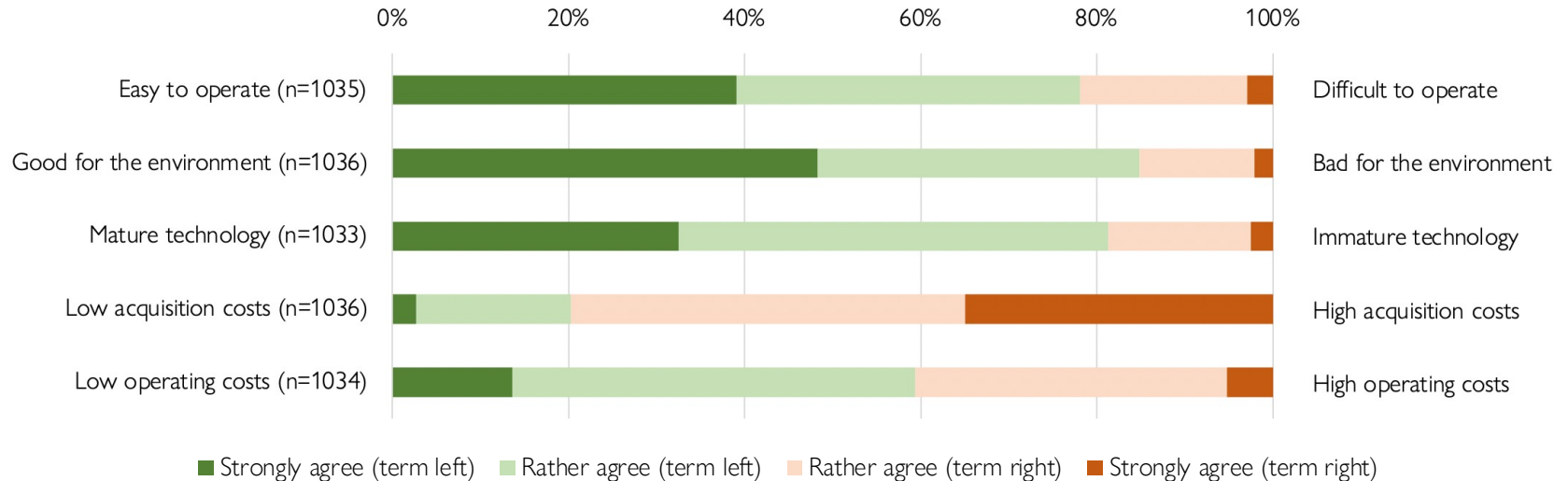
**Figure 8.**

Share of homeowners interested in adopting a heat pump (n=100), per type of existing heating system.

# Barriers to heat pump adoption

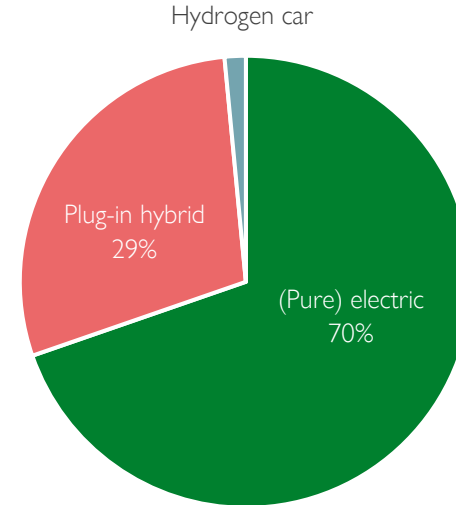
- While 85% of respondents (rather) agree that heat pumps are good for the environment and 82% perceive them to be a mature technology, the **initial capital expenditure** is a concern for a majority of respondents.

**Figure 9.** Semantic differential of heat pump perceptions (n=1,051).



# Electric vehicle adoption

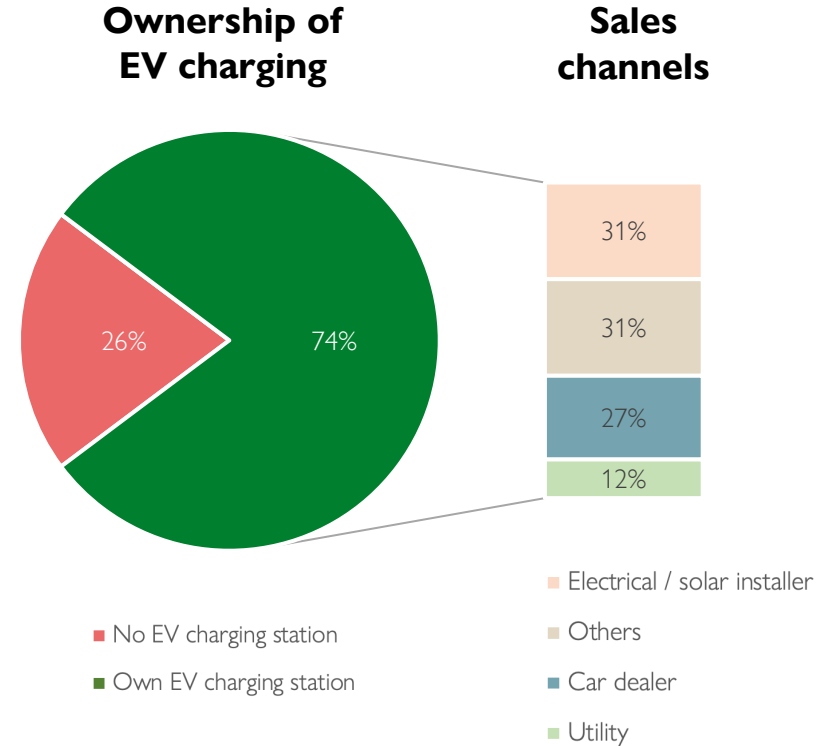
- In the growing EV market, the trend is towards **purely battery electric vehicles (BEV)**, with plug-in hybrid vehicles losing customer attractiveness. Among respondents driving an electric vehicle, **70%** own a BEV.
- Hydrogen cars represent a marginal market share.
- **80%** of EV owners used to drive a combustion engine car before purchasing their current vehicle.
- Among respondents owning more than one car, **74%** use their EV as the main vehicle.
- **16%** of respondents are car sharing users.



**Figure 10.** Share of early electrifiers with an EV, per vehicle type (n=66).

# Electric vehicle charging stations

- **74%** of EV owners have a charging station at home, of which **39%** reported also owning a **solar PV** system.
- In terms of **sales channels**, less than half of EV drivers with their own charging station have bought their wall box from a car dealer (27%) or an electric utility (12%). Electricians / solar installers have the highest market share (31%).
- **30%** of tenants interested in purchasing an EV reported that it is not possible to install a charging station at their private parking place.



**Figure 11.**

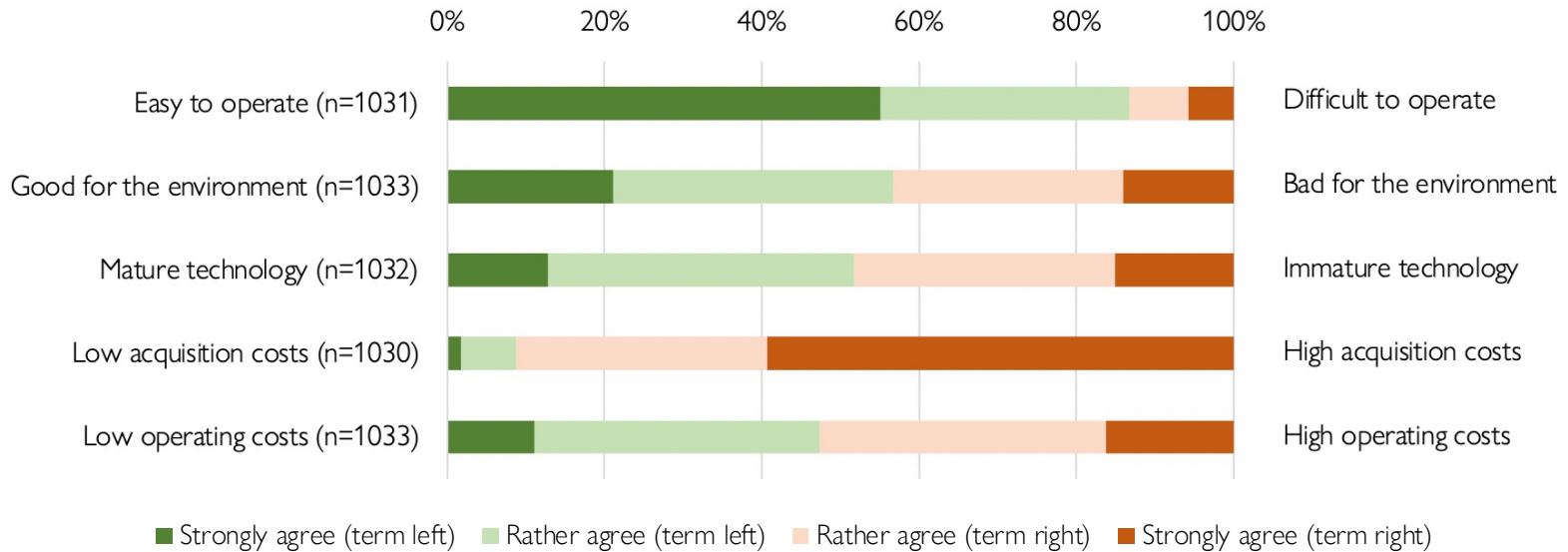
Share of early electrifiers with an EV (n=66) owning a charging station, and type of charging station provider.



# Barriers to electric vehicle adoption

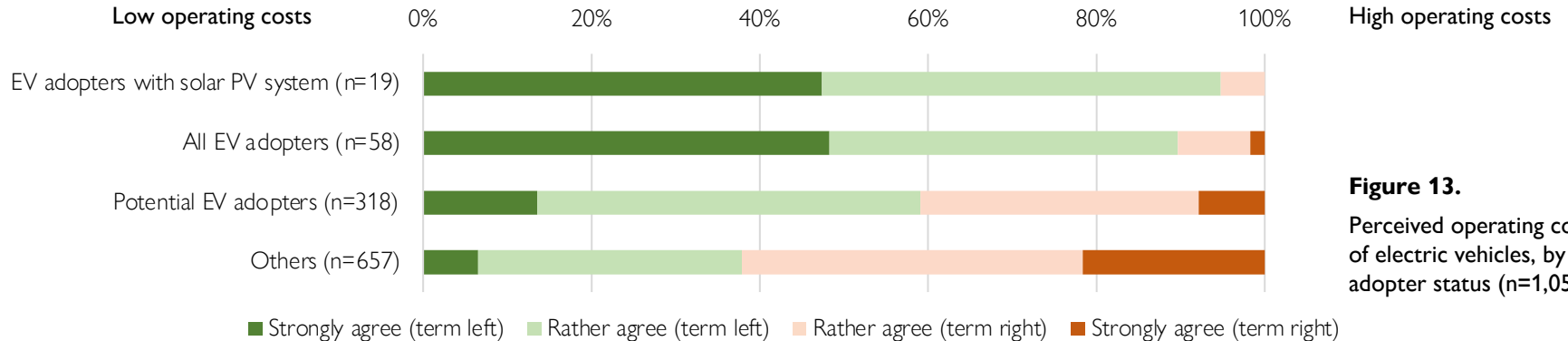
- While a majority of respondents view electric vehicles as an environmentally friendly, mature technology, **high acquisition costs** are perceived as an obstacle in the current uncertain economic environment.

**Figure 12.** Semantic differential of electric vehicle perceptions (n=1,051).



# Familiarity with EVs increases perception of low operating cost

- While respondents not owning an EV are almost evenly split between those who think EVs have lower vs. higher operating cost than conventional cars, this perception changes with increased familiarity.
- **60%** of potential adopters and **89%** of actual adopters associate EVs with low operating cost.
- None of the Early Electrifiers who charge their EV with self-produced solar power strongly associate them to high operating cost.

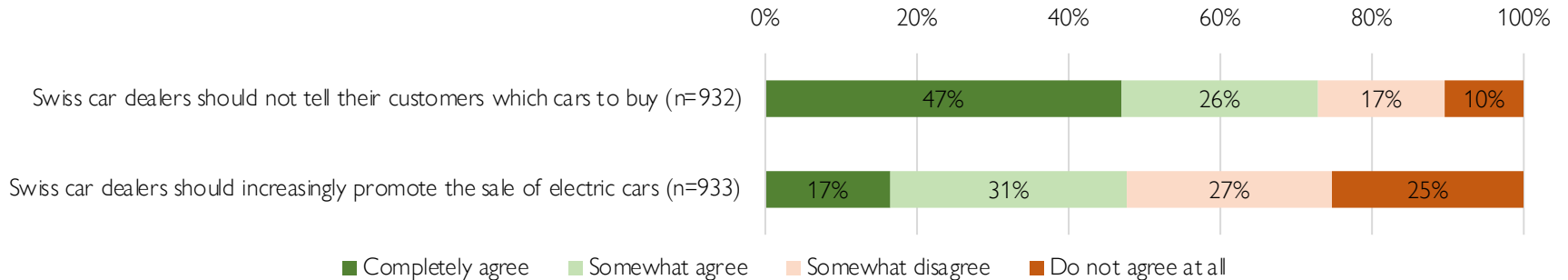


**Figure 13.**  
Perceived operating cost of electric vehicles, by adopter status (n=1,051).

# The role of car dealers in promoting electric vehicles

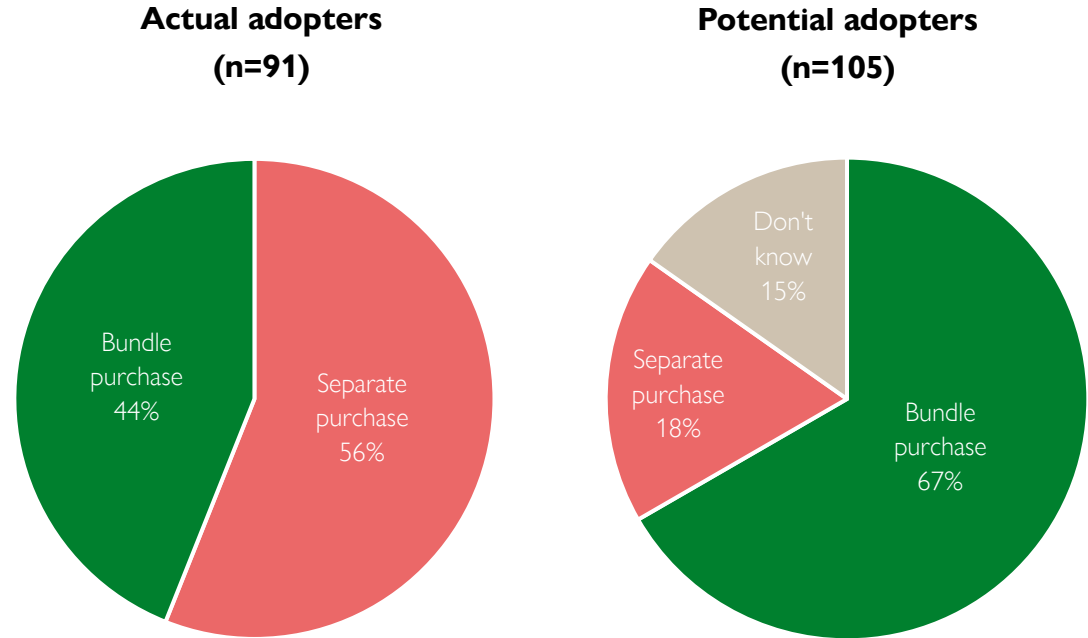
- While 48% of respondents “completely agree” or “somewhat agree” that Swiss car dealers should increasingly promote the sale of electric vehicles, the view that car dealers should not tell their customers which car to buy is popular among a majority (73%) of respondents.

**Figure 14.** Extent to which respondents support statements pertaining to electric vehicles (n=1,051).



# Untapped potential for bundling

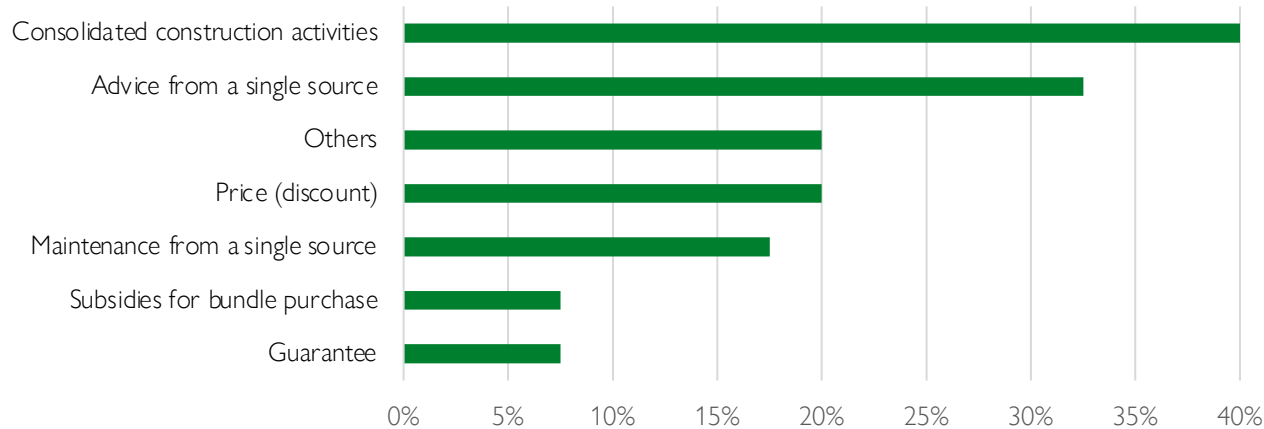
- Among potential adopters of more than one clean energy technology, **67%** could imagine purchasing them simultaneously (bundling). Among actual adopters, the share of bundled purchases is **44%**.
- **73%** of past adopters say they hesitated to purchase a second technology after making the first investment. Bundled solutions tailored to customer needs could open up untapped market potential.
- **33%** of actual adopters reported that they had connected their energy technologies to a smart home system.



**Figure 15.** Share of early electrifiers owning (left) or planning to purchase (right) multiple technologies per mode of acquisition.

# Factors driving bundling decisions

- Simplifying construction activities and one-stop-shopping are key drivers of bundling decisions.
- While **76%** of potential heat pump adopters (n=49) and **48%** of potential EV adopters (n=128) would be interested in a service contract for maintenance, **68%** of those planning to adopt multiple technologies would likely choose having such contract from a single source (n=105).



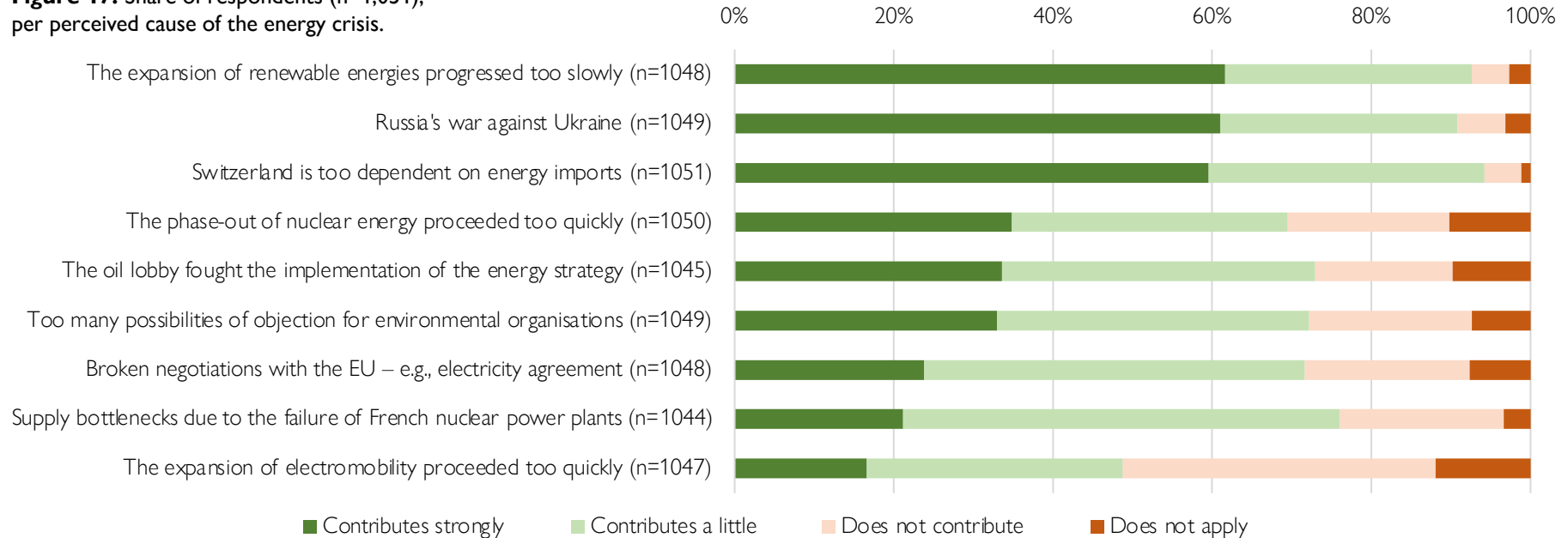
**Figure 16.**  
Share of early electrifiers having purchased multiple technologies at the same time (n=40), per factor driving their bundling decision.

# 3. Citizen perceptions of the energy and climate crises

# Perceived *causes* of the energy crisis

- More than **90%** of respondents see a too slow expansion of renewable energies, Russia's war against Ukraine, and Switzerland's dependence on energy imports as the **top three factors** contributing to the current energy crisis.

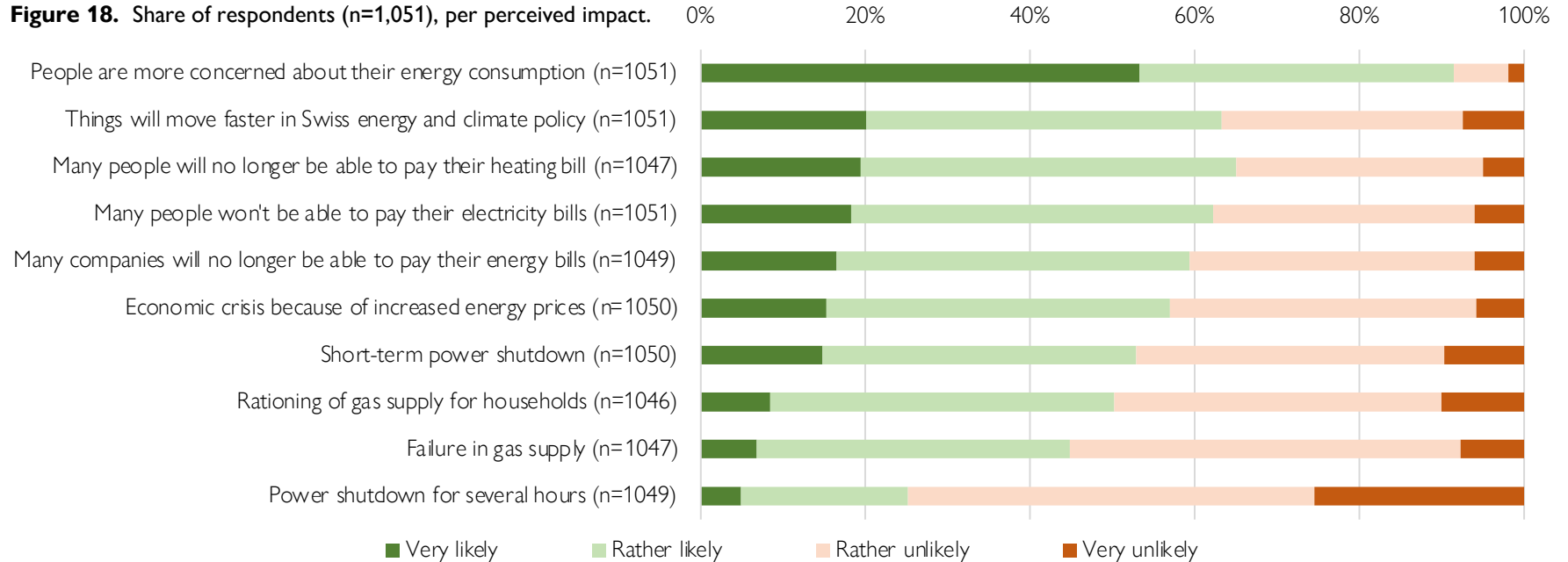
**Figure 17.** Share of respondents (n=1,051), per perceived cause of the energy crisis.



# Perceived socio-political *consequences* of the energy crisis

- 91% of respondents think it is (rather) likely that the crisis leads to more awareness about energy.
- Concerns about the **economic** impacts of the crisis are more widespread than concerns about **physical** shortages.

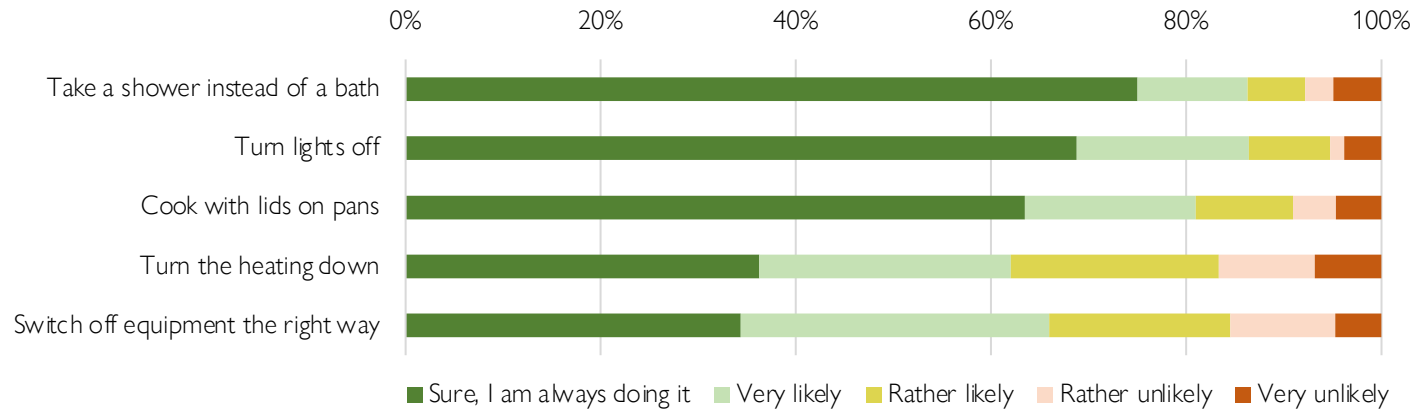
**Figure 18.** Share of respondents (n=1,051), per perceived impact.





# Energy crisis: Impacts on energy consumption behaviour

- The energy-saving campaign of the Swiss government promotes 5 top tips for private households (see Figure 19).
- Between **34%** and **75%** of respondents state that they already perform these five energy-saving activities, reflecting some nuances between them. Taking a shower instead of a bath is more popular than turning down the heating, but still, more people state that they are “very likely” (**26%**) to **turn down the heating** than those who say they are “very unlikely” to do so (**7%**).
- Overall, these results suggest an increased level of awareness among energy consumers in light of the crisis.

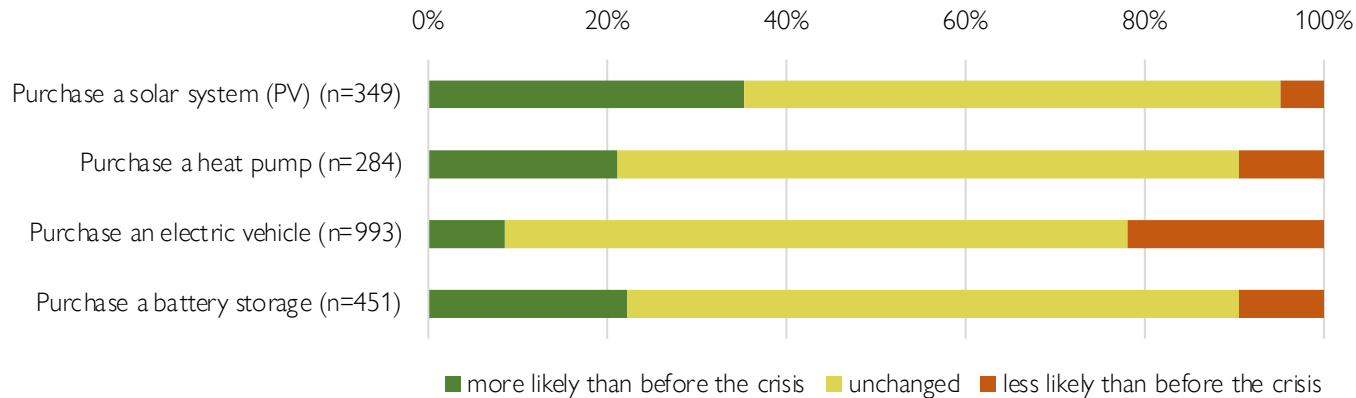


**Figure 19.**  
Share of respondents (n=1,051) likely to do these activities to save energy this winter.

Source: <https://www.dont-waste.ch/en/energy-saving-tips-for-private-households/>

# Energy crisis: Impacts on energy investment trends

- **35%** of homeowners are **more likely to purchase a solar PV system** today than before the energy crisis, while **5%** say they are less likely to do so, and the rest have not changed their intentions.
- **22%** of respondents are less likely to purchase an EV today than before the crisis, twice the amount of those more likely to do so (**9%**). **69%** have unchanged intentions.



**Figure 20.**

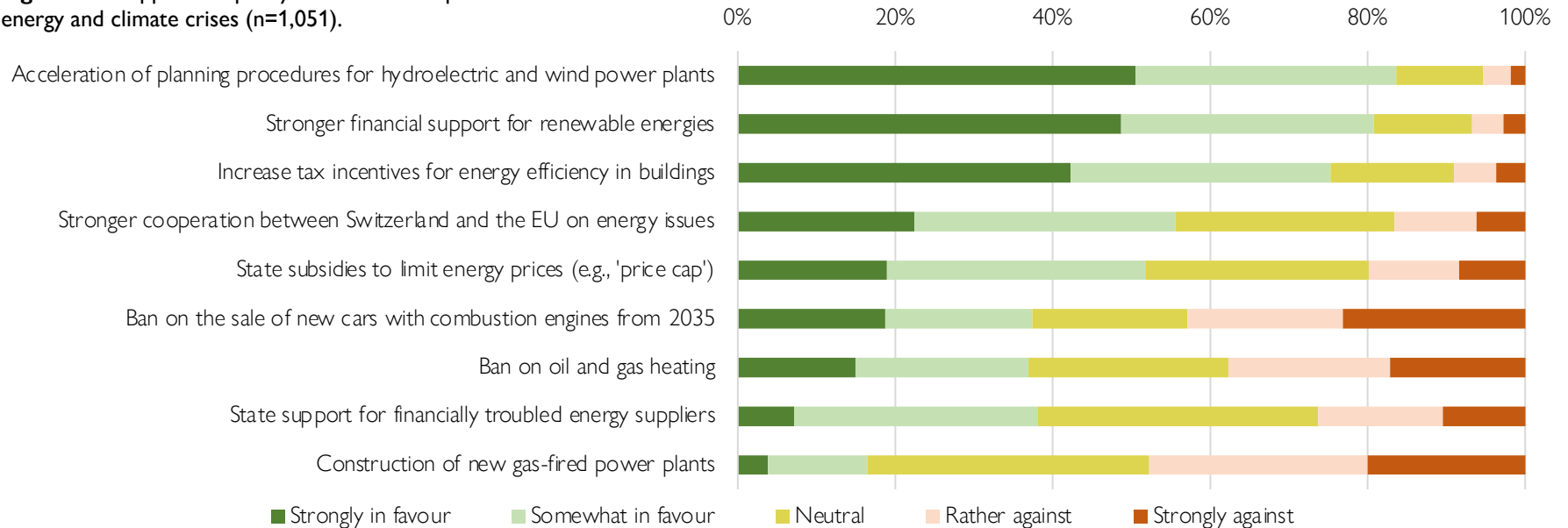
The influence of the current energy crisis on the probability of respondents to purchase a given technology.

**Note:** Purchase intentions for solar PV, heat pumps, and battery storage are based on homeowner responses, whereas EV purchase intentions are based on the full sample.

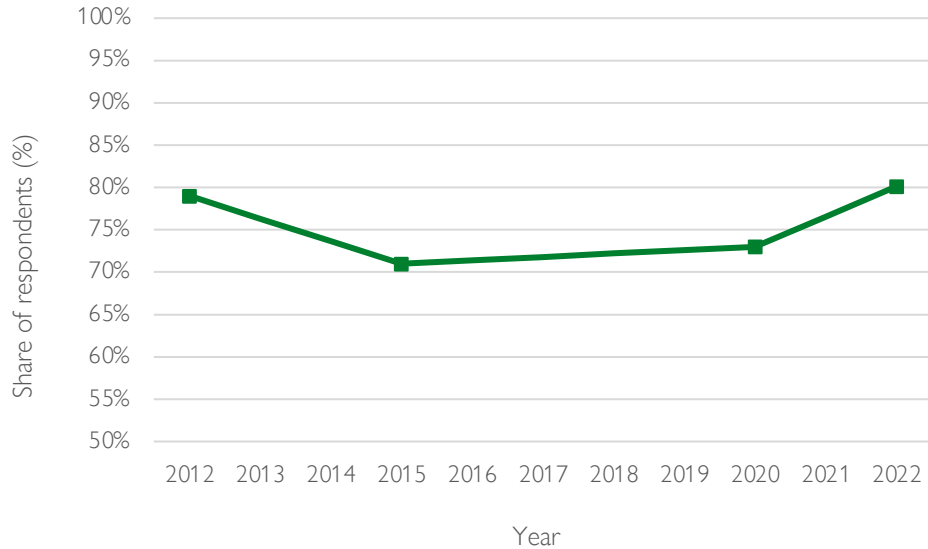
# Support of policy responses to the energy and climate crises

- More than **75%** of respondents support faster planning procedures for hydro and wind power plants, more financial support for renewables and for energy efficiency in buildings as the **top 3 policy responses** to the energy crisis.

**Figure 21.** Support for policy measures in response to the energy and climate crises (n=1,051).



# Social acceptance of wind energy

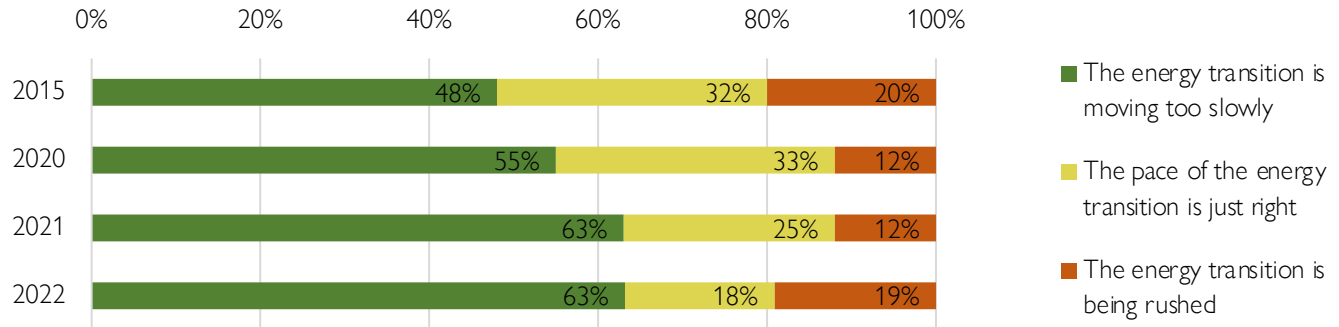


**Figure 22.** Share of respondents who fully or rather agree to approving a wind energy project close to their place of residence (n=1,051).

- In 2022, **80%** of respondents said that they would (rather) agree to a potential wind project close to their place of residence, a seven percentage point increase compared to 2020, and in fact the highest level observed since we first asked this question in the 2012 edition of the Consumer Barometer.
- Although stated acceptance levels have been high among a majority of the Swiss population, implementation issues remain; almost every wind power project in Switzerland has faced opposition, and often legal action.

# Attitudes towards the speed of the energy transition

- Similar to previous years, a majority of respondents (63%) think that the Swiss energy transition is moving too slowly.
- What is new compared to the pre-crisis situation is that the previously low share of respondents who think the energy transition is moving too fast has increased from 12% (2021) to 19% (2022). This appears to reflect the recent political debate, where a majority in parliament has taken steps to accelerate the transition away from imported non-renewable energies, while others would like to revert the country's Energy Strategy 2050, approved in a 2017 popular vote. 55% of those stating that the energy transition is being rushed are supporters of the Swiss people's party (SVP).

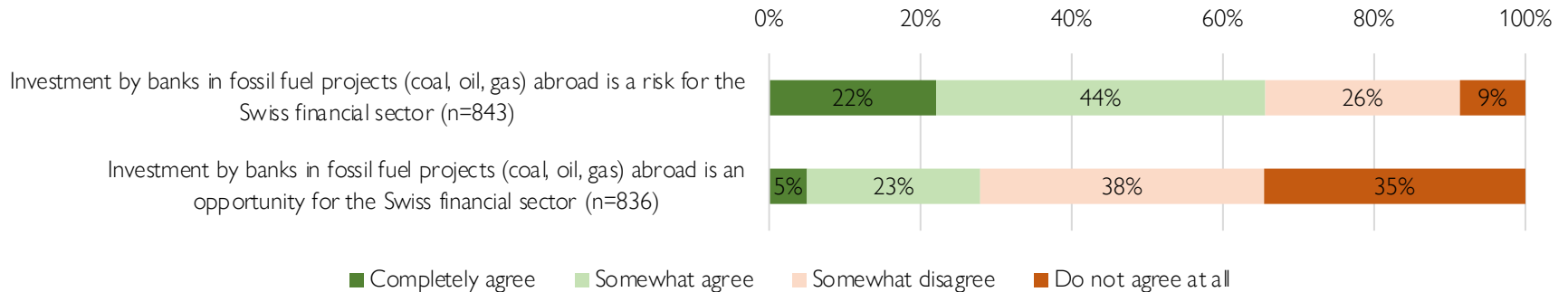


**Figure 23.**  
Respondents' assessment of the speed of the Swiss energy transition (n=1,051).

# Investing in fossil fuels: An opportunity or risk for the Swiss financial sector?

- Major Swiss banks finance a wide range of energy projects abroad, including fossil fuel projects (coal, oil, gas).
- While **28%** of respondents see this as an opportunity for the financial sector (down from 29% in 2021), a majority of **66%** see it as a risk (up from 62% in 2021).

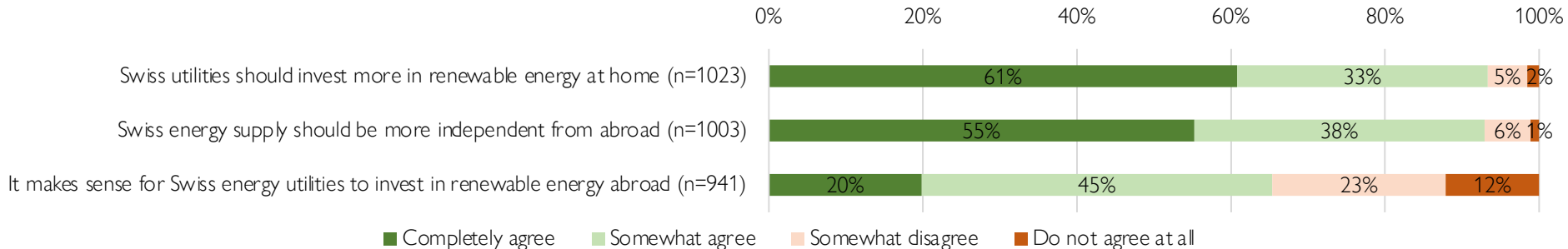
**Figure 24.** Extent to which respondents believe investing in fossil fuels abroad is a risk or opportunity for the Swiss financial sector (n=1,051).



# Investing in utility-scale renewable energy: Domestically or abroad?

- While 65% of respondents think that it makes sense for Swiss utilities to invest in renewable energy projects abroad, 94% of respondents (rather) agree that those firms should invest more domestically. Compared to 2021, the share of respondents who *completely agree* increased by 7 percentage points (from 54% to 61%).
- Although most respondents believe that the Swiss energy supply should be more independent from abroad, the majority significantly underestimate import dependence. Only 12% of respondents know that approximately 70% of the energy demand is covered through imports, an increase from the 4% observed in 2019.

**Figure 25.** Extent to which respondents support statements pertaining to renewable energy investment (n=1,051).



# 4. Conclusions



# Summary of key findings

- Russia's war in Ukraine has led to an increase in energy awareness among Swiss consumers.
- This translates into rising interest in a range of clean energy technologies among homeowners, most notably solar PV and heat pumps. Adopters of these technologies express a very high level of customer satisfaction and perceive them to be viewed positively by their peers.
- There is also a strong interest in electric vehicles, with a shift from plug-in hybrid to pure battery electric vehicles. In contrast to a net increase in purchase intentions for solar PV, the energy crisis has led some consumers to postpone their EV purchase. While most respondents express positive emotions towards clean energy technologies, a minority of 11% encounter electric vehicles with fear.
- For both heat pumps and EVs, their initial cost is perceived to be a barrier to purchase, while many consumers appreciate their lower operating cost compared to fossil fuel alternatives, suggesting a potential role for financial service providers.
- The survey results hint at market potential for bundling of PV, EV, and other clean energy technologies such as heat pumps and battery storage. One-stop-shop solutions could facilitate further decarbonization of buildings and transport.
- In light to the energy crisis, a stable share of 63% of respondents would like to see an acceleration of the energy transition. On the other hand, the share of respondents who are unsure about the right way forward has increased.
- When it comes to taking policy action to alleviate the energy crisis, the top three measures enjoying the highest levels of support are 1) accelerated planning procedures for hydro & wind, 2) more financial support for renewables and 3) tax incentives for improving energy efficiency in buildings.

## Contacts:

### Elizabeth Côté

Research Associate

Chair for Management of Renewable Energies

+41 71 224 2944

[elizabeth.cote@unisg.ch](mailto:elizabeth.cote@unisg.ch)

Languages: French, English

### Dr. Beatrice Petrovich

Research Associate

Chair for Management of Renewable Energies

+41 79 39 86 219

[beatrice.petrovich@unisg.ch](mailto:beatrice.petrovich@unisg.ch)

Languages: Italian, English

### Prof. Dr. Rolf Wüstenhagen

Director IWÖ-HSG

Chair for Management of Renewable Energies

+41 76 306 43 13

[rolf.wuestenhagen@unisg.ch](mailto:rolf.wuestenhagen@unisg.ch)

Languages: German, English

# Appendix

# Appendix: Sociodemographic variables

| Variable name                     | Description                        | % in Swiss population | % in representative sample (n=1,051) | % in early electrifier booster (n=275) |
|-----------------------------------|------------------------------------|-----------------------|--------------------------------------|----------------------------------------|
| <b>Language region</b>            | German-speaking Switzerland        | 74.4%                 | 74.0%                                | 77.8%                                  |
|                                   | French-speaking Switzerland        | 25.6%                 | 26.0%                                | 22.2%                                  |
|                                   | Italian and Rhaeto-Romanic regions | N/A                   | N/A                                  | N/A                                    |
| <b>Gender</b>                     | Men                                | 49%                   | 49.5%                                | 65.5%                                  |
|                                   | Women                              | 51%                   | 50.5%                                | 34.5%                                  |
| <b>Age</b>                        | 18-29 years                        | 19%                   | 19.0%                                | 6.5%                                   |
|                                   | 30-44 years                        | 29%                   | 28.0%                                | 24.0%                                  |
|                                   | 45-59 years                        | 30%                   | 30.4%                                | 34.9%                                  |
|                                   | 60-75 years                        | 22%                   | 22.6%                                | 34.5%                                  |
| <b>Level of education</b>         | Without high school degree         | 62%                   | 60.6%                                | 25.5%                                  |
|                                   | With high school degree            | 38%                   | 39.4%                                | 74.5%                                  |
| <b>Political party preference</b> | Right wing parties (SVP, FDP)      | 41%                   | 40.2%                                | 31.6%                                  |
|                                   | Centre parties (GLP, Die Mitte)    | 21%                   | 22.4%                                | 32.7%                                  |
|                                   | Left wing parties (GPS, SP)        | 30%                   | 28.6%                                | 25.1%                                  |
|                                   | Other / no party preference        | 8%                    | 8.8%                                 | 10.5%                                  |