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10th Consumer Barometer of Renewable Energy

in cooperation with Raiffeisen Switzerland and SwissEnergy

Technical Report
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Executive Summary

Energy transition: time to speed up
55% of Swiss consumers think that the energy transition is progressing too slowly. A "Rösti ditch" is also identified: while only 3% of the respondents living in French-speaking Switzerland think the energy transition is going too fast, this share increases to 16% in the German-speaking regions. The longitudinal nature of the Consumer Barometer allows to identify trends over time. Levels of confidence in the feasibility of a carbon phase-out have seen a strong increase in recent years: while, in 2015, 47% of respondents were confident that we would be able to do without fossil fuels, this share has increased to 67% this year.

Strong support for the Glacier initiative
If the vote on the Glacier initiative[1] would take place today, 67% of the respondents (n=1'021) would support or rather support the initiative. The strongest support comes from young respondents (78% of those below 30 years of age), while the initiative has slightly lower support among those 30 to 44 years of age (56%).
Another conceivable popular initiative that was tested in the survey related to financing the energy transition. It suggested that deployment of solar energy would be accelerated through a one-time investment by the Swiss National Bank, which had reported an annual profit of CHF 49 billion in 2019. The results show similarly high levels of support for this hypothetical initiative as for the Glacier Initiative. Overall, 71% would (rather) support it.

E-mobility: considerable interest, but knowledge gaps persist
The transition towards electric mobility is gaining momentum. Among respondents interested in buying a car in the next five years, 51% would choose a battery electric vehicle as their first or second preference. Significant gender differences can be observed, with women appearing to take longer than men to become attracted by electric cars.
While the interest for electric mobility is relatively high, knowledge gaps persist: in contrast to the results of various life-cycle assessments[2], only 60% of the respondents think that electric cars significantly help to reduce CO_2 emissions.

Oil heating: time to say goodbye?
Switzerland is the European country with the highest share of oil heating systems[3]. A slight majority of respondents think this should change: 54% would be (rather) in favour of a ban on oil heating installations. Further, if explicitly asked, only 2% of house owners say that an oil heating would be their first choice if they had to replace their existing heating system. It is important to keep in mind, though, that factors like the need to quickly replace a broken boiler or the moderating influence of installers may still lead to a status quo bias in actual decision contexts.

From interest to action: can a "climate bonus" on mortgages help?
Financial constraints are often mentioned by homeowners as a hurdle to investment in renewable energy technologies. To facilitate "walking the talk", we find that a "climate bonus" on mortgages might help. Indeed, increasing the amount of a mortgage specifically for implementation of climate-friendly measures would incentivize 28% of those planning to renovate their homes to follow through on their intention and invest in a PV system.

[1] https://gletscher-initiative.ch
[2] See for example http://www.carboncounter.com , https://nzzas.nzz.ch/wirtschaft/elektroauto-am-besten-fuer-die-umwelt-ld.1537932
[3] https://www.swissinfo.ch/ger/gebaeude-und-klima_heizen-mit-oel--schweiz-mit-hoechsten-anteil-in-europa/45170456

Climate change: strong feelings and remaining knowledge gaps
The Swiss population feels strongly about climate change. 53% feel sad about it, while 37% are afraid. These emotions may be partly explained by the fact that 69% of respondents agree that it is highly likely that their region will be affected by climate change, and 51% say that their region is *already* affected by it. However, knowledge gaps about the causes of climate change persist in parts of the population. For example, while 97% of climate scientists agree that human-caused climate change is happening (AAAS, 2014)[4], respondents underestimate this broad consensus, thinking on average that only 69% of scientists agree.

#Fridays for Future: Public support for climate youth, but also scepticism
For the past one and a half years, the Fridays for Future movement has occupied a central place in the climate debate. The results show that 80% of Swiss consumers consider it positive when young people show interest in environmental issues and climate protection. However, there is also a degree of scepticism about the effectiveness of the strikes: 62% of those surveyed (rather) think that the demonstrations have not helped the environment much.

Climate solutions: Technological innovation or behaviour change?
In terms of mitigating climate change, respondents place high hopes in technological innovation and have mixed feelings about changes in consumer behaviour. Only 20% think that it is very likely or rather likely that many people will voluntarily reduce their energy consumption to slow down climate change. On the other hand, 67% of the respondents, rate "changes in consumer behaviour" in second place as one of the most important drivers for solving the climate problem. Technological innovation comes in the first place (78%).

Aviation: Emerging headwinds for high-carbon travel
Air travel represents a significant part of the Swiss carbon footprint (12-18%[5]). However, our survey results reveal that a majority of respondents underestimate this share. 67% of respondents think that flying is too cheap, a strong increase of 10 percentage points compared to 2018, possibly reflecting the political debate about a carbon tax on air travel.

The detailed study results, infographics, and further information are available at:

https://kuba.iwoe.unisg.ch

About the Consumer Barometer of Renewable Energy
Since 2011, the Consumer Barometer of Renewable Energy has established itself as one of the most comprehensive annual surveys of energy preferences in Switzerland. The representative survey is published by the Chair for Management of Renewable Energies at the University of St. Gallen in cooperation with Raiffeisen Schweiz and SwissEnergy. The sample (N=10'21) is representative of the Swiss population with regard to gender, region, education and party preferences.

[4] American Association for the Advancement of Science (2014)
[5] The range of estimates can be explained by different calculation methods, for example with regard to the climate impact of greenhouse gas emissions in high altitude or the consideration of other pollutants: https://www.wwf.ch/fr/nos-objectifs/trafic-aerien ; https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaeft?AffairId=20194281

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Data and Methods

The study is based on a representative sample of 1'021 Swiss respondents aged 15 to 74, residing in the German- and French-speaking parts of Switzerland. The data was collected in January 2020 and the sample was drawn from the B2C online panel of intervista AG[6]. The sample is representative for gender and education, with 36% of respondents having obtained a higher education degree. Geographically, the sample corresponds to the distribution of the overall population among the German and French-speaking regions of Switzerland. 25% of respondents reside in Western Switzerland, 25% in Alpine/Pre-Alpine regions, 21% in the Western Midlands and 29% in the Eastern Midlands. The Consumer Barometer sample is also representative in terms of political preferences. 50% of respondents stated their views were best represented by right wing parties (SVP, FDP, BDP), 18% by the middle parties (GLP, CVP) and 25% by the left-wing parties (GPS, PS). The remaining 6% stated that another political party best represented their views and opinions. The sample included 62% of home or condo owners and 38% of renters or cooperative partners.

[6] https://www.intervista.ch/panel/

Climate and Energy Policy

The 2020 consumer barometer included a set of questions about people's preferences regarding energy and climate policy. We tested support for a recently submitted popular initiative, as well as for two hypothetical climate-related popular initiatives.

The Glacier initiative aims to enshrine the objectives of the Paris Climate Accord in the constitution. It calls for Switzerland to reach net zero emissions by 2050, in return, no more fossil fuels are expected to be used on the market after 2050, unless there is no other technical solution. Instruments for the promotion of innovation and technologies are also planned[7]. After collecting more than 113'000 signatures, the initiative was formally validated in December 2019 by the Federal Chancellery. It will be put on the ballot in the next few years, after parliamentary debate. We asked respondents whether they intend to participate in the vote, and if yes, what their voting intentions are.

Among those who intend to vote[8], a majority of 67% support the initiative: 41% say they would vote in favour, and another 26% would rather vote in favour. The highest acceptance level is among young respondents: among those who are less than 30 years old, 78% (rather) support the initiative, followed by those 60 or above (67%). In terms of political orientation, we find that Green party supporters are the ones most in favour (98%) followed by the Green Liberal party (91%) and the Socialist party (88%). A majority of supporters of all parties, except the Swiss People's Party (SVP), express an intention to (rather) vote in favour of the Glacier initiative.

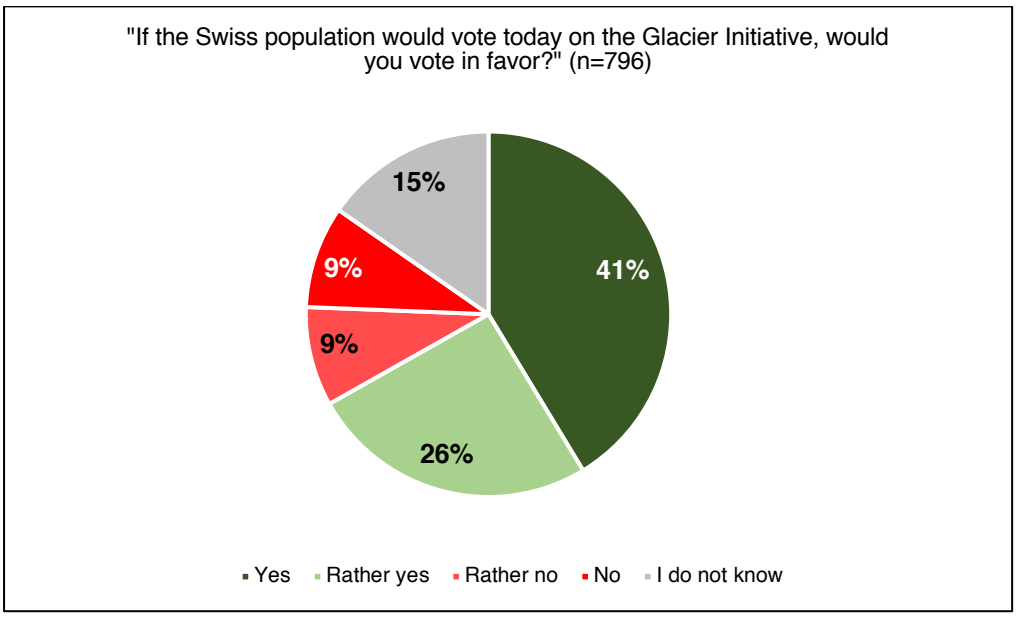

Figure 1: Voting intentions on the Glacier initiative

A second question tested a possible popular initiative related to financing the energy transition. It suggested that investment in Swiss renewable energy infrastructure would be funded through a one-time transfer of funds from the Swiss National Bank, which had reported an annual profit of CHF 49 billion in 2019. We asked the following question: "Imagine that a

[7] Question presented to the respondents (translated from original German version): "The Swiss electorate will have to vote on the Glacier Initiative in 2022. This initiative aims to enshrine the objectives of the Paris Climate Accord in the Constitution. The initiative plans for net zero emissions by 2050, in return, no more fossil fuels are expected to be used on the market after 2050, unless there is no other technical solution. Instruments for the promotion of innovation and technologies are also planned."
[8] 78% of the respondents indicate that they intend to vote on the Glacier initiative

popular initiative would propose to use the profit of the Swiss National Bank (CHF 50 billion) to invest in solar energy on a one-off basis. This could cover around 20% of Switzerland's electricity needs. Would you accept this initiative?" The results show similarly high levels of support for this hypothetical initiative as for the Glacier Initiative. Overall 71% support the idea, with 38% in favour, and an additional 33% rather in favour. Only 7% indicated to be undecided or not knowing, 11% each are against or rather against. We found gender differences: while 78% of women are (rather) in favour, this share falls to 64% for men. We further find a majority in favour among all political parties: the lowest share among SVP voters (55%, n=296) and the highest share amongst supporters of the Green party (95%, n=75).

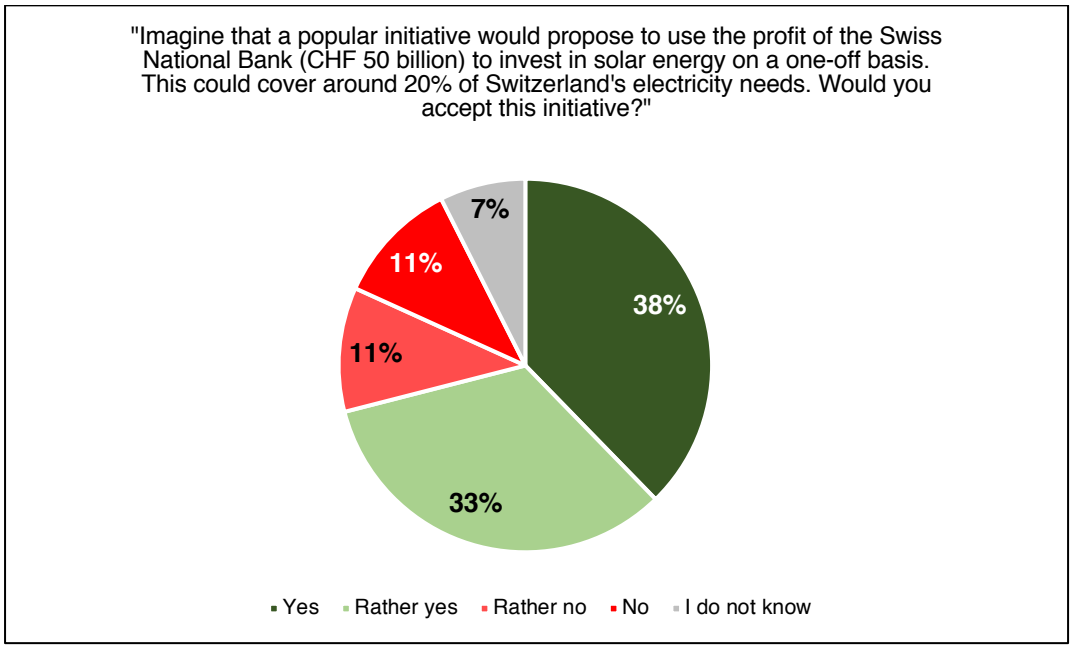

Figure 2: Voting intentions on possible "Solar National Bank" initiative

A third question surveyed the population on another hypothetical initiative looking into rewarding employees that avoid air travel for their vacation. A member of parliament had indeed suggested to offer more days off for those who would give up flying[9]. While a tax on air tickets would make rail travel financially more attractive, a holiday bonus could convince those who would not be prepared to spend some of their vacation days on board of a train. Specifically, we asked: "Imagine that a popular initiative would propose that all employees who do not take private air travel during a year would be rewarded with two additional days of holiday. Would you accept this initiative?" In contrast to the two preceding ones, this hypothetical popular initiative would only enjoy support by a narrow majority of voters (54%), of which 33% are in favour and another 21% rather in favour. Based on experience with previous referendums in Switzerland[10], such a narrow majority at the beginning of an election campaign is unlikely to be sufficient for actually winning the vote. In terms of demographics, we find that while 57% of women are (rather) in favour, this share falls to 49% among men. Further, while 87% of Green party voters (n = 75) are (rather) in favour, this share falls to 61% for the Green liberal party voters (n = 57). Among those who are (rather) in favour of the initiative (n = 543), 54% indicated that they consciously choose holiday destinations that avoid air travel, even if this means that they have to accept considerably longer travel times.

[9] https://www.tdg.ch/suisse/davantage-vacances-employes-voyage-train/story/29794818
[10] Rinscheid & Wüstenhagen, (2018), Divesting, Fast and Slow: Affective and Cognitive Drivers of Fading Voter Support for a Nuclear Phase-Out, Ecological Economics 152, 51-61.

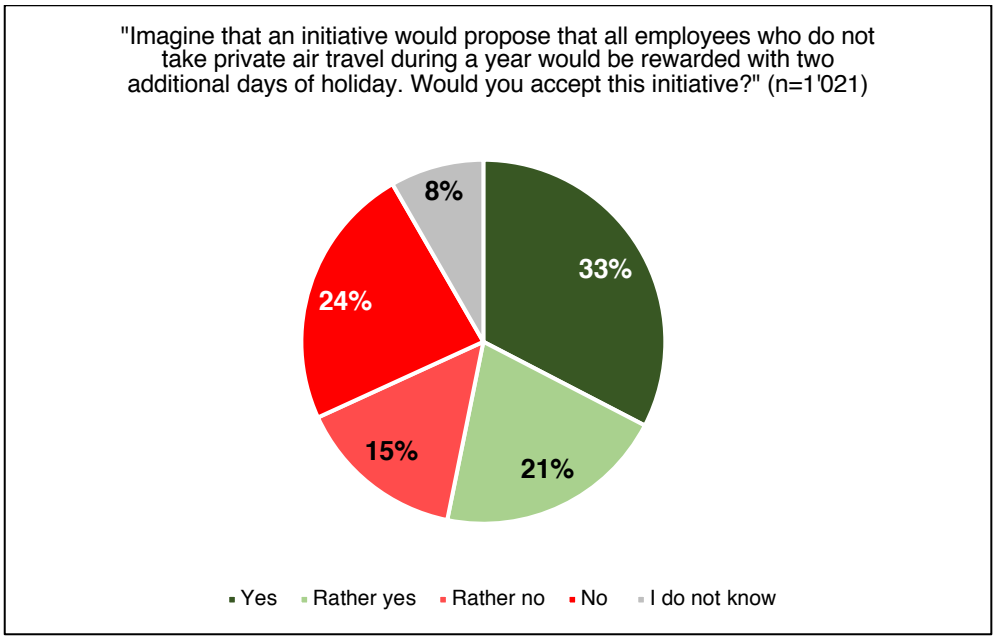

Figure 3: Voting intentions on possible "Climate Holiday Bonus" initiative

A majority thinks the Swiss Energy Transition is progressing too slowly

Switzerland must reduce its greenhouse gas (GHG) emissions, as well as its energy consumption, to reach the objectives included in its Energy Strategy 2050. This requires new technologies and practices. 55% of the respondents think the energy transition is progressing too slowly in Switzerland, which is 7 percentage points more than in 2015. On the other hand, only 12% think the energy transition is going too fast. We further find a "Rösti ditch": while only 3% of those living in (French-speaking) Western Switzerland (n=260) think that the energy transition is progressing too fast, this share increases to 16% in the other (mostly German-speaking) regions (n=761).

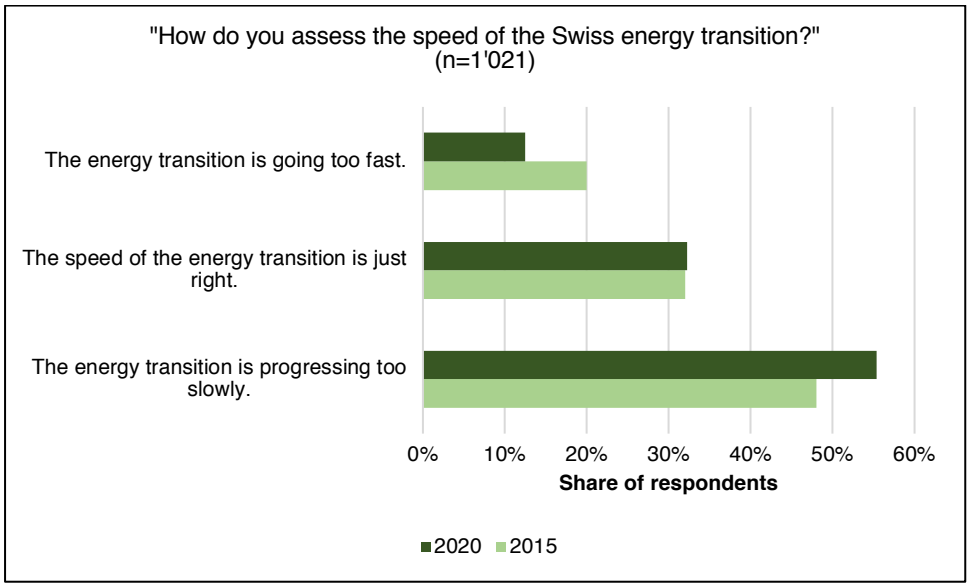

Figure 4: Opinions on the speed of the energy transition

Opinions also vary between political affiliations, largely following a traditional left-right cleavage. However, even among the most conservative party, more people (31%) think that the energy transition is progressing too slowly, compared to those who think it is going too fast (26%). In contrast, none of the Green Party supporters and only 2% of Green Liberal Party supporters (n=57) share this latter view.

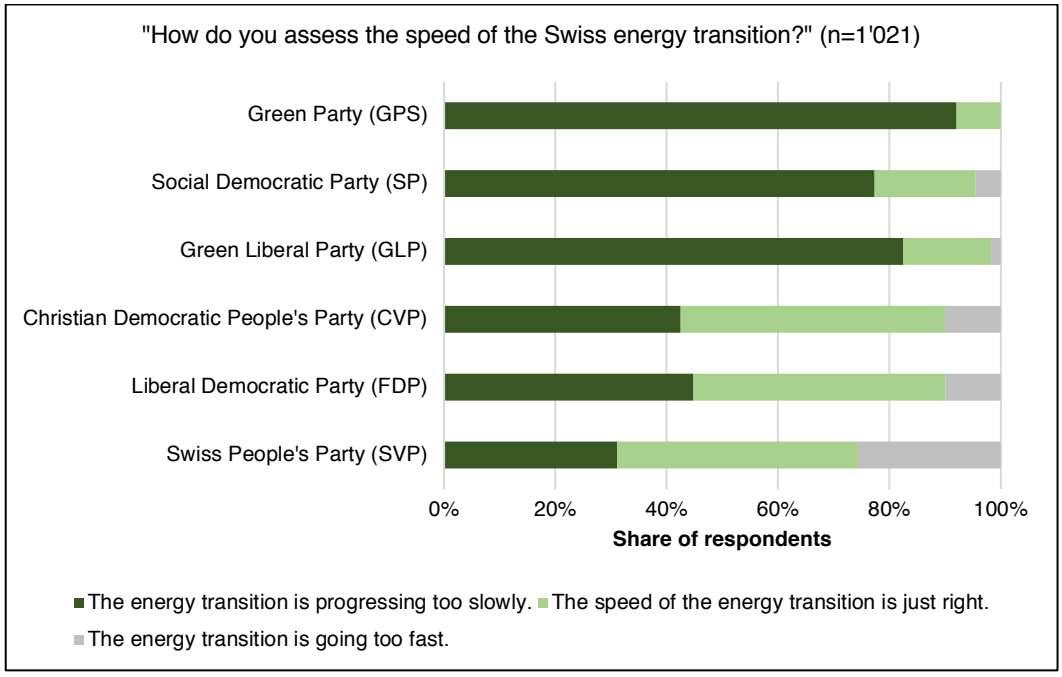

Figure 5: Opinions on the speed of the energy transition by party preferences

This year, again, the results highlight that on a general level, social acceptance of wind energy in Switzerland is high among the population. Indeed, on average, respondents would like wind energy to make up 15% of the Swiss electricity mix. This is far away from the current share of 0.2%. Further, solar energy stays the clear winner in terms of preferences.

"Please enter your preferred electricity mix below, as you would like it to be based on the energy technologies. For each energy source, please indicate the percentage of electricity that you would like to be produced in Switzerland[12]"

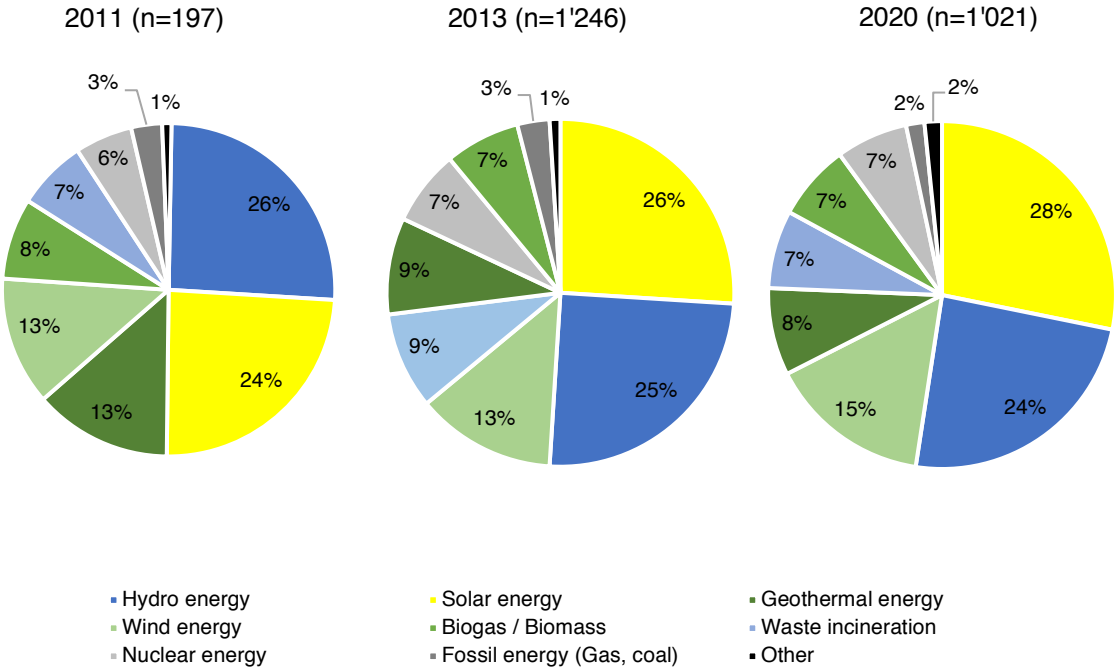

Figure 6: Electricity mix preferences over the years

The results further highlight that preferences regarding the energy mix vary significantly by gender, except in the case of geothermal energy and fossil fuel sources. Women's preferred energy mix contains higher shares of solar and wind, and lower shares of hydro and nuclear, than men. There is a similarity between which energy technologies are preferred by men and women on one hand, and to what extent specific technologies are perceived to be masculine or feminine on the other hand. As Figure 8 shows, wind and solar are perceived by the average respondent as rather feminine technologies, whereas nuclear energy is almost exclusively perceived to be a masculine technology[11].

[11] The remaining share did not have an opinion.

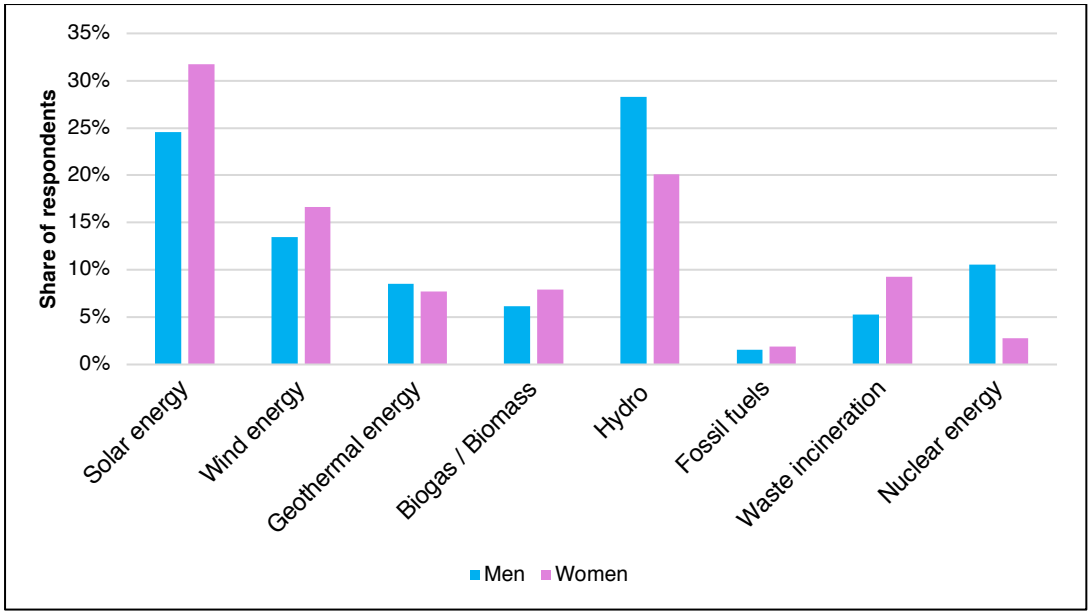

Figure 7: Electricity mix preferences - men versus women

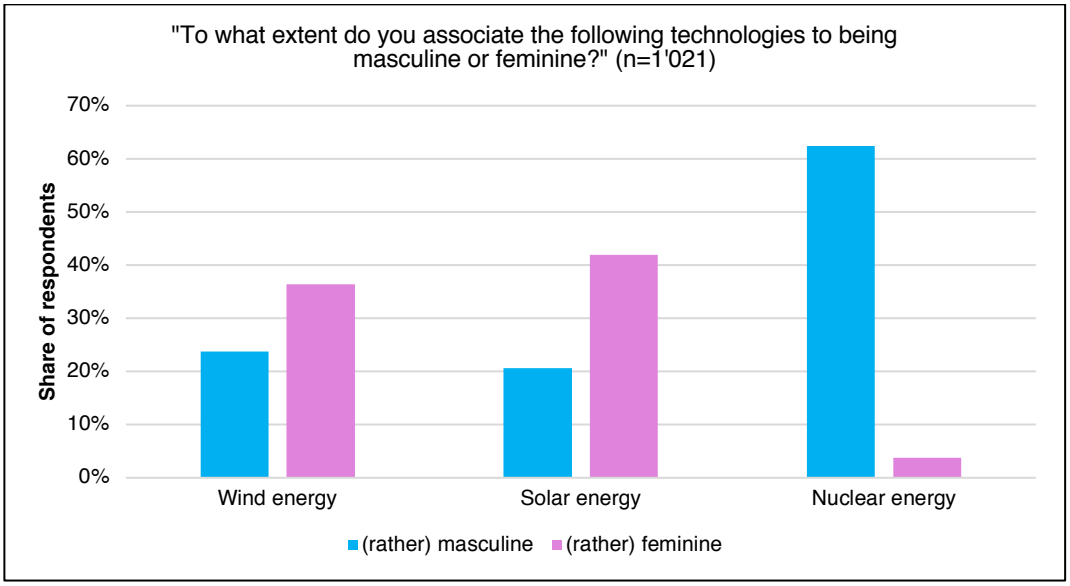

Figure 8: Gender associations of energy technologies

The Energy Transition Barometer – Longitudinal trends

In the first edition of the consumer barometer of renewable energy, in 2011, we created an "energy transition barometer". It allows visualizing changes in consumers' attitudes shortly before the Fukushima accident in February 2011 and the following years[12]. The barometer consists of questions which do not only look into the perceived feasibility of the energy transition but also respondents' acceptance of wind energy.

[12] Methodological footnote: the sample for 2011 is smaller than in the subsequent years and consists of respondents from the region of St. Gallen only. This is important to note because there was a public vote in St. Gallen in November 2010 on phasing out nuclear energy and investing in a geothermal project. This issue was intensely debated in the city of St. Gallen shortly before the February 2011 survey was conducted, possibly leading to higher levels of awareness, knowledge, and confidence about the energy transition than in other parts of the country. Further, between 2011 and 2020, not all questions were repeatedly asked, which explains the gap between 2015 and 2020.

The question about the feasibility of a medium-term nuclear phase-out shows the typical pattern observed after previous nuclear disasters (see Renn 1990[13] for an analysis of post-Chernobyl attitude changes). After an initial spike in consumer confidence that the nuclear phase-out is possible (from 63 to 74% between 2011 and 2012), the corresponding values have slowly been declining since then, reaching 65% this year.

While confidence in a nuclear phase-out has been slowly declining while staying at a comfortable majority among the population, overall levels of confidence in a carbon phase-out appear to be relatively higher now than in 2015. 53% of respondents in the 2015 survey thought we would never be able to do without fossil fuels, while this share decreased to 33% this year.

Every energy project, especially large wind turbine installations, is crucially dependent on issues of social acceptance. In 2020, 73% of respondents were welcoming to a wind project slightly outside of their community, compared to 71% in 2015 and 79% in 2012. However, even though a high acceptance level has been observed among the population for a decade, implementation issues remain; almost every wind turbine project in Switzerland has faced opposition, and often legal action. Even though a majority is in favour of local wind power generation on a country level, a minority of individuals have the opportunity to block projects.

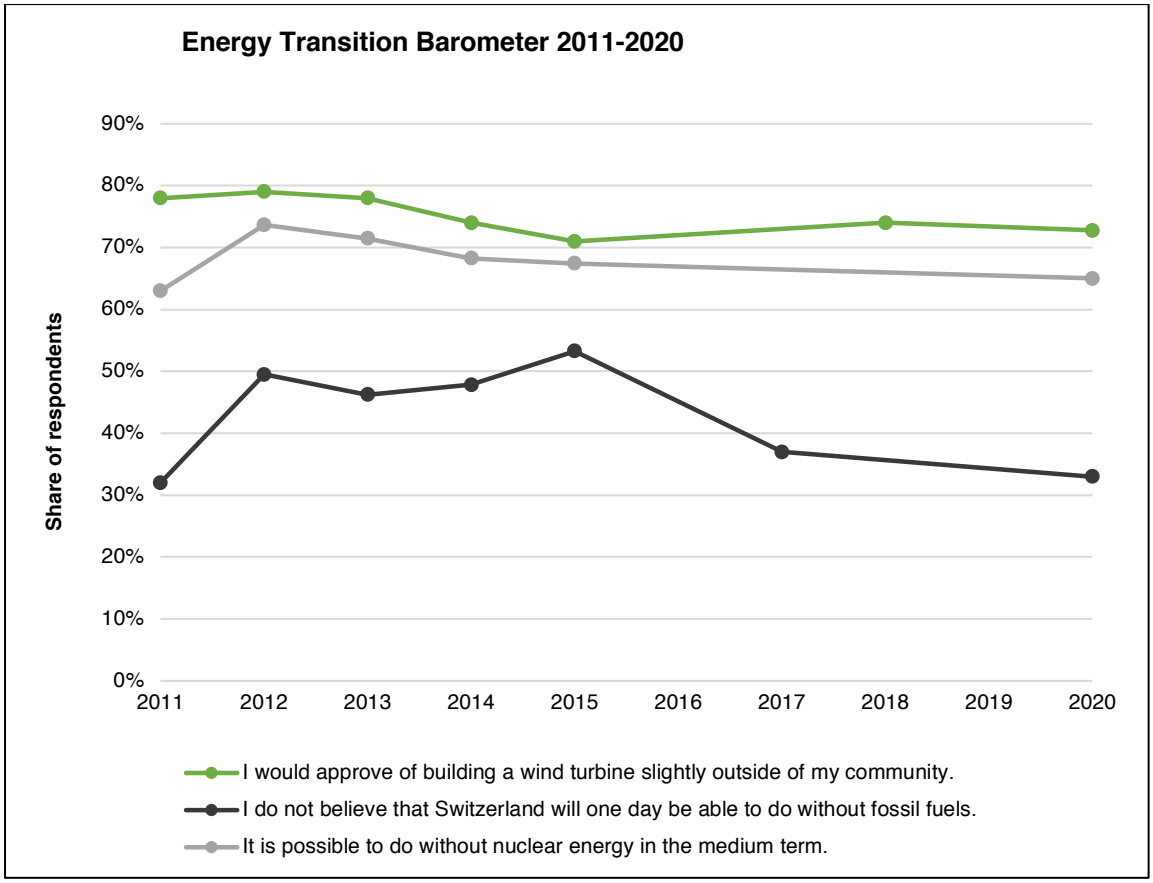

Figure 9: The energy transition barometer, 2011-2020

[13] Renn, O. (1990). Public responses to the Chernobyl accident. Journal of Environmental Psychology, 10(2), 151–167.

Mobility

Mobility (excluding aviation) represents 39% of the Swiss carbon footprint.[14] Passenger cars alone account for almost a quarter of Switzerland's carbon emissions and 77% of those of all road traffic (OFEV)[15].
To reduce this share, CO_2 emission standards, which have been mandatory for all new passenger cars since 2012, oblige Swiss importers to limit CO_2 emissions of their vehicles. Swiss regulations have been gradually aligned with those of the European Union. Between 2015 and 2019, Swiss importers had to limit the average emissions of imported vehicles to 130 g CO_2/km, or else pay a fine. Until 2017, the amount of fines remained relatively low, amounting to between CHF 1 and 10 million per year. In 2018, however, the amount increased to CHF 31.7 million, with almost half of the importers failing to meet their targets. As of 2020, the emissions limit has been lowered to 95 g CO_2/km, which is likely to lead to a further increase in penalties, giving car importers a financial incentive to accelerate the shift towards electric vehicles.

We asked respondents what they thought all car importers together had to pay in penalties in 2018. We find that the Swiss population greatly underestimates the amount. While 7% knew or guessed the correct amount (more than CHF 30 million), the rest underestimated the penalty payments.

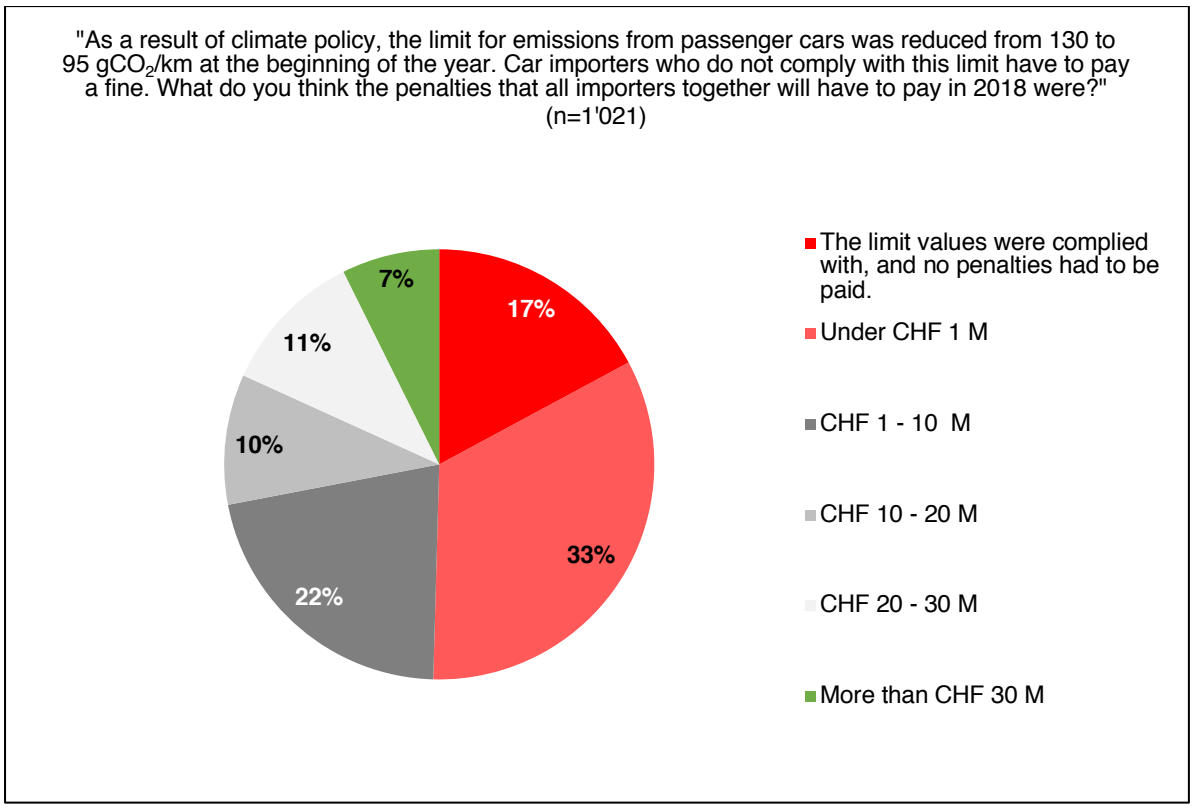

Figure 10: Population estimation of car importers' CO_2 fines

Apart from curbing traffic growth, shifting to electric mobility offers an opportunity to lower emissions. Indeed, electric vehicles not only reduce air pollution in cities but also carbon

[14] https://www.bfs.admin.ch/bfs/de/home/statistiken/mobilitaet-verkehr/unfaelle-umweltauswirkungen/umweltauswirkungen.html#-2100663993
[15] https://www.heidi.news/articles/les-principales-sources-de-carbone-en-suisse

dioxide emissions[16]. In 2019, 13'000 electric vehicles were registered in Switzerland, which represents a rise of 144% compared to 2018. The share of electric vehicles still represents only 4.2% of new cars sold in Switzerland.

However, in this year's consumer barometer, we observe a high interest in electric cars, potentially predicting a significant increase in this share. Among respondents interested in buying a car in the next five years (n=367), 51% are interested in a purely electric car as their first or second preference, and 57% in a hybrid electric vehicle. A significant decrease in interest can be observed regarding gasoline cars: while 72% were interested in a gasoline car as a first or second preference in 2018, this share decreases to 48% this year.

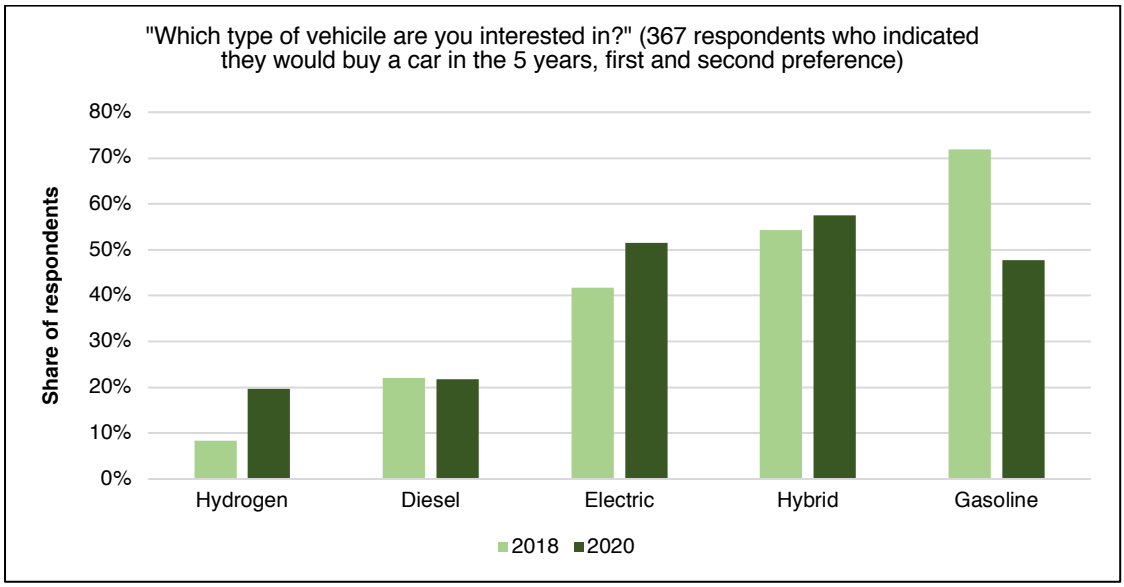

Figure 11: Engine type preferences among potential car buyers

Significant gender differences can be observed, with women appearing to take longer than men to become attracted by electric cars. While 40% of men looking to buy a car in the next five years (n=222) would opt for a gasoline car as a first or second preference, this share rises to 59% for women looking to buy a car (n=145). On the other hand, 56% of men would select an electric car as a first or second preference, compared to 45% among women.

[16] The advantage of electric cars in terms of carbon dioxide emissions depends on the electricity mix used to charge it. In Switzerland, with its low-carbon electricity mix, electric cars have clearly lower emissions than equivalent gasoline or diesel cars; https://www.heidi.news/articles/pourquoi-les-voitures-electriques-sont-plus-ecologiques-que-les-voitures-classiques-en-europe or https://www.psi.ch/sites/default/files/2020-02/5232_1-2020_D.pdf

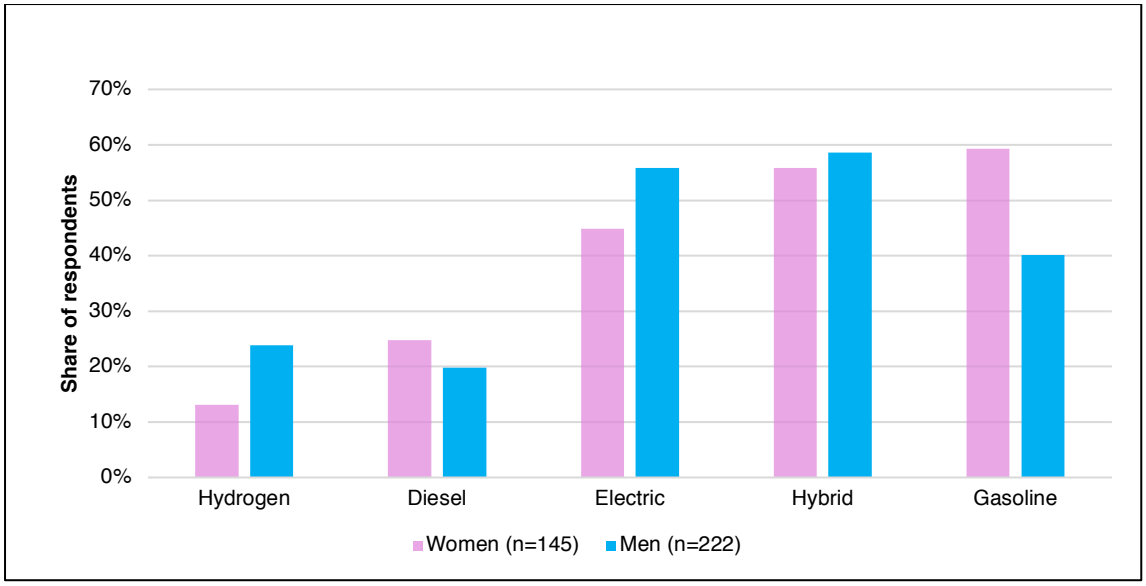

Figure 12: Engine type preferences; men versus women

In previous editions of the consumer barometer of renewable energy, we have identified the protection of the environment as the main reason to purchase an electric car. We thus asked, this year, if respondents thought that electric cars significantly help to reduce CO_2 emissions. The results highlight that a majority thinks so (60%), with difference between gender: 63% of the men and 56% of the women. This implies that almost half of the population is unaware of the latest scientific evidence[17], which shows that electric vehicles are indeed a significant lever to reduce carbon intensity of transport, especially in combination with renewable energy.

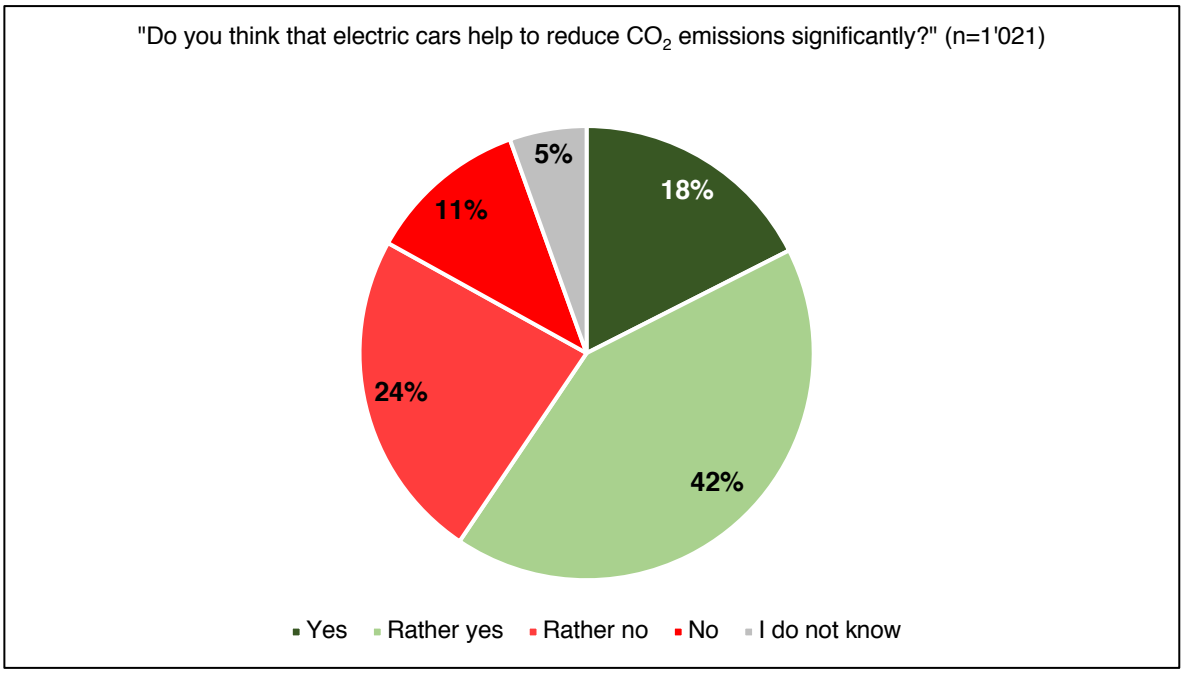

Figure 13: Knowledge about CO_2 reduction potential of electric cars

Another possible driving factor for a switch to electric mobility may be knowledge about the current emission levels of one's current vehicle. We asked current car owners (n=708): "Do

[17] See for example http://www.carboncounter.com , https://nzzas.nzz.ch/wirtschaft/elektroauto-am-besten-fuer-die-umwelt-ld.1537932

you know the CO_2 emissions in grams per kilometre of your current car?" We find that only 18% reported knowing the amount. The average amount reported is 132 g/km, which may be a fairly accurate estimate. Indeed, this figure almost perfectly reflects the actual average emissions of new cars sold a few years ago[18], but is 39% higher than the 2020 emissions limit of 95 g/km for new cars. Significantly fewer women (5%) reported knowing the amount than men (27%). These results suggest that realizing the full potential of switching to electric mobility may require continued efforts to raise awareness about the actual CO_2 emissions of fossil-fuelled cars.

When considering the purchase of a vehicle, another factor taken into account is the depreciation of the car. What will be the resale price of the car? When asked: "Imagine two cars that cost 30'000 CHF today. One is electric, and the other one is a gasoline car; otherwise, they are identical. At what price do you think you can sell these two cars in two years?", we find that respondents estimate, on average[19], the resale price of an electric car (CHF 20'075) to be higher than the resale price of a gasoline car (CHF 17'517).

Further, we found in previous editions that the main barrier to adoption of e-mobility was a perceived lack of public charging stations. We find this year that 68% of the respondents would not know where to charge an electric car around their workplace or place of residence. This share decreases to 66% among those looking to buy a car (n=367) and increases to 70% for those who are not (n=654).

Moreover, when asked "what proportion of newly registered cars in Switzerland do you think will be electric in 2022?", the respondents, on average think that the share of electric cars in 2022 will be 21% which is 6 percentage points higher than the Swiss government target.[20] These results overall show that the Swiss population is quite confident about the transition to electric mobility.

[18] https://www.bfe.admin.ch/bfe/de/home/news-und-medien/medienmitteilungen/mm-test.msg-id-71335.html
[19] Median : electric (CHF 20'307); gasoline (CHF 17'739)
[20] https://www.admin.ch/gov/de/start/dokumentation/medienmitteilungen.msg-id-73457.html

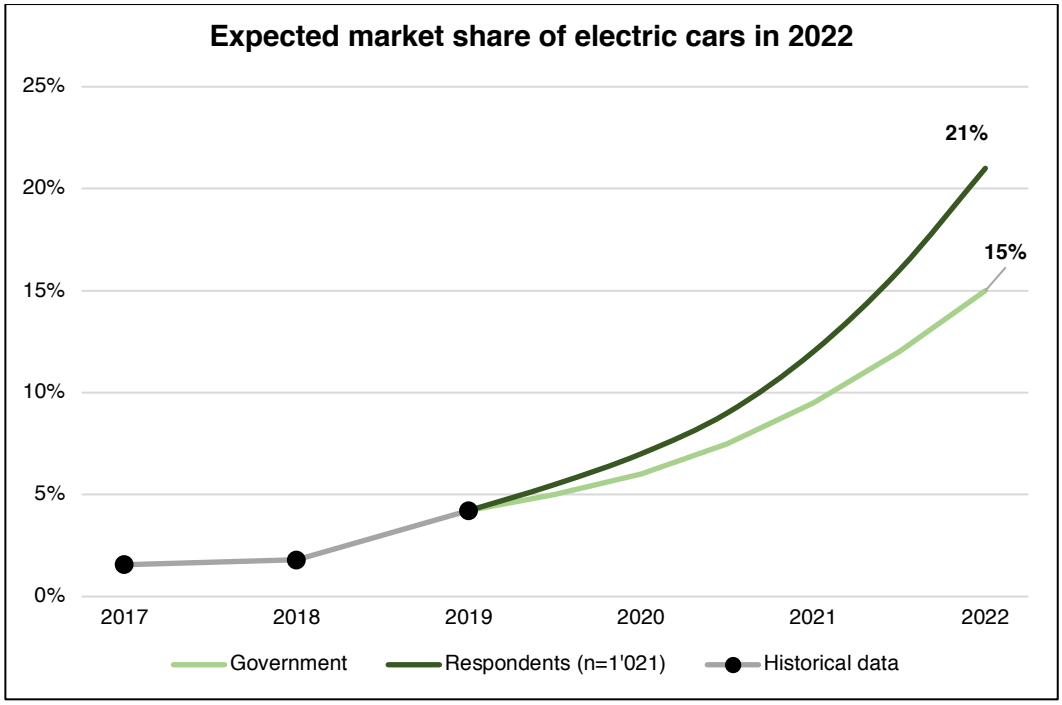

Figure 14: Expected market share of electric vehicles in 2020 - government versus consumers' target

Buildings

According to SwissEnergy, 56% of residential heating in Switzerland is still done with gas and oil[21]. Besides, buildings are responsible for more than a quarter of CO_2 emissions, making them the second-largest source after transport. Per capita emissions from buildings are above the European average[22]. Two-thirds of buildings were constructed before the 1980s, and Switzerland is the European country that heats the most with oil.

These figures show that Switzerland still has a large potential to improve the energy efficiency of its buildings. Renovations are progressing only slowly and are still largely insufficient to meet the objectives of the Energy Strategy 2050. Specialists explain the slowness of the transition by the public's lack of knowledge of technological solutions and the provision of financial aids. Some cantons have been discussing banning oil and gas heating such as the canton of Fribourg. The latter has been trying to speed up the transition to more sustainable heating solutions by drastically limiting the possibilities to install heating systems with oil or gas. In return to these partial bans[23], the canton has introduced financial aids for replacing heaters.

We find that 54% of the respondents in Switzerland would be (rather) in favour of a ban on oil heating systems and 45% for gas heating systems. As such, a cantonal law (partially) banning oil heating installations, such as the one in Fribourg, may thus find approval in other cantons,

[21] https://www.heidi.news/articles/les-principales-sources-de-carbone-en-suisse
[22] See for example : https://www.swissinfo.ch/ger/gesellschaft/gebaeude-und-klima_heizen-mit-oel--schweiz-mit-hoechsten-anteil-in-europa/45170456
[23] Starting at the beginning of 2020, it is no longer permitted to install new oil and gas heating systems in the canton of Fribourg unless they are coupled with at least 30% of renewables for new buildings and 20% for old ones.

but the rather narrow majority also explains why similar attempts have been subject to intense political campaigning from opposition groups in other cantons.[24]

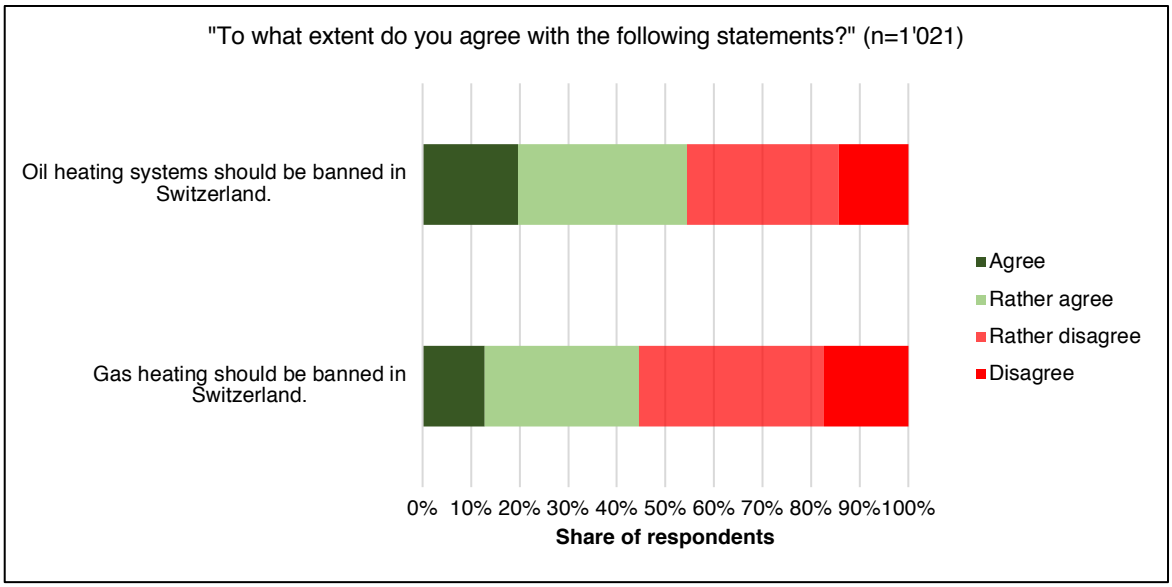

Figure 15: Opinions on a ban of gas and oil heating systems

A transition from gas and oil to renewable heating options can be observed by looking at the preferences from current (n=315) and potential homeowners (n=301). A very small percentage of 2% of homeowners would choose an oil heating system if they had to replace their heating installation, and this share falls to 1% for potential homeowners. With regards to gas heating systems, only 0.5% of homeowners would select this option while 2% of potential homeowners would choose this option[25]. Among those who selected an oil heating system as a replacement (n=13), 62% currently have an oil heating.

[24] In fact, similar legislation has been rejected by 50.6% of the population in a cantonal vote in Berne, facing opposition from homeowners and industry associations. https://www.srf.ch/news/schweiz/abstimmungen/abstimmungen/abstimmungen-be/abstimmungen-im-kanton-bern-knappes-nein-zum-neuen-energiegesetz

[25] Question asked to the respondents : “If you had to replace the heating system in your home or future home, which of the following would be your preferred heating system?”

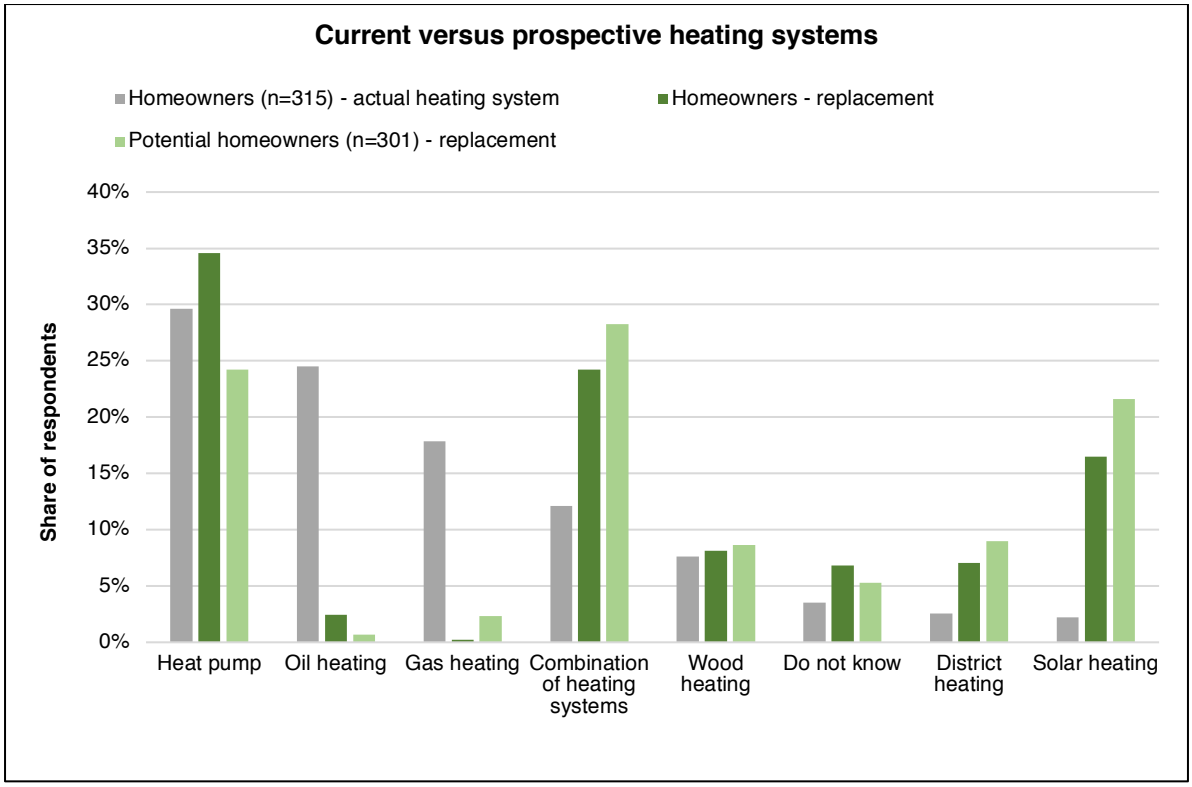

Figure 16: Homeowners' heating system preferences

Earlier, we noted that specialists explain the slowness of the transition by the public's lack of knowledge of technological solutions and the provision of financial aids. An overview of the homeowners' willingness to invest in renewable energy technologies over the years highlights that the interest is there, but inertia persists.

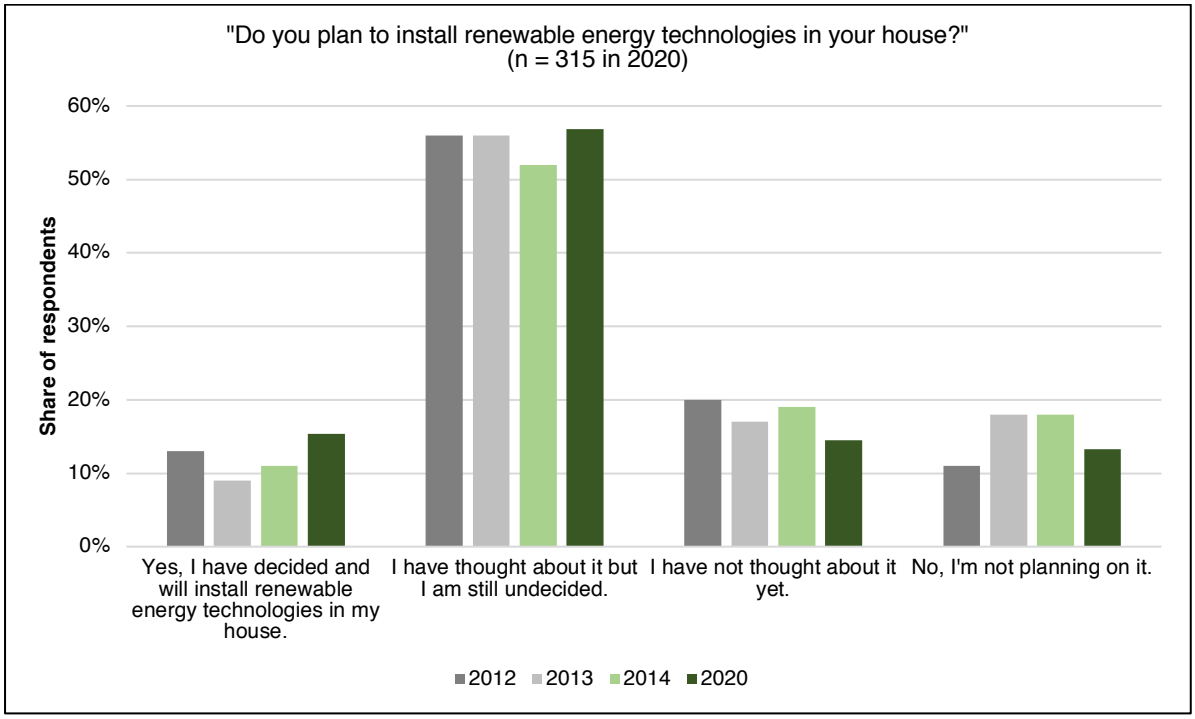

Figure 17: Homeowners' interest in renewable energy technologies

In terms of specific technologies, which could contribute to more sustainable buildings, we observe a preference for photovoltaics, heat pumps and thermal insulation[26].

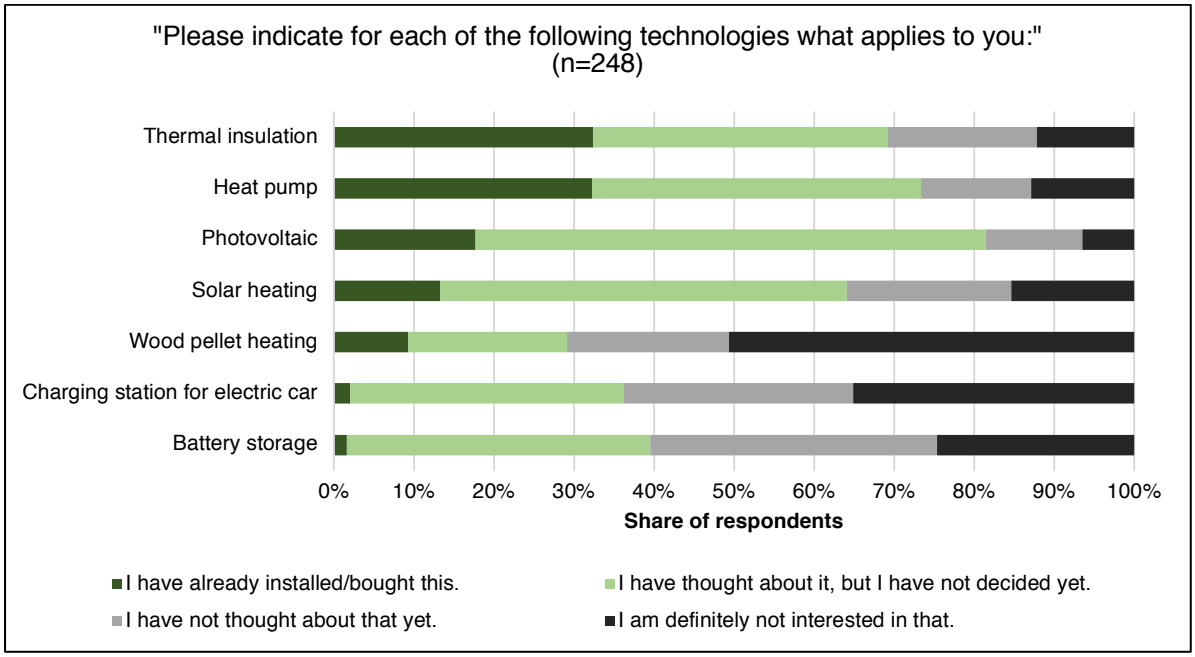

Figure 18: Homeowners stand regarding renewable energy technologies

Homeowners who have already invested in renewable energy technologies (n = 154), are highly satisfied with their decision. 84% would recommend an investment in thermal insulation to a friend, 89% in photovoltaics, 90% in heat pumps, 85% in solar heating and 74% in wood pellet heating. Further, we find that among this group, only 46% sought advice from a specialist regarding an overall energy concept for their property when they invested in renewable energies.

We also asked homeowners and potential homeowners who had mentioned an interest in renewable energy technologies (n=248), who they trust the most when making a purchase decision for renewables energy technologies. We find that energy consultants are the most trusted (40%).

[26] Only includes homeowners who have mentioned an interest in renewable energy technologies (n=248)

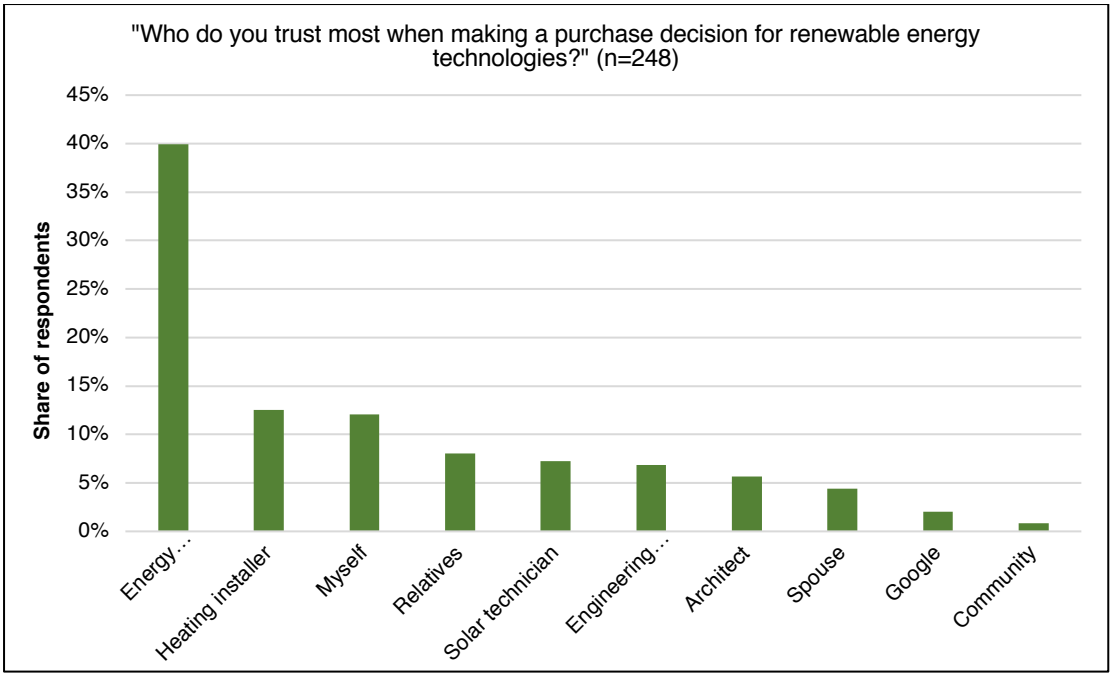

Figure 19: Person of trust for purchasing decision in renewable energy technologies

We further find that the main financial criteria for homeowners[27] when deciding about investments in renewable energy or energy efficiency technologies are the percentage reduction of energy costs (24%), making a contribution to the energy transition (20%) and the payback period (20%)[28].

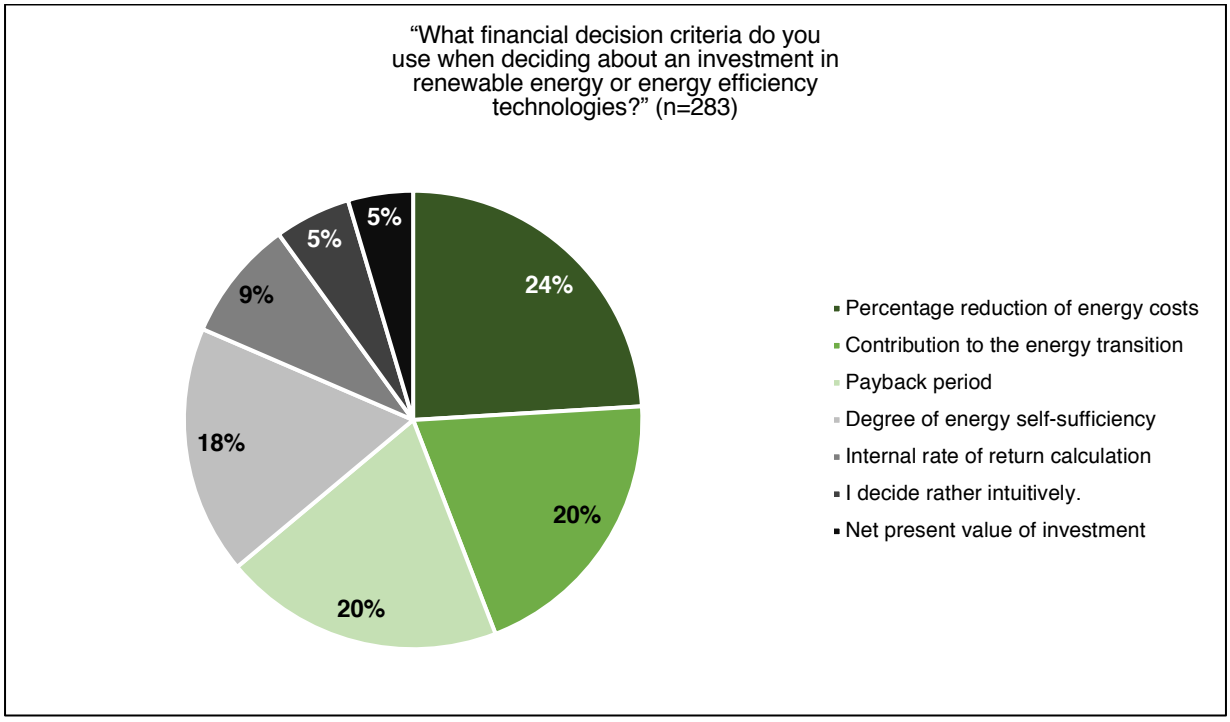

Figure 20: Financial decision criteria for investments in renewable energy technologies

[27] Here we excluded homeowners who mentioned that they have no intention to install renewable energy technologies in their homes (n=32).
[28] Respondents could select more than one answer.

Among those who selected the payback period as a criterion (n=125), we further asked after how many years the investment should pay off. We find that only 23% of them expect a return of 5 years maximum. In contrast, in 2015, 50% of them expected a return of 5 years or less, indicating an increase in patience among residential investors.

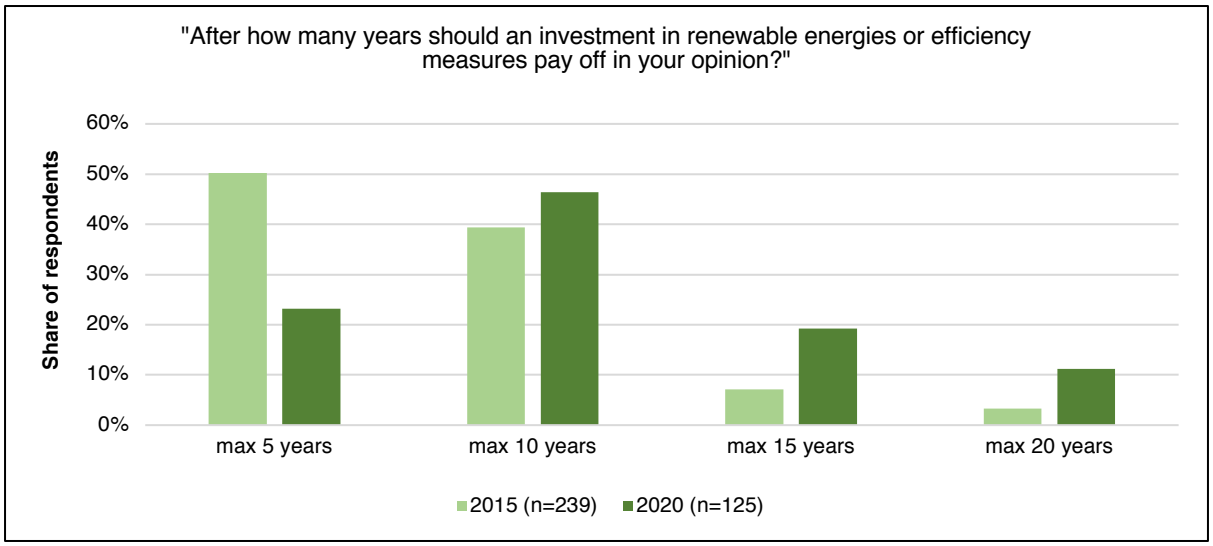

Figure 21: Payback period for investment in renewable energy technologies

One barrier to investment in sustainable technologies is a lack of financial resources. For this reason, we investigated the effect of a "climate bonus"[29] on renewable energy technology or energy efficiency investments by homeowners interested in renovating their homes (n=84). We started by asking homeowners what options they would give up in order not to exceed their budget. We find that a charging station for electric cars (21%) would be given up first, followed by a PV system (13%) and interior painting (13%). Interestingly, however, we find that the investment in a sustainable heating system (4%) would be the last option they would give up on[30]. Next, we asked homeowners which options they would implement if they were to receive a "climate bonus". We find a positive effect of this bonus. This is highlighted, for example, by the fact that 28% of homeowners who plan to renovate their homes, would choose to install a solar system if such a bonus was available.

[29] This "climate bonus" would not touch on the affordability of the mortgage. Affordability would in fact be increased by an additional "income" from PV power production or reduced costs from lower energy bills.
[30] While these different options are not fully comparable (e.g. long-term versus one-time investments) they give us an indication of how homeowners may prioritize them.

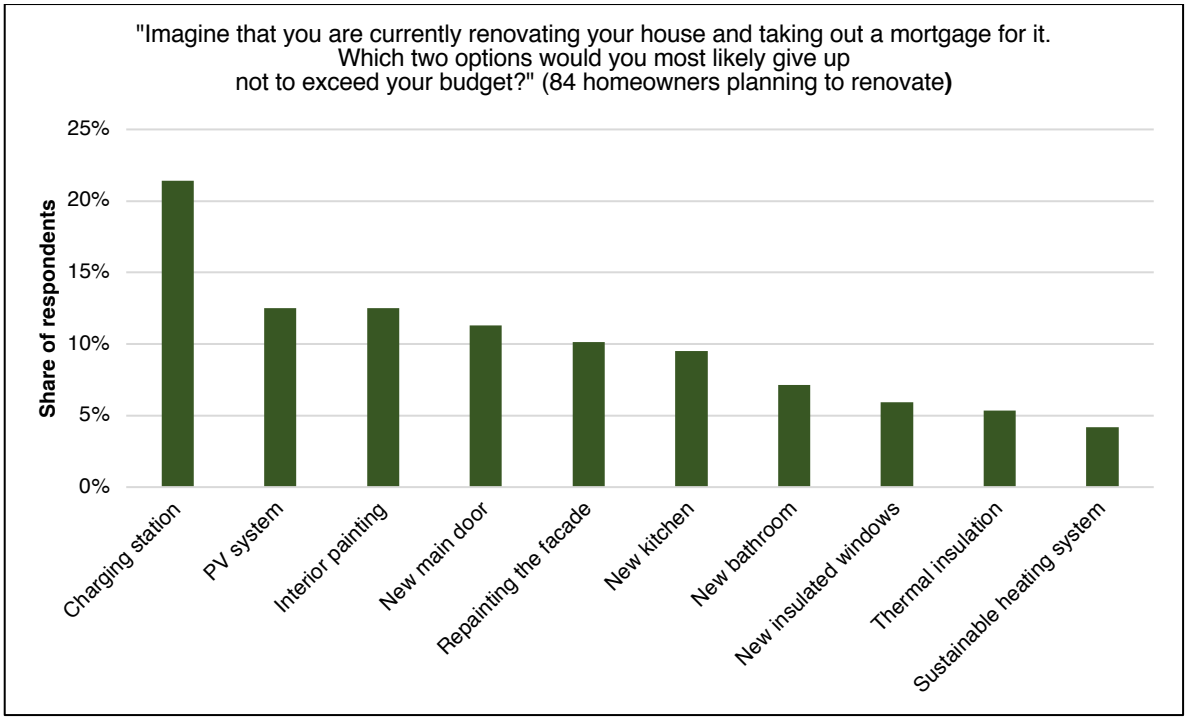

Figure 22: Budget constraint and investment in renewables

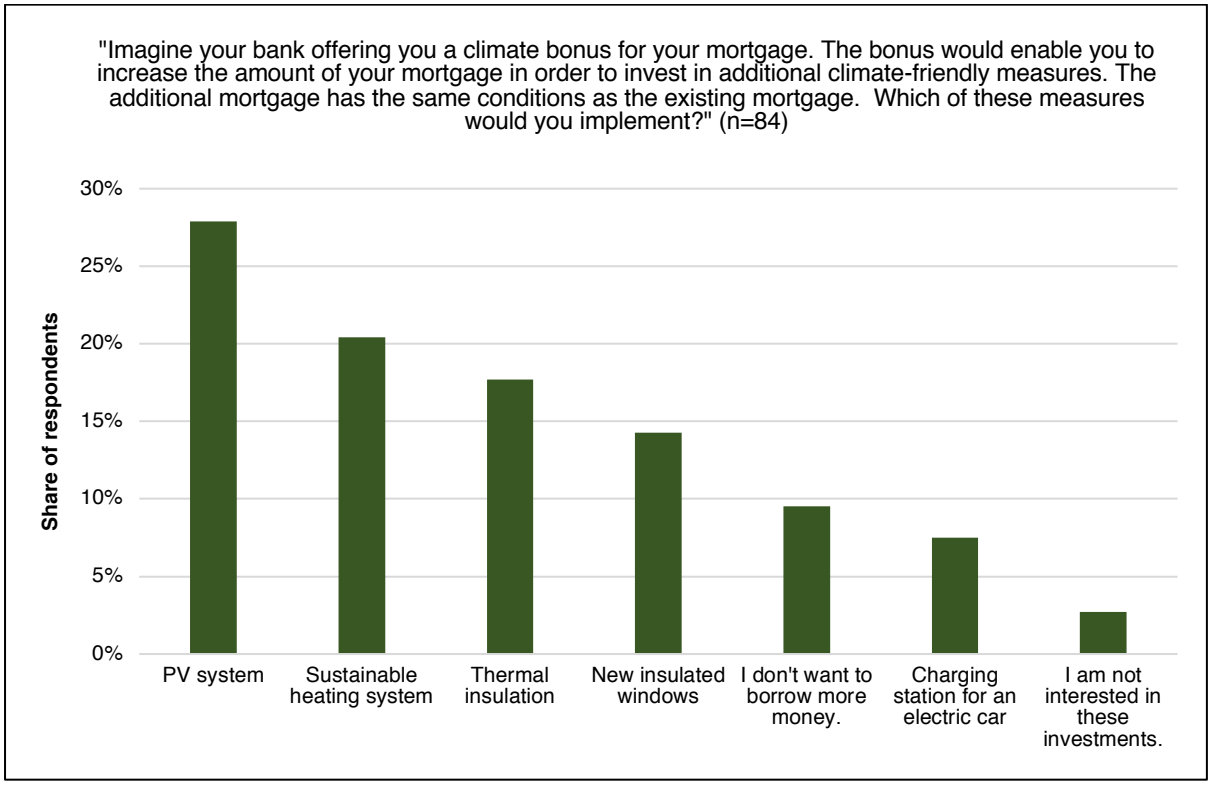

Figure 23: Climate bonus and investment in renewables

While investments in renewable energy technologies are more limited for condo owners, they have the option to co-invest with the other owners of their building. An example of such investments is a solar installation on the roof of their building. We find that 14% of condo owners (n=145) have already installed a solar system and that 8% are having initial talks about it. 39% have not yet talked about it with the co-owners showing that awareness may be increased in this regard.

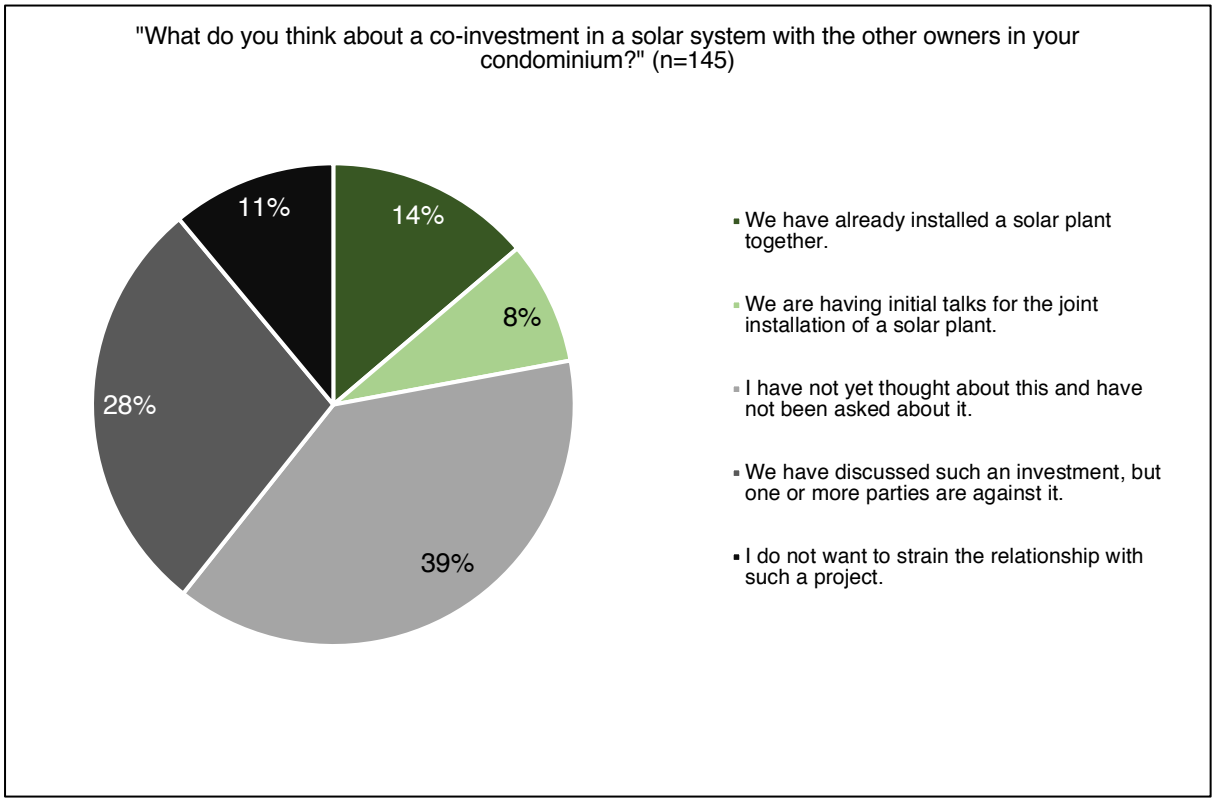

Figure 24: Condo owners – co-investment in a solar system

The majority of Swiss consumers are renters. We gauged their interest in renewable energy technologies by asking whether they had talked about the use of them with their landlord[31]. We find that 39% of renters have an interest in engaging in conversations with their landlord about it.

[31] In many instances, renters do not have a direct contact with their landlord. However, they can reach out to the management office in charge of the building/house.

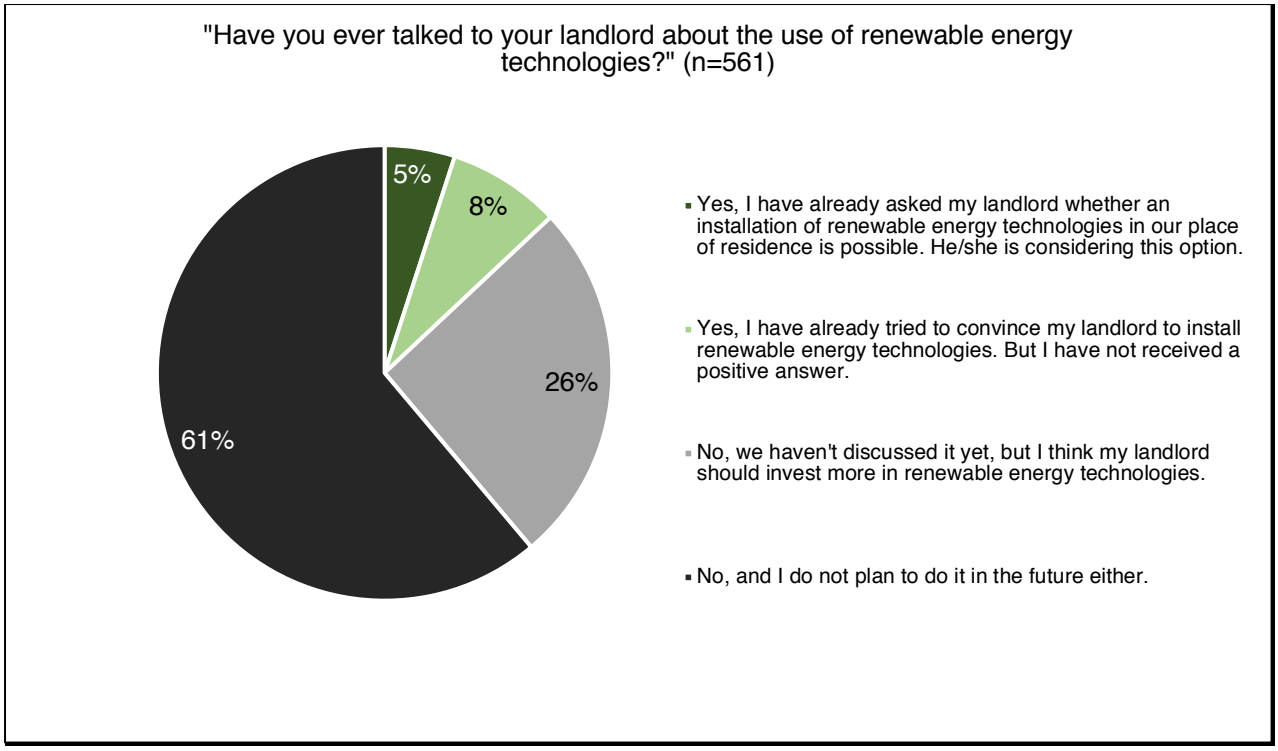

Figure 25: Renters and interest in renewable energy technologies

Banks

Consumers can have an impact on climate change through their purchases or behaviours, but also by how they invest their money. We asked respondents who had direct contact with their bank in the last two years (n=794), what the focus of their interaction was. We observe that "green investments" are rarely the subject of the conversation, highlighting a potential for banks to engage with their clients more on this topic[32].

[32] No significant differences were observed between homeowners and other respondents in the sample.

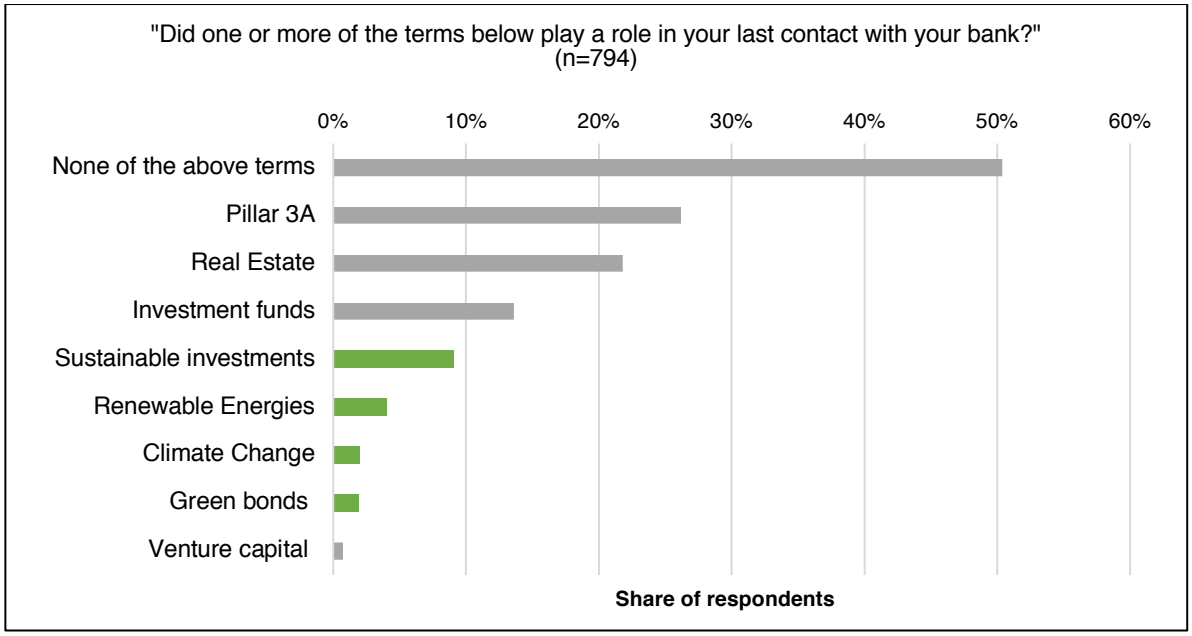

Figure 26: Role of clean investments in contact with banks

Banks can play an important role in transitioning to a cleaner energy future through their asset allocation decisions and by offering new products and services. While we observe that 40% of Swiss respondents would (rather) like their bank to be more proactive in offering investment in renewables or other sustainable investments, a recent survey[33] conducted in Germany highlighted that 62% of those surveyed would like to be actively asked by their financial advisor in a consultation whether sustainability criteria should be taken into account in their investment. It thus appears that many retail investors are inclined to take into account broad sustainability criteria, and a subsegment wants to actively invest in renewables. However, country-specific preferences need to be taken into account when interpreting these findings.
Further, we find that Swiss consumers find their banks to be increasingly competent in correctly assessing the opportunities and risks regarding renewable energy and other sustainable projects (45% in 2017 versus 58% in 2020).

[33] Bafin, June 2019, «Wie sicher ist nachhaltig?»,
https://www.bafin.de/SharedDocs/Veroeffentlichungen/DE/Fachartikel/2019/fa_bj_1906_nachhaltige_Geldanlage.html

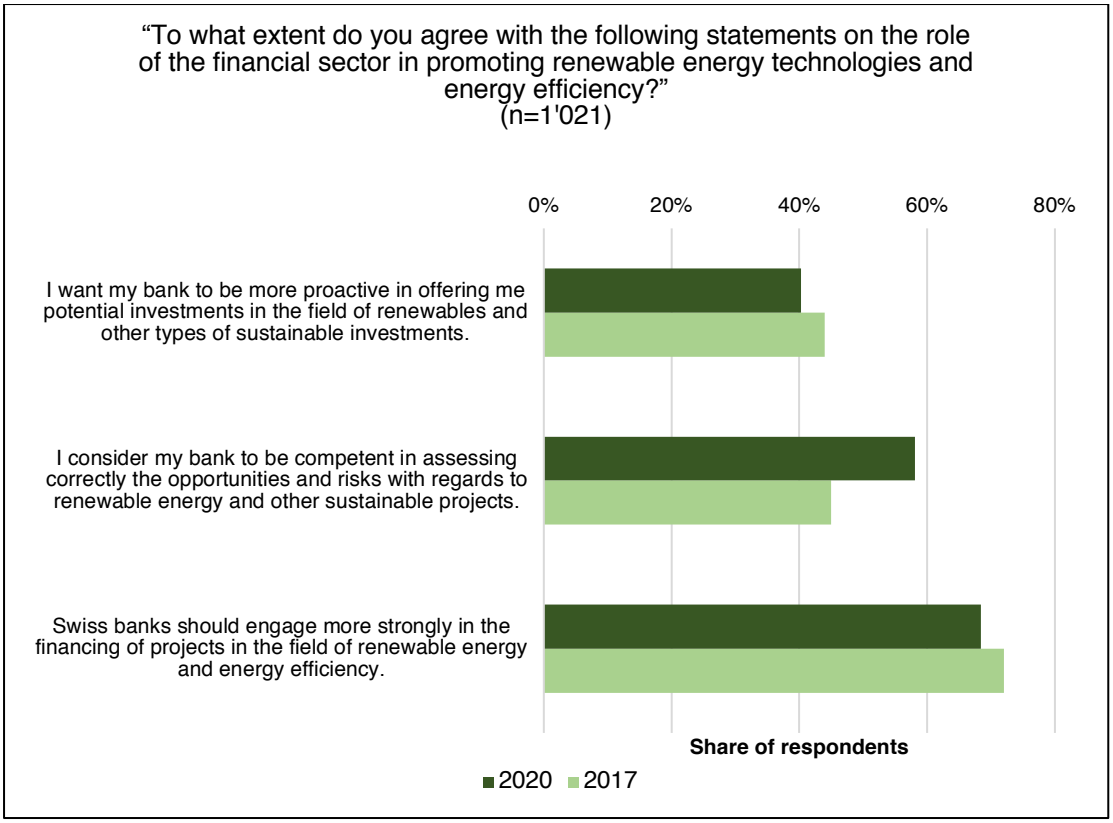

Figure 27: Opinions on the role of banks

Swiss Climate Policy

Climate change: a feeling of sadness

Researchers now acknowledge that in many decision contexts, choices are not only based on what people think or know about a topic or decision option, but also on how they feel about it[34]. This also holds true regarding individuals' behaviour towards climate change.

We find that the emotion that most respondents experience when thinking about climate change is sadness (53% indicated feeling this emotion). This is followed by anger (42%) and fear (37%). Only 27% of respondents feel confident about climate change. From psychology, we know that our emotions can act as vital messengers to help us meet our basic needs for self-preservation and safety. Touching on human psychology thus appears to be an important element to consider when investigating attitudes towards climate change. Past research has shown that fear can lead to different types of behaviours[35]. This emotion can lead some people to act, while it can lead others to feel helplessness or to deny the facts[36]. Denial can, in this case, take hold in the face of anxiety over the discourse on climate change. As such, a specific emotion, such as fear may have different types of effects depending on the characteristics of the person.

[34] Slovic, P., Finucane, M. L., Peters, E., & Macgregor, D. G. (2004). Risk as Analysis and Risk as Feelings: Some Thoughts about Affect, Reason, Risk, and Rationality. Risk Analysis, 24(2). Kahneman, D. (2011). Thinking, fast and slow. Macmillan.
[35] https://www.nottingham.ac.uk/counselling/documents/podacst-fight-or-flight-response.pdf
[36] Albert Mourheiber (2019): Votre cerveau vous joue des tours. Paris: Allary Editions.

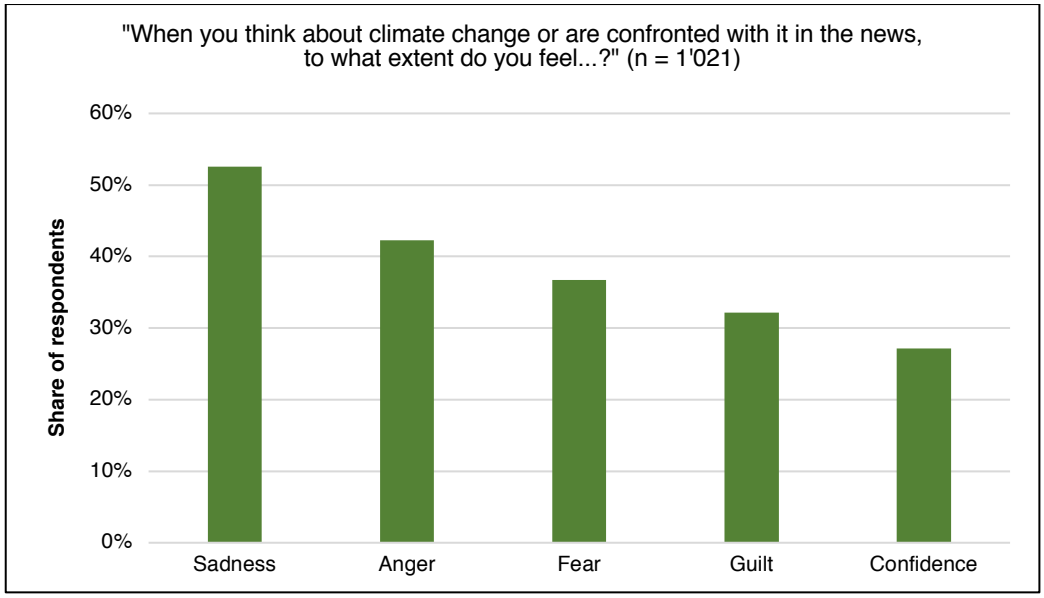

Figure 28: Feelings towards climate change

Differences in emotional reactions can be observed between age groups. Specifically, those between 15 and 29 years of age appear to have stronger reactions than those 60 and above. While 45% of the 15-29-year-olds feel fear, this percentage drops to 30% for those 60 and above. Sadness is also more prevalent in the first age group (59% versus 46%), and so is anger (51% versus 39%). Men and women also differ in this regard: while 41% of women feel fear, this percentage drops to 33% for men. The difference is even more accentuated in the case of sadness: while 60% of women indicated feeling this emotion, 45% of the men did.

Causes of climate change: remaining knowledge gaps

There is now a clear consensus in the scientific community that human activities are the main cause of climate change. A study from 2016[37] shows that 97% of scientists agree that humans contribute to climate change. Are Swiss respondents aware of this broad scientific consensus? To start exploring this question, we asked respondents whether they think climate change is caused by natural processes, by human activity or both. We find that 51% think it is mainly caused by human action, while 31% think it is caused in equal parts through natural processes and human action. Interestingly, only 4 people out 1'021 say they do not know. Further, while 58% of those between 15 and 29 think that climate change is mainly caused by human activities, this share drops to 45% for those 60 and above, reflecting a high level of climate competence among young people.

[37] Cook, J. et al. Consensus on consensus: a synthesis of consensus estimates on human-caused global warming. Environ. Res. Lett. 11, 048002 (2016).

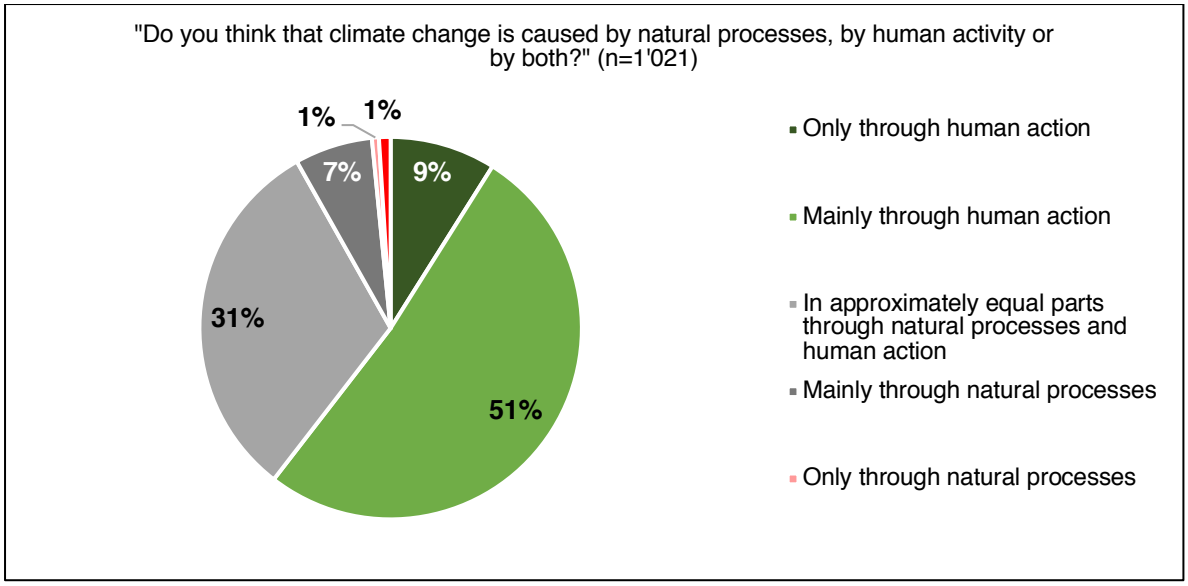

Figure 29: Opinions on the causes of climate change

Second, we asked respondents the following question: "What do you think: What percentage of climate scientists worldwide agree that the increase in carbon dioxide (CO_2) concentration in the atmosphere, since the middle of the 20th century, is primarily due to human activities?". We find that, on average, the Swiss population thinks that 69% of climate scientists worldwide agree on this. In comparison, a recent study[38], using a German sample found a percentage of 66%. The scientific consensus is estimated to be slightly higher by male respondents (71%), compared to female respondents (67%). Differences between age groups also exist: 73% for those aged 15-29, and 65% for those above 65. Differences between political parties can also be observed. Interestingly, even voters of climate oriented political parties, such as the green party and the green liberal party underestimate the scientific consensus.

Climate change: more than half of the respondents already see the effects

The survey further highlights that 22% of the respondents fully agree that it is highly likely that their region *will be* affected by climate change (n=486)[39]. This percentage increases to 69% if one includes those who (rather) agree with this statement. 4% of the respondents think that climate change will never have an impact in Switzerland. Further, 51% of the respondents (rather) agree that their region *is already* affected by climate change (n=525), with 16% among them fully agreeing that this is the case.

[38] Rinscheid, A., Wüstenhagen, R. Germany's decision to phase out coal by 2038 lags behind citizens' timing preferences. *Nat Energy* 4, 856–863 (2019).
[39] We split the sample in two for these questions: one half was asked about perceived future effects of climate change while the other half was asked about perceived current effects.

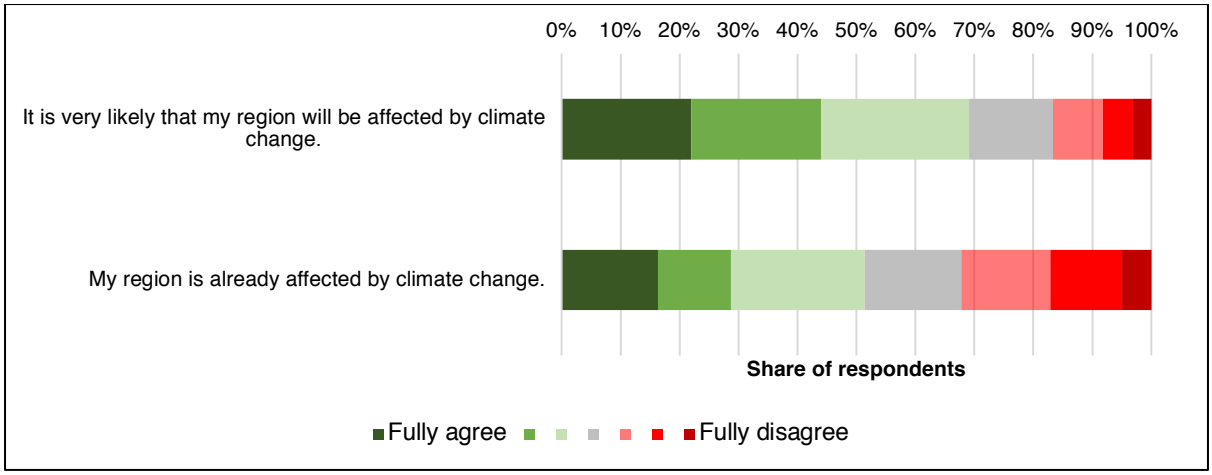

Figure 30: Perceived effects of climate change

Among those who mentioned that they do not yet feel the effect of climate change in their region (n=169), we asked them when they thought the effects of climate change would be felt in Switzerland, if at all. We find 63% of them think the effect would be felt within the next 20 years. 14% indicated not knowing.

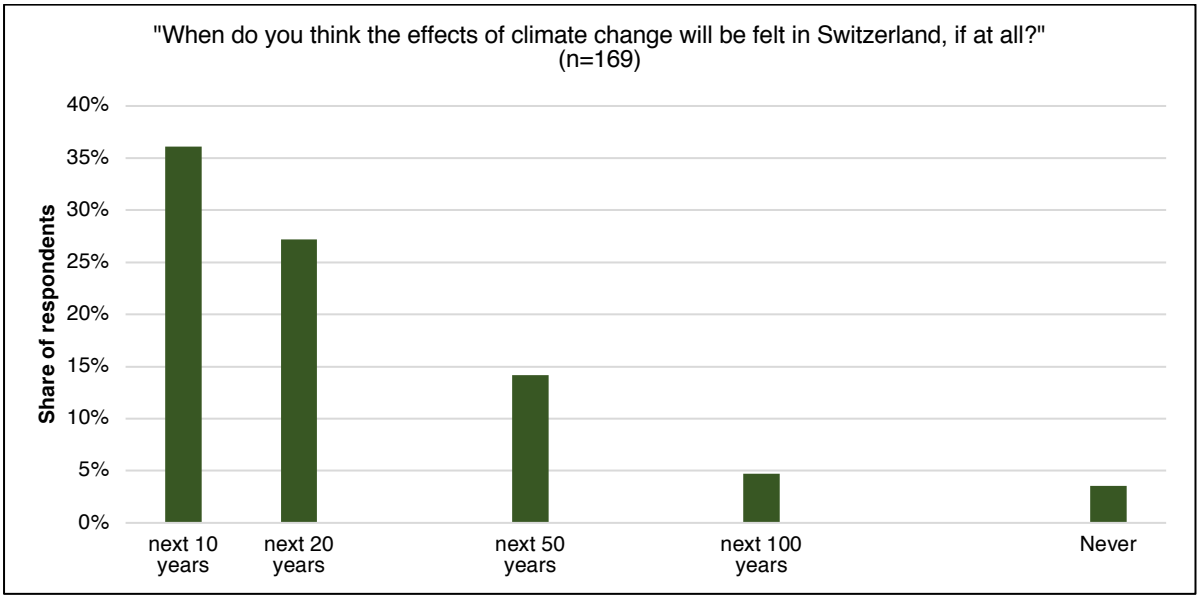

Figure 31: Perceived effects of climate change - timeline

To better understand how respondents perceive the effect of climate change, we asked: "Climate research predicts that greenhouse gas effects will lead to increased extreme weather events. Have you personally had any experiences in the last two years, during which you have been directly affected by such effects of climate change?". A majority of respondents (69%) answer that they experienced the effect of climate change through heat waves (n=1011[40]). Only 17% reported having experienced no effects.

In fact, according to the World Meteorological Organization, the last decade was the warmest in history. In July 2019, Europe experienced an intense heatwave where one heat record after another got broken: 42.6°C in Germany, 41.8°C in Belgium and 40.4°C in the Netherlands.

[40] The sample size equals here n=1011 as we have excluded respondents who mentioned they do not think climate change is happening.

On 25 July, the temperature reached 42.6°C in Paris. Switzerland was not spared, with 38°C recorded in Sion[41].

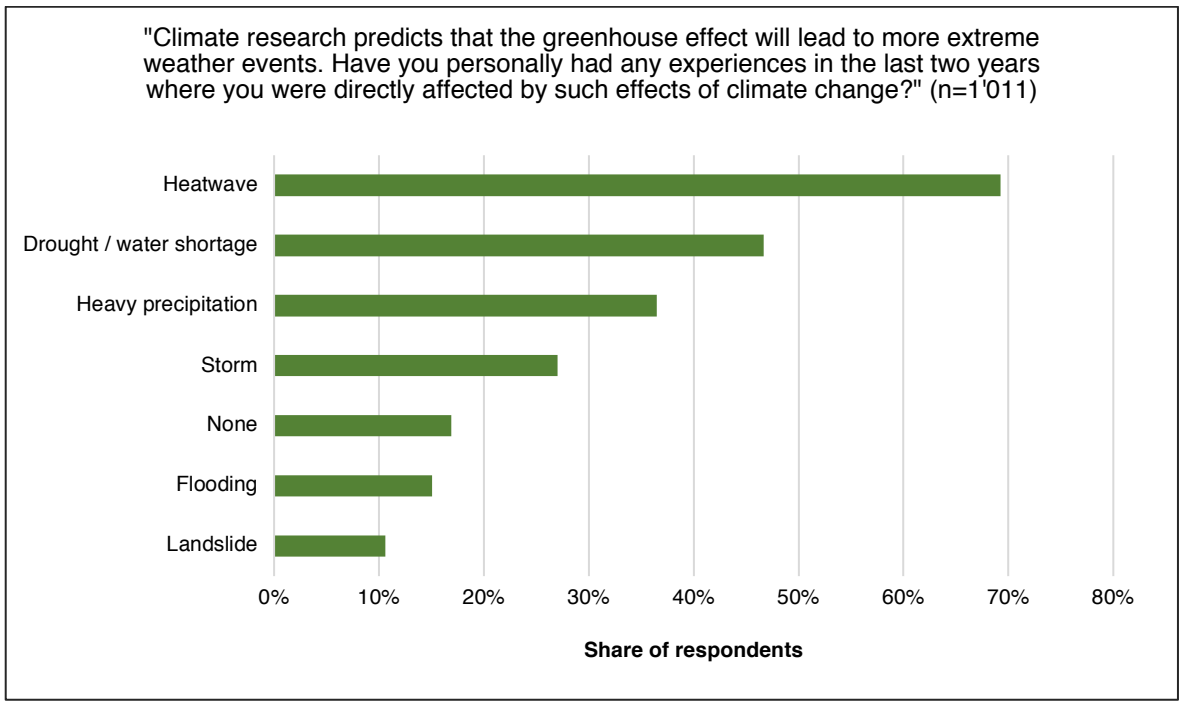

Figure 32: Observed effects of climate change

Fridays for Future movement: positive feelings more salient than negative ones

Since 2018, school and university students worldwide have been committed to climate protection in the form of the Fridays for Future movement. Students go on strike on Fridays to raise awareness and demand faster action on climate change. From small beginnings, the movement has quickly gained traction. In September 2019, more than 100'000 people went on the streets of Bern to express their concerns as part of the Fridays For Future movement. This movement now holds a central place in the debate about climate change, which is highlighted by the fact that 71% of the respondents indicated having heard about the Fridays For Future movement (climate strikes). Awareness of the movement seems to be significantly higher among the German-speaking population (76%) than among the French-speaking one (54%). Results also highlight that awareness reaches its peak among those 15-29 years of age and its minimum among those 45 to 59.

In general, we find that positive feelings about the movement are widespread, with 32% of respondents expressing enthusiasm about Fridays for Future, and another 29% feeling joy. At the same time, there is also a certain level of polarization in the emotional reactions: 28% of respondents are angry when they think about the climate strike movement[42].

[41] https://www.heidi.news/articles/interactif-la-decennie-qui-a-fait-du-rechauffement-climatique-une-realite
[42] This question was only asked to respondents who indicated having heard of the climate strikes (n=721)

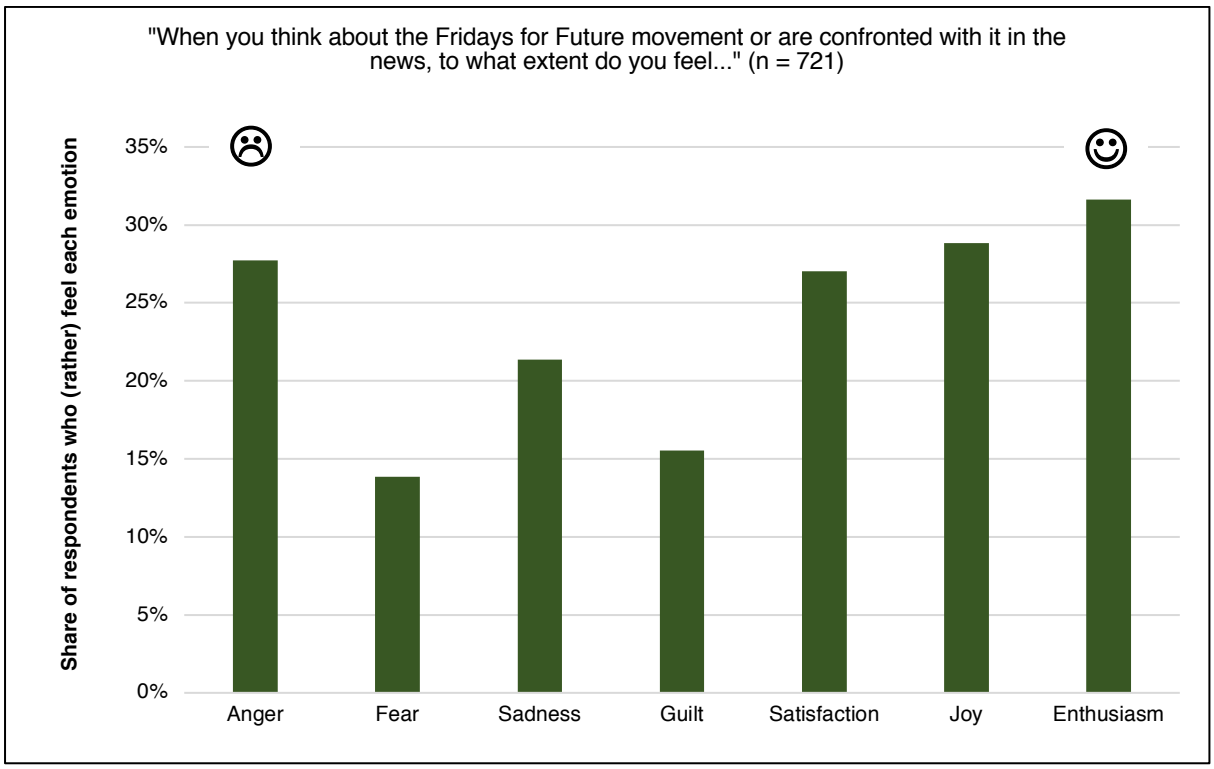

Figure 33: Feelings towards to Fridays for Future movement

The Fridays For Future movement: active participation

In terms of active participation in the climate strikes, we find that among those who have heard about the movement (n=721), 7% say that they are actively involved in one form or another. Among those (n=50), 56% are between 15 and 29 years old, 8% between 30 and 44, 8% between 45 and 59, and 18% 60 and above. 22% of those who mentioned they are active in the Fridays for Future movement, have children who are themselves active.

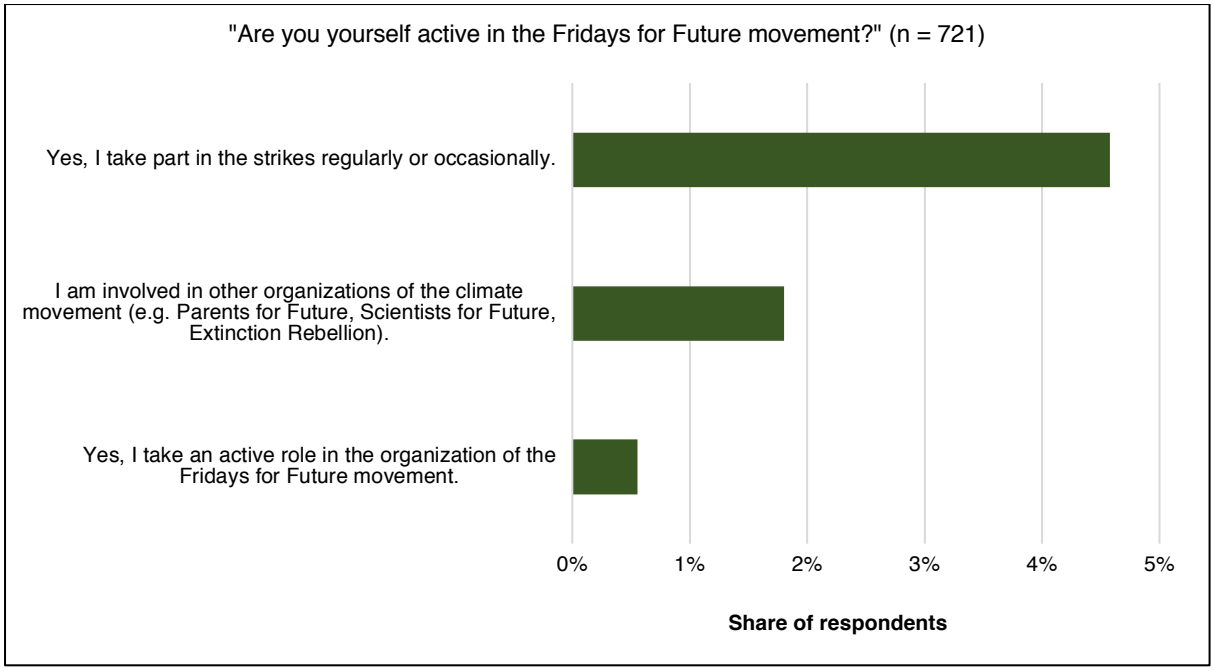

Figure 34: Engagement in the Fridays for Future movement

The Fridays for Future movement: support, but also scepticism

A large proportion of the respondents think it is a good idea for young people to show an interest in environmental and climate protection (80%). 26% (rather) think that civil disobedience is also a good way of drawing attention to climate change, On the other hand, there is also a degree of scepticism about the effectiveness of the strikes: 62% of those surveyed (rather) think that the demonstrations have not much helped the environment.

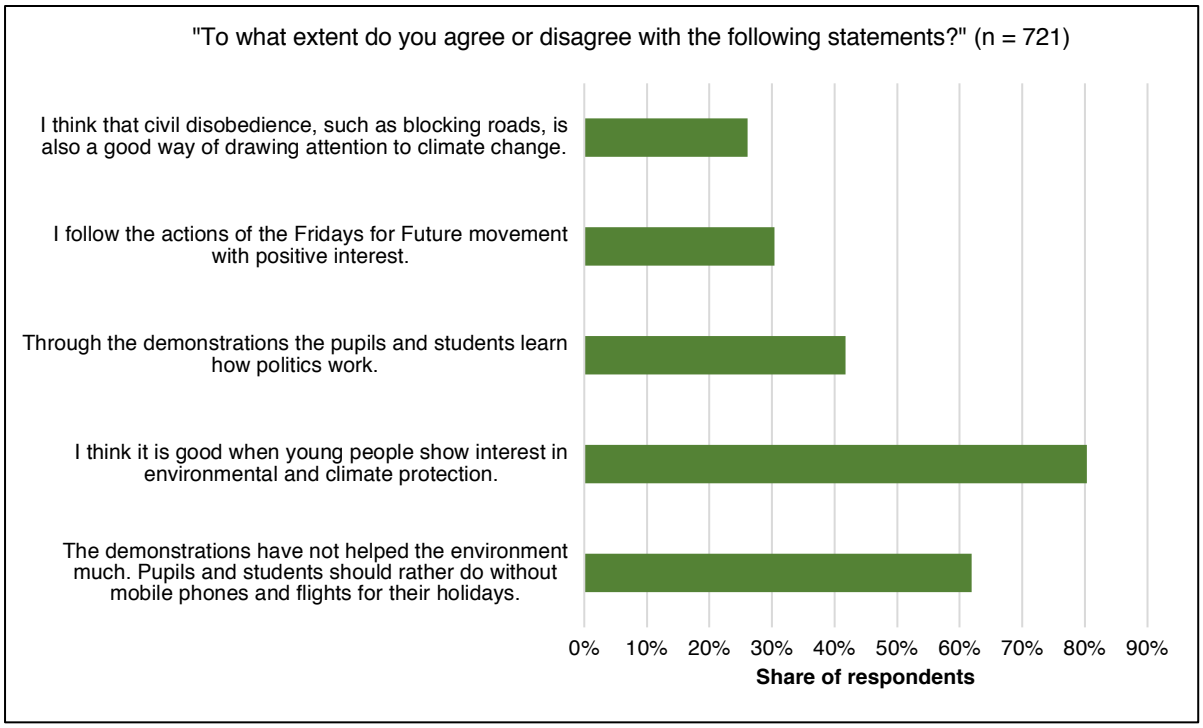

Figure 35: Opinions on the Fridays for Future movement

Climate solutions: technological innovation or behaviour change?

56% of the respondents (n=1011) feel (very) strongly responsible for personally making a contribution to reducing climate change and only 14% do not feel responsible.

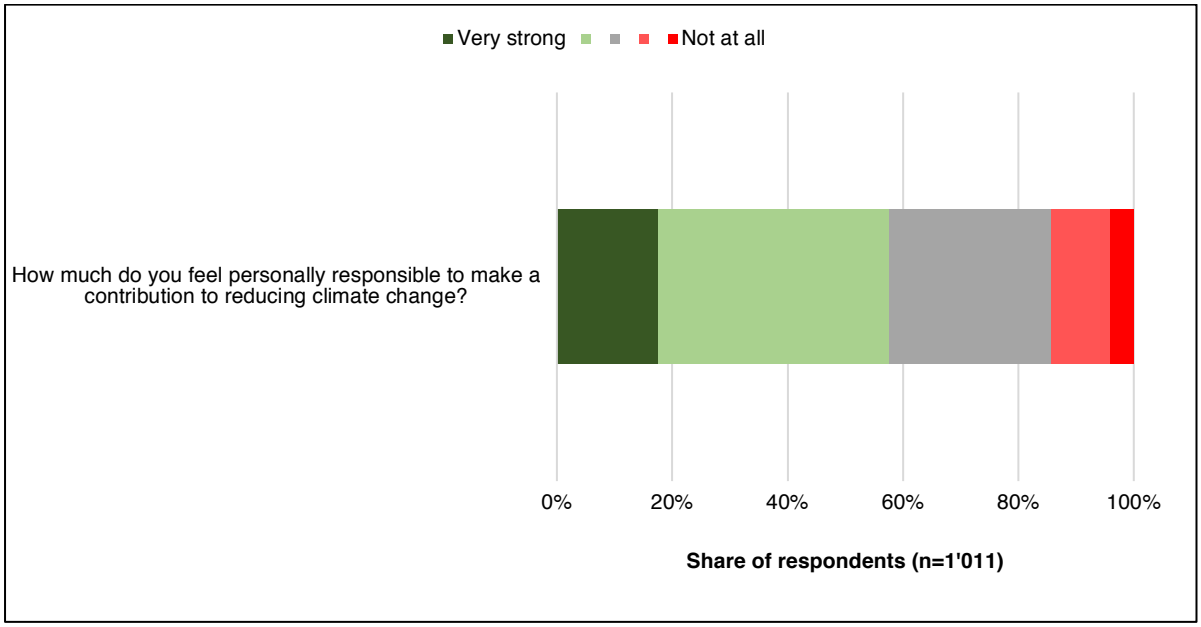

Figure 36: Perceived responsibility to reduce climate change

However, only 20% indicated that they think it is (rather) likely that a significant amount of people would voluntarily reduce their energy consumption to slow down climate change, while 51% think it is (rather) unlikely. The remaining percentage had a neutral opinion (28%) or did not know (1%). Interestingly, we do not observe any differences between age groups on this statement and the previous one.

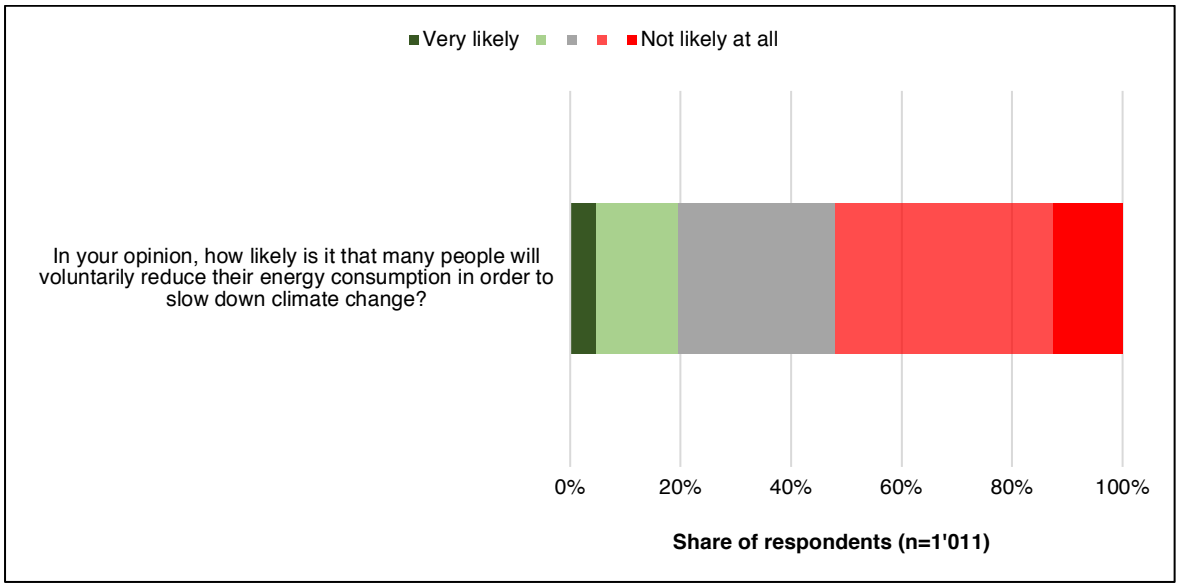

Figure 37: Hope in voluntary behavioral change from the population

On the other hand, when asked what aspects they think will make an important contribution to solving the climate problem, 67% of the respondents mention changes in consumer

behaviour as an important factor, second to only technological innovation (78%), and followed by large companies (60%). Taken together, these findings suggest that respondents appreciate the potentially large impact that changes in consumer behaviour can have on reducing emissions, but they feel like those will not just emerge from voluntary insight. Instead, suitable policy frameworks will be needed to make consumers confident that others will do their part, too, and companies can play their part in offering affordable low-carbon solutions.

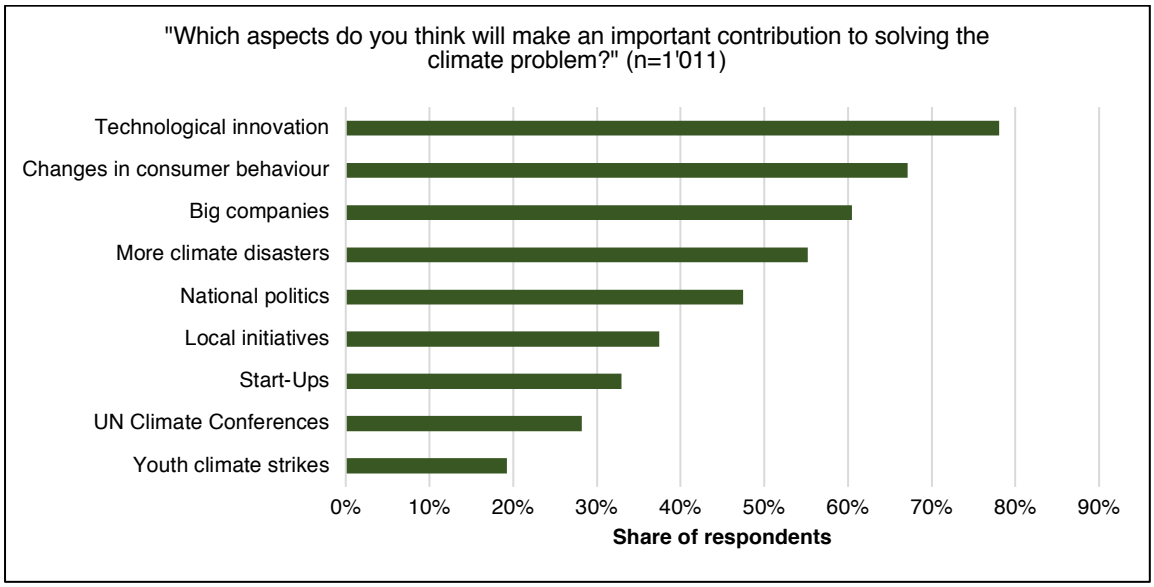

Figure 38: Drivers to solving the climate change problem

Climate protection measures: some habits are harder to change than others

We further find that that switching off lights and electronic devices when they are not needed (82%) and purchasing regional and organic food (78%) are high on the list of popular climate protection measures. By contrast, 23% of those surveyed say they avoid eating meat to reduce greenhouse gas emissions. 41% of respondents choose holiday destinations that do not require air travel, and 44% say they consciously refrain from using their car to reduce their environmental footprint.

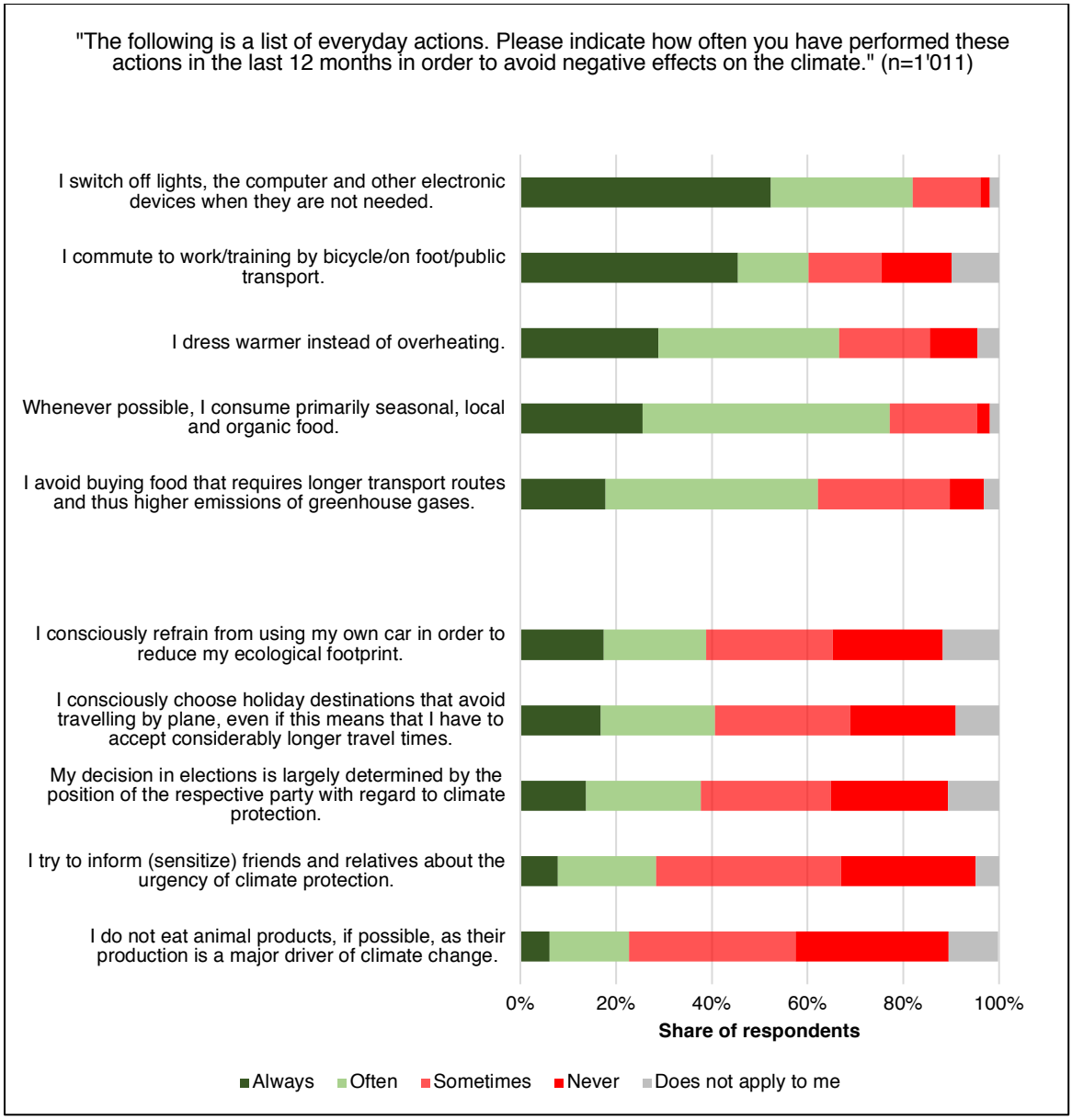

Figure 39: Climate measures to avoid negative effects from climate change

Fukushima effect versus "Greta effect": what will make a bigger difference?

When asked which of the two will have had a bigger long-term effect in a few years, we find that 52% of respondents think that the Fukushima nuclear accident will have a more significant impact than the Fridays For Future movement. 13% think that the "Greta effect" will be greater than the Fukushima effect, the rest have either no opinion or think that both will have little impact. We observe significant differences on this question between language regions, age groups and political parties. While 53% of the German-speaking respondents think Fukushima will have the greatest effect, this share is lower, 45%, among French-speaking respondents. Further, while 23% of those 15-29 aged think the Fridays For Future movement will have the most significant effect, this share falls to 8% for those aged 30 to 44.

In terms of political parties, we find that confidence in the "Greta effect" is particularly pronounced among supporters of the Green party, perhaps reflecting the party's strong

performance in the 2019 national elections, which have also been dubbed the “climate elections”. 46% of Green party supporters think that Fridays for Future will have a bigger impact, compared to 32% of them who lean towards Fukushima being more impactful. Supporters of conservative parties, in contrast, do not believe that the Fridays for Future movement is going to make much of a difference, whereas they acknowledge the significant Fukushima effect, which in some cases had led to a complete reversal of their party’s energy strategies. This is most pronounced among supporters of the Swiss People’s Party (SVP), where 59% believe Fukushima will have had a bigger effect, compared to just 5% for Fridays for Future. Interestingly, even among parties who until recently did not put a strong emphasis on renewable energy and climate policy, only 24% of their supporters believe none of the two effects are going to have a significant impact on the world, a share that is just 8% among Green party supporters.

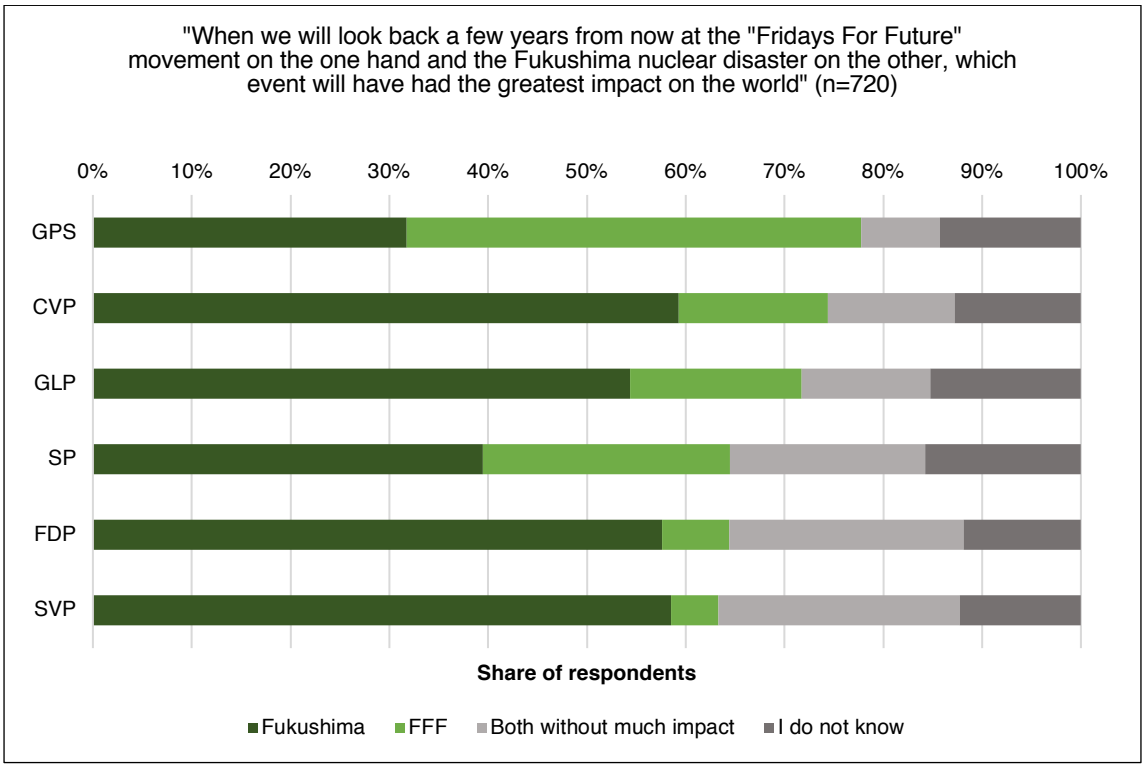

Figure 40: Impact on the world - Fukushima versus Fridays for Future

Aviation: Emerging headwinds for high-carbon travel

Air travel in Switzerland is growing exponentially: the number of trips have increased by 43% between 2010 and 2015, which is mainly due to the sharp increase in leisure travel that accounts for 53% of the growth[43].

The consumption of air travel, mainly private, reflects Switzerland's socio-economic disparities. People whose income allows them greater mobility by air therefore have an important lever to reduce their carbon footprint by limiting their journeys, or by considering offsetting them. We observe that those who fly the most, have a monthly household income of CHF 9001 or more and are in the 15 to 29 age group. In contrast, 53% of people in the lowest income class and 41% of those aged 60 and above never fly.

[43] Comportement de la population en matière de transports. Résultats du microrecensement mobilité et transports 2015

“How many times a year, on average, do you travel by plane for leisure?” (n=1’021)

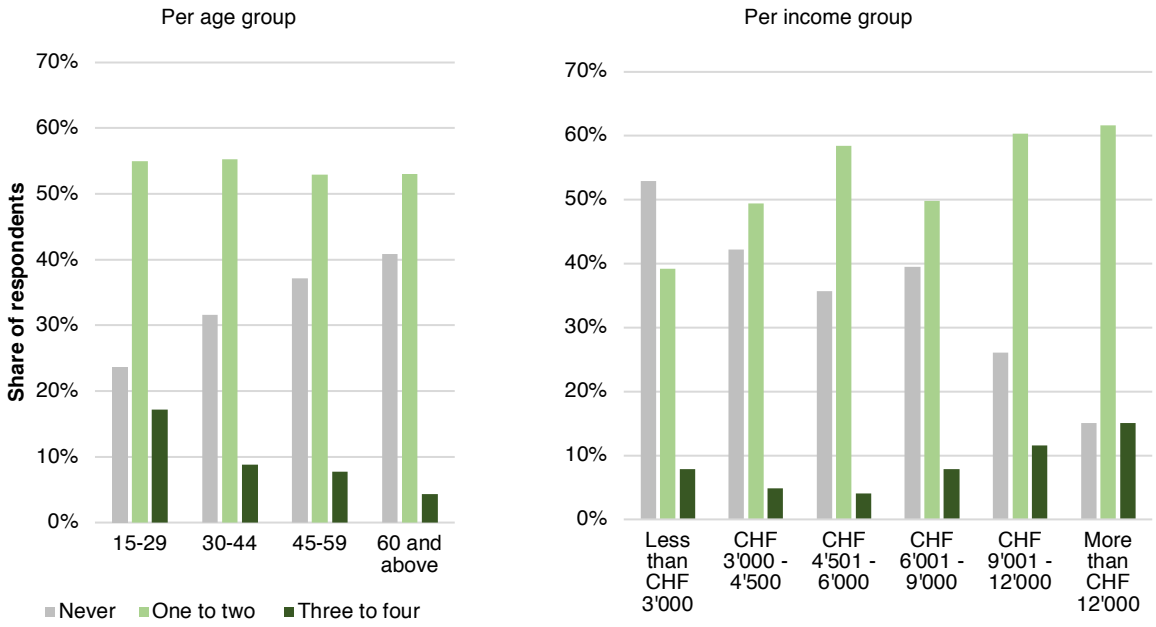

Figure 41: Flying behaviour per age and income groups

When asked about their attitudes towards the impact of air travel on our climate, 65% of those who fly (n=676) (rather) agree that every avoided flight is a step in the right direction. We also observe a type of rebound effect: 45% (rather) agree that it is fine for them to fly occasionally as they act environmentally friendly in their daily life. This opinion may be partly explained by the fact that more than half of the population underestimates the share represented by airplane fuels in the overall carbon footprint of the country. In fact, aviation accounts for 12% to 18% of Switzerland’s overall carbon footprint[44].

[44] The range of estimates can be explained by different calculation methods, for example with regard to the climate impact of greenhouse gas emissions in high altitude or the consideration of other pollutants: https://www.wwf.ch/fr/nos-objectifs/trafic-aerien ; https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaeft?AffairId=20194281

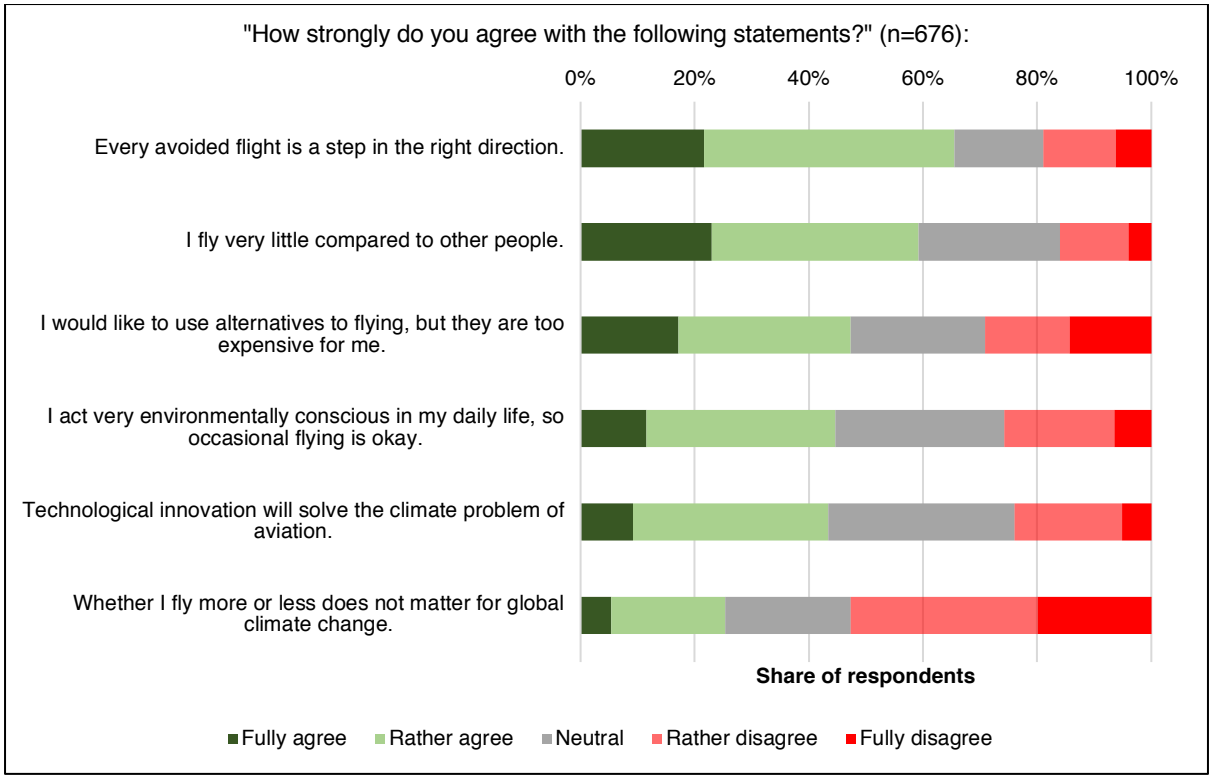

Figure 42: Opinions on air travel

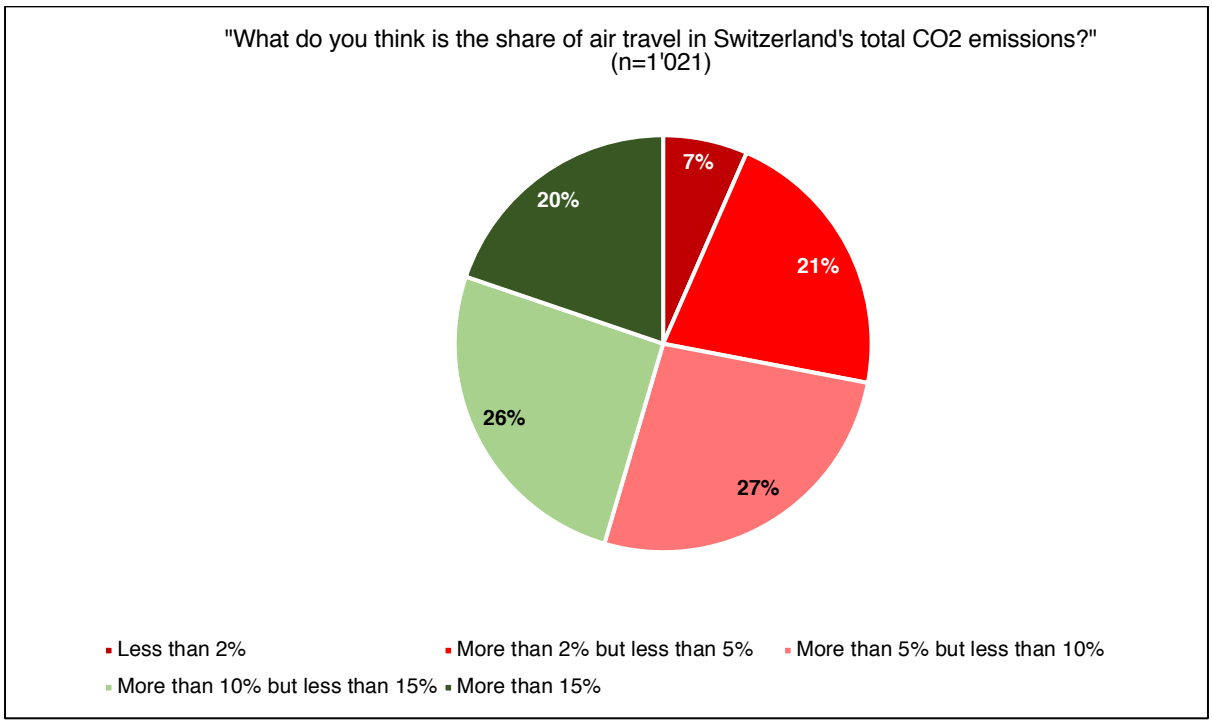

Figure 43: Knowledge on share of air travel in Swiss carbon footprint

Comparing between 2018 and today, we find that an increasing number of people find that flying is too cheap (57% in 2018 versus 67% in 2020). We hypothesize that this may be caused by higher awareness about environmental costs of flying; awareness brought in parts by the Fridays for Future movement and hashtags like #Flygskam or #Flightshame on social media.

Further, a lower number of people agree with the statement “We can be proud to be able to afford it” (24% in 2018 versus 19% today).

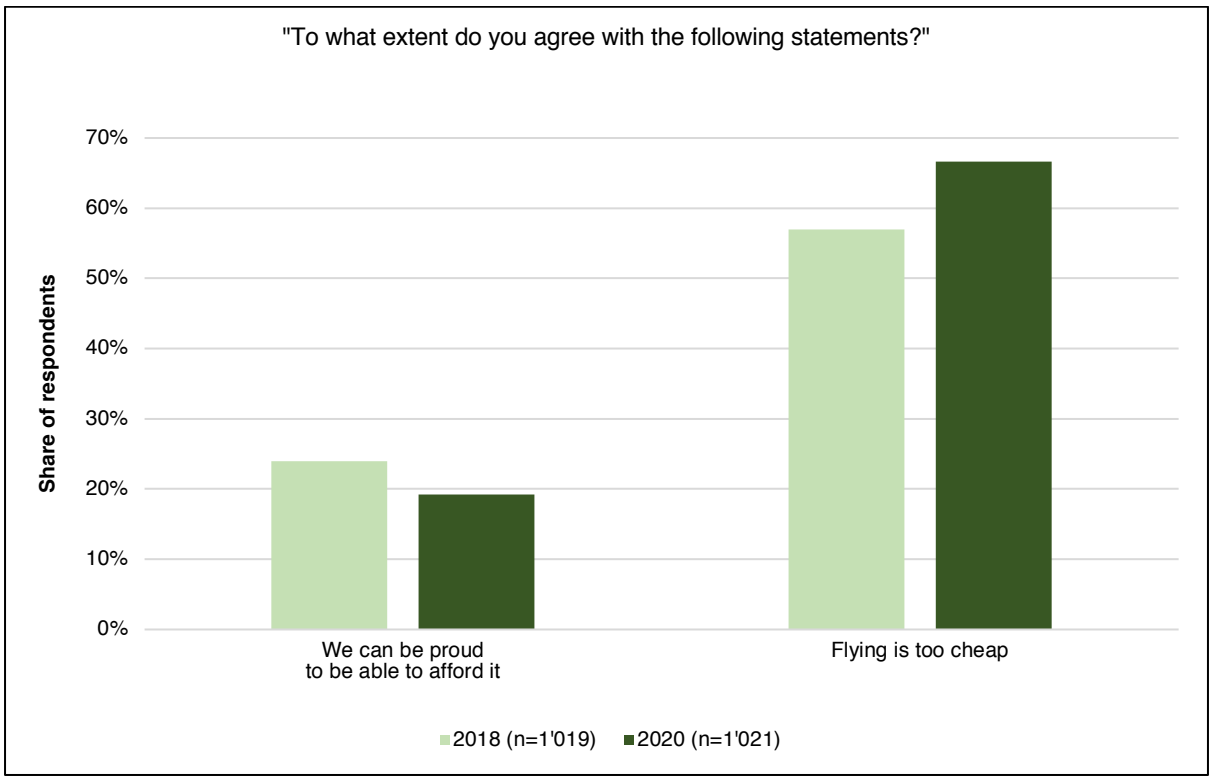

Figure 44: Opinions on Swiss air travel

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From Attitudes to Behaviour: A Note on Interpreting Survey Data

Decision-makers who take the study results as a starting point for strategy development should be aware of the following points.

Consumer behaviour materializes in situational contexts, in which several factors beyond basic preferences play a role.

- Status Quo Effect: Overcoming the status quo is a time-consuming and emotional effort for the consumer. In the electricity market, only about 10% of customers actively choose a different product than the pre-defined default (Litvine & Wüstenhagen 2011, Kaenzig et al. 2013, Chassot et al. 2017).
- Lack of Supply: In a new market (such as electric mobility or solar-battery systems) there is often only a limited number of suppliers. Under such circumstances, existing products may not correspond to consumer preferences with regard to aesthetics, price or other attributes.
- Peer Group Effect: Human decision-making is based not only on individual preferences, but also on social influence. The opinion of relevant reference groups may, for example, affect voter behavior (Rinscheid & Wüstenhagen 2018). Conversely, the probability of purchasing solar panels can be increased by neighborhood effects (Bollinger & Gillingham 2012, Dharshing 2017, Curtius et al. 2018).
- Interest-based Communication: Markets and the political process are characterized by competition between different communication strategies. Established players may influence preferences for change in favor of the status quo through deficit-oriented communication (Longchamp 2008).
- Emotional Influences: Decision-making is a complex interplay of rational and emotional factors (Kahneman 2011, Brosch et al. 2014, Rinscheid & Wüstenhagen 2018). Successful energy communication must also appeal to the emotional level.

It should also be noted that surveys can only cover a part of the population. Concerning **representativeness of the sample**, the Consumer Barometer meets the highest standards with regard to the Swiss population. However, differences can occur if an observed sample does not correspond to the overall population (e.g. if less than half of the voters participate in a referendum). When using the results in marketing, it should be considered that usually only part of the consumers (the so-called target group) consider the purchase of a given product. Observing the preferences of the overall population helps to identify the market potential but should be supplemented by target group-specific analyses (Kaenzig & Wüstenhagen 2008, Tabi et al. 2014, Salm et al. 2016, Petrovich et al. 2019).