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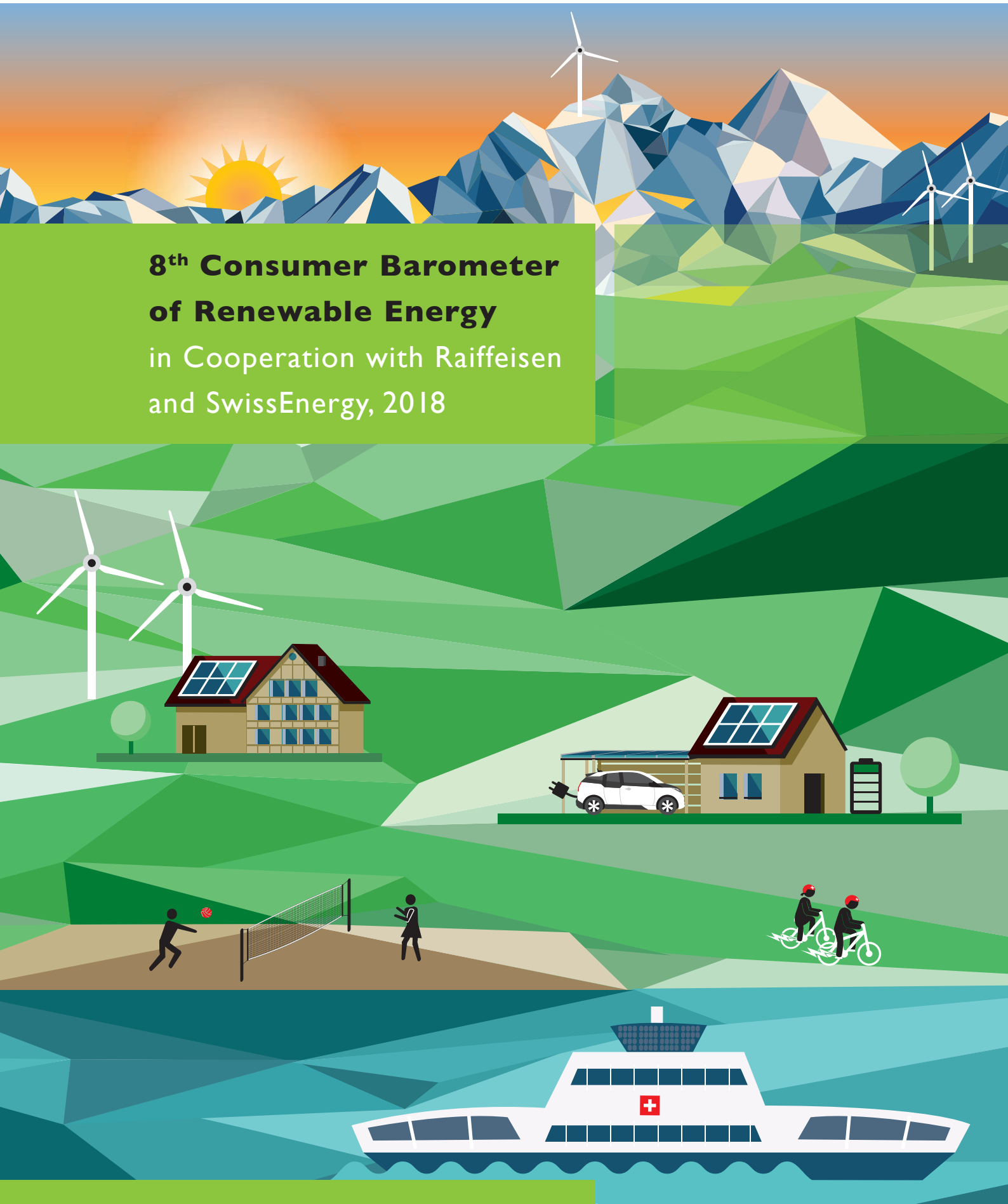
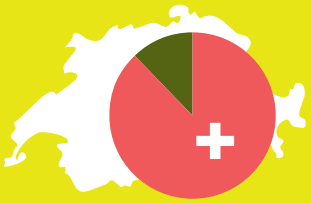


8th Consumer Barometer of Renewable Energy

in Cooperation with Raiffeisen and SwissEnergy, 2018

CONSUMER BAROMETER OF RENEWABLE ENERGY 2018

MADE IN SWITZERLAND



Preferred mix of renewable electricity is **88 %** Swiss made

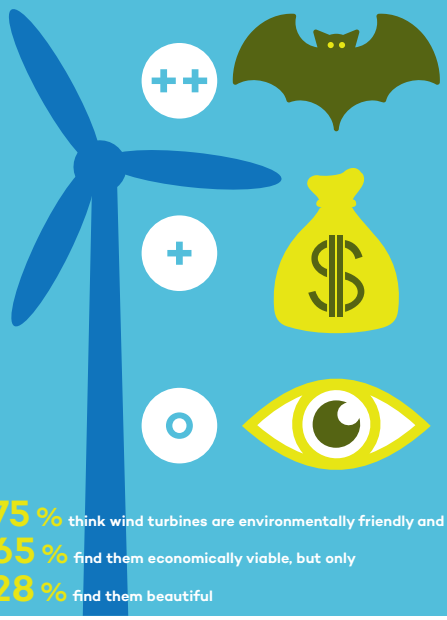
MARKET LIBERALIZATION

70 % are in favor of liberalizing the electricity market

UNAWARE OF IMPORT DEPENDENCE

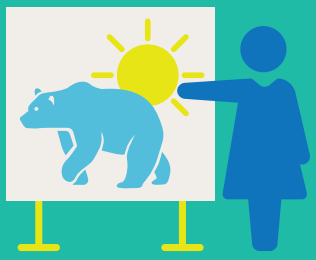
Only **7 %** know that **75 %** of Swiss energy demand (heat, electricity and fuels) is covered through imports

SOCIAL ACCEPTANCE OF WIND



75 % think wind turbines are environmentally friendly and
65 % find them economically viable, but only
28 % find them beautiful

CLIMATE EDUCATION

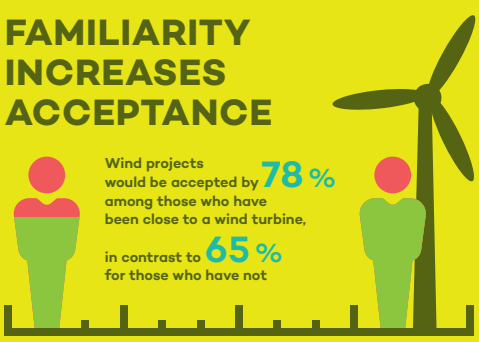


78 % think that schools should spend more time teaching energy & climate change

DIESEL BANS IN CITIES

63 % of male and
73 % of female respondents support banning the most polluting diesel cars from cities

FAMILIARITY INCREASES ACCEPTANCE



Wind projects would be accepted by **78 %** among those who have been close to a wind turbine, in contrast to **65 %** for those who have not

GREEN PENSION FUND

46 % of young people would be interested in investing part of their private pension plan (pillar 3a) in renewable energy projects

ADVANTAGES OF LESS TRAFFIC IN CITIES

52 % see cleaner air as the main benefit of reducing traffic in cities, **22 %** less noise and **10 %** safety for children

SOLAR BATTERY SYSTEMS

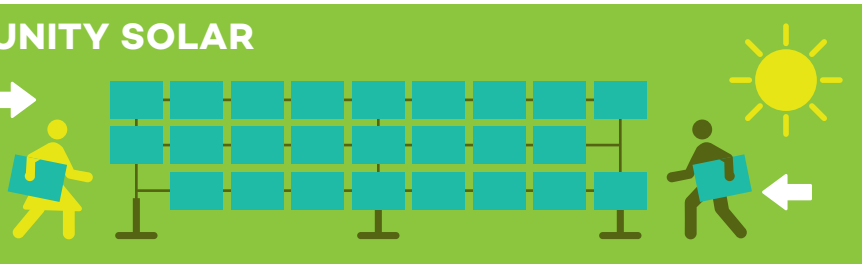
64 % are interested in buying solar panels with battery storage ... ... compared to **36 %** without storage

ENERGY EFFICIENCY SERVICES

29 % of homeowners would be very interested in a service bundle combining their mortgage with access to a network of partners for improving their energy efficiency, and another **49 %** would be rather interested in such a service

COMMUNITY SOLAR

63 % are interested in projects allowing them to invest in solar panels without owning a roof or property



First issued in 2011, the annual Consumer Barometer of Renewable Energy is one of the most comprehensive reviews of the Swiss population's preferences on energy topics. It is tracking the evolution of customer preferences on energy and climate-related issues over time and helps to identify emerging trends in areas like energy efficient buildings, electric mobility, social acceptance of wind energy, community financing of renewables, and green investment. The study is based on a representative sample of 1'019 respondents in the German- and French-speaking parts of Switzerland.

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The full report can be downloaded at
www.iwoe.unisg.ch/kundenbarometer

Executive Summary

- Compared to previous editions of the Consumer Barometer of Renewable Energy, the 2018 results show that Swiss consumers are becoming increasingly concerned about climate change and transportation-related emissions. 68% indicate that they would be in favor of banning the most polluting diesel vehicles within cities and 57% of respondents say that flying is too cheap. At the same time, their interest in new energy technologies and related financial solutions is growing. For the first time, more homeowners state that they are interested in investing in **solar panels with batteries** (64%) as opposed to solar panels without batteries (36%). Mobility preferences also seem to be changing. 42% of the respondents, who indicated that they are interested in buying a car in the next five years, state that an **electric car** would be their first or second choice.

- In terms of **financial innovation**, 29% of homeowners indicate that they would be very interested **in a service bundle** where their bank, in addition to a mortgage, would provide them access to a network of partners for improving their home's energy efficiency. Another 49% would be rather interested in such a service. 64% of respondents, three percentage points more than last year, express an interest in participating in **community solar projects**, which would allow them to invest in solar panels even without owning a roof or house. Furthermore, 46% of young people under the age of 30 say they would be interested in investing part of their private pension plan (pillar 3a) in **renewable energy projects**.

- Several findings reflect preferences that are consistent with the objectives of the Swiss Energy Strategy 2050, which has been adopted by 58% of the voters in 2017. For example, in line with the energy strategy, which calls for an expansion of domestic renewable power generation, consumers prefer renewables **"made in Switzerland"**. Their preferred electricity mix is 88% Swiss made.

- One of the areas where progress in achieving the Energy Strategy 2050 targets has been slow is the implementation of **wind energy** projects. Our results shed light on some of the social acceptance issues. In contrast to widely quoted environmental issues, the true pain point appears to be diverging aesthetic preferences: while 75% of respondents consider wind turbines to be environmentally friendly, only 28% find them beautiful. When it comes to local acceptance, we find differences between respondents who have had direct exposure to wind turbines and those who have not. 78% of those who state they have already been close to a wind park would (rather) agree to having wind turbines built close to their community, while among those who have never been close to one, this share drops to 65%.

- In line with current political debates about electricity market liberalization, we find that 70% of Swiss consumers tend to be in favor of **liberalizing the electricity market**, which would allow consumers to freely choose their electricity provider. It should be noted though that such preferences, measured in the absence of a political campaign, can change in the run-up to a popular vote.

- Despite last year's broad discussions about the Energy Strategy 2050, consumers' **energy-related knowledge** still leaves significant room for improvement. Only 7% of respondents know that 75% of Swiss energy demand (heat, electricity and fuels) is covered through imports, while the majority significantly underestimate Switzerland's import dependence. The knowledge level on this issue increased by three percentage points compared to last year. Moreover, while 87% of respondents indicate a lack of charging stations as a main reason not to buy an electric car, almost half of them significantly underestimate the number of charging stations currently available in Switzerland. Many respondents acknowledge the importance of education: 78% think that schools should spend more time on **educating young people** about energy and climate change.

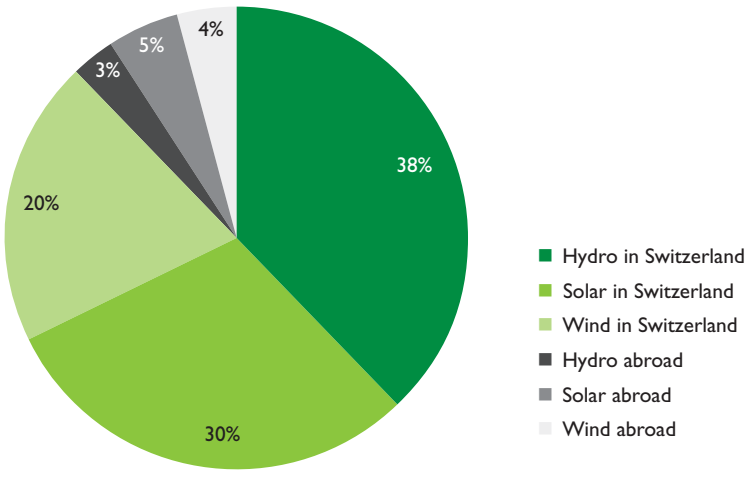
- Transportation-related **air pollution in cities** appears to be high on Swiss consumers' minds. Asked where they would see the most important advantages of reducing traffic in cities, 52% of respondents refer to cleaner air. Less noise (22%) and more safety for children (10%) follow in second and third place.

Market Liberalization and the Future Swiss Electricity Mix: Consumers' View on Energy Policy

Almost a year after the acceptance of the Swiss Energy Strategy 2050 in the popular vote of May 21st 2017, the first part of this year's consumer barometer gauges public preferences on a number of energy and climate policy issues. One of the topics that is currently back on the political agenda is the **liberalization of the retail electricity market**, which has been planned for a long time as an element of harmonization with European energy policies. In line with a majority of the national parliament[1], our survey shows that a majority of Swiss consumers would welcome the idea of choosing freely their electricity suppliers. 70% of respondents (N=1019) indicate that they are (rather) in favor of liberalization - an increase of 28 percentage points compared to 2016[2]. Only 16% of this year's respondents are (rather) against market liberalization, another 14% are undecided.

One goal of the Swiss Energy Strategy 2050 is the expansion of renewables, targeting 11'400 GWh by 2035. We asked respondents (N=1019) how they would like to see this goal achieved, offering them a choice between three different sources of renewable electricity, and a choice between projects at home or abroad. A large majority of respondents (88%) prefer **renewables "made in Switzerland"**. This result is consistent with the priorities set forth by the Energy Strategy. These preferences are also reflected by the current situation. In 2016, 39.5 TWh of renewable electricity was generated domestically[3], whereas Swiss investors owned approximately 6.6 TWh of renewable power generation abroad[4], hence about 14% of Swiss renewables were located in other European countries. In terms of preferences for specific renewable energy sources, respondents favor a rather well diversified mix consisting of hydro (41%), solar (35%) and wind (24%). When looking at the domestic part only, consumers' preferred mix would translate into 4.4 TWh/a of additional hydropower, 3.4 TWh/a of new solar and 2.3 TWh/a of new wind power generation in Switzerland. To gauge whether these are realistic expectations, these numbers can be compared to projects on the waiting list for feed-in tariffs[5]. Those currently planned renewable energy projects are in a similar order of magnitude, although with a slightly different mix: consumers' preferred mix for 2035 represents 144% of currently registered hydro projects, 169% of solar photovoltaics projects and 68% of planned wind projects, resonating with many observers' assessment that solar photovoltaics may show particularly high growth potential.

"The Swiss Energy Strategy plans for the expansion of renewables (11'400 GWh by 2035). How would you like this goal to be reached?" (1019 respondents)

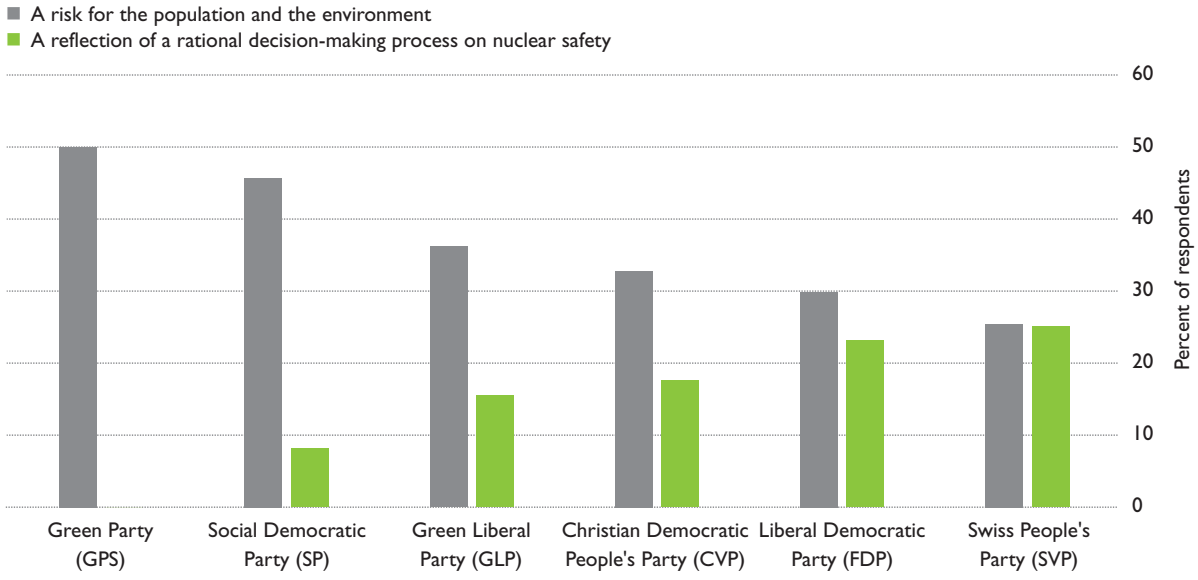


Percent of respondents

[1] https://www.24heures.ch/suisse/national-marche-electricite-ouvert/story/28952917
[2] http://iwoe.unisg.ch/kundenbarometer
[3] Schweizerische Elektrizitätsstatistik 2016
[4] https://energiezukunftschweiz.ch/wAssets/docs/hkn-neue-energie/201609_Bericht_Investitionen_EE_2016_V2.pdf
[5] Based on Q4 2017 data, https://pronovo.ch/de/services/berichte/#

While the Energy Strategy 2050 foresees a gradual phase-out of nuclear power, existing plants are allowed to continue operating "as long as they are safe". This topic is currently widely discussed due to the Swiss Federal Nuclear Safety Inspectorate's (ENSI) recent decision to allow for the restart of Beznau I, Axpo's 49-year old power plant and the oldest commercially operating nuclear reactor in the world. It had been closed for more than three years after material defects had been observed[6]. Respondents' reactions to the ENSI's decision show that **diverging views about nuclear power** persist[7] (N=1019). While only a small share of respondents agree with the operator's claim that reopening Beznau is "an important pillar of the Energy Strategy 2050" (8%) or see it as "a big step for Switzerland" (3%), a significant share perceives it as "a risk for the population and the environment" (34%), and 21% feel like restarting the plant sends "a negative signal for innovation". 13% interpret this decision as "an example of irresponsible profit maximization by managers". In contrast to other elements of the energy strategy, such as renewables or market liberalization, which find support from a variety of political camps, the **traditional left-right cleavage** persists on nuclear issues. In fact, more than 50% of supporters of the Green Party (GPS) state that restarting the power plant poses a risk for the population and the environment, whereas only 25% of the Swiss People's Party (SVP) voters share this opinion. In contrast, 25% of SVP voters say that this decision is "reflecting a rational decision-making process on nuclear safety" while the share of respondents agreeing with this assessment decreases linearly towards the left of the political spectrum, bottoming out at zero per cent of the GPS voters. To observers who thought that the decision about phasing out existing nuclear power plants could be reduced to a mere technical issue, the continued politicization of this issue may be sobering evidence.

"After being closed for more than three years, Axpo has received the authorisation to restart Beznau, its 49-year-old nuclear plant, in March 2018. I find this*:" (1019 respondents)



*This graph focuses on two answer options out of the seven offered to respondents in the survey.

[6] https://www.letemps.ch/suisse/beznau-i-plus-vieille-centrale-nucleaire-monde-devra-tourner-jusqua-2030
[7] Respondents had to select one answer only out of seven different given options.

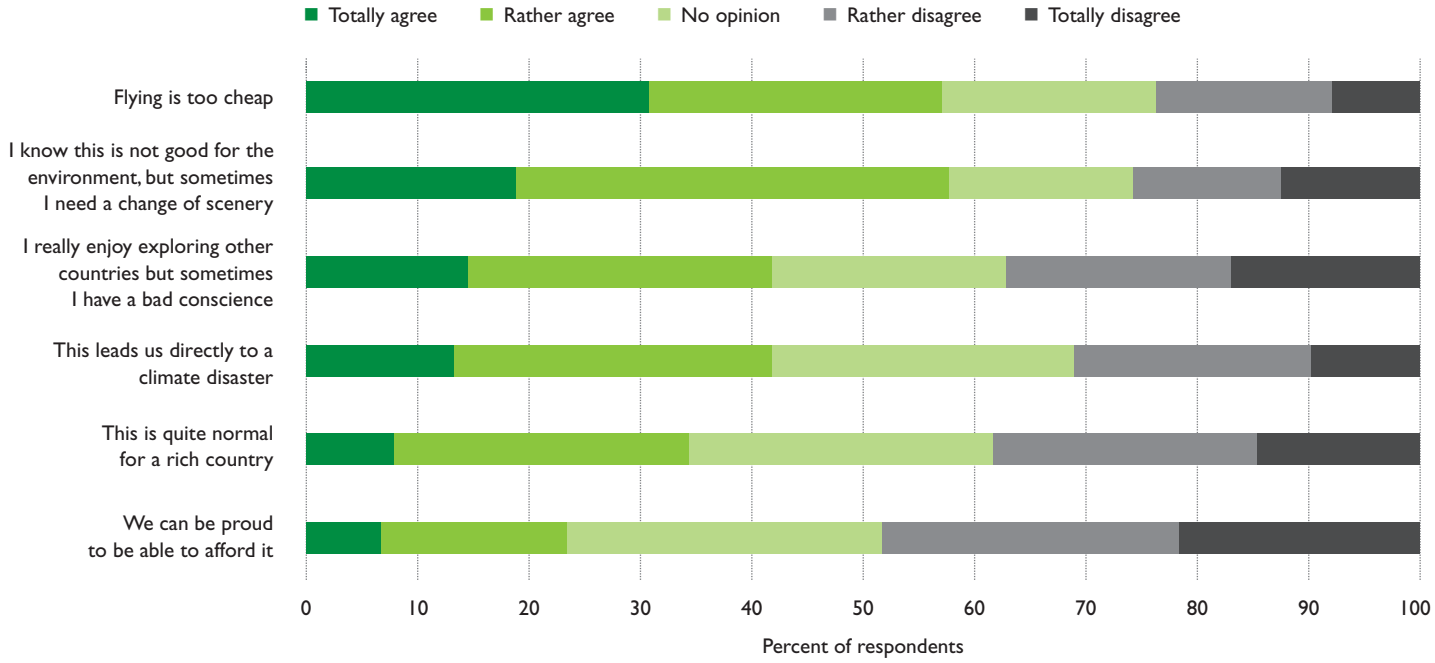
Climate change:
What to do about carbon emissions from air travel?

While carbon emissions have decreased in some sectors, air travel continues to be a problem child of Swiss climate policy. In fact, **airplane fuels** represent up to 18%[8] of Switzerland's overall **carbon footprint**[9] and more than 80% of flights departing from Switzerland have a European destination[10]. While air travel is increasing in other parts of the world too, Swiss consumers are second only to Norway when it comes to air miles per capita[11]. In addition, business travel remained stable in Switzerland showing that it is private trips that account for the rise in emissions.

Environmental organizations are calling for measures to reverse the growing trend. When asked about their **attitudes towards the impact of air travel on our climate**, respondents (N=1019) express ambivalent views. 57% of respondents in this year's consumer barometer (rather) agree to the statement "Flying is too cheap". Nearly the same share states "I know it is bad for the environment, but sometimes I need a change of scenery". Similarly, 42% (rather) agree that they really enjoy exploring other countries, but that they sometimes have a bad conscience, while the same share of respondents (rather) agree to the statement "This leads us directly to a climate disaster". A smaller share thinks that flying as frequently as the Swiss population is quite normal for a wealthy country (33%) or that we can be proud to be able to afford it (24%).

A proposed counter-measure currently being discussed, is the introduction of an **environmental tax** on flights[10]. Our results suggest that this could have some effect. About a third of respondents say they would change their travel plans (by switching to other modes of transportation or spending their vacation in Switzerland) if a CHF 50 surcharge were to be introduced on European flights, while half of them say they would simply pay the tax and fly regardless. While these answers need to be interpreted with caution, given that the discussion about the proposed tax is at an early stage, they illustrate that apart from financial aspects, travel behavior is also driven by other factors, such as availability of and previous experience with transportation alternatives (e.g. adequate international train connections).

"Swiss consumers are world champions of air travel.
To what extent do you agree with the following statements?" (1019 respondents)



[8] https://www.swissinfo.ch/fre/sci-tech/conférence-climatique-de-bonn_-il-est-choquant-que-les-déplacements-en-avion-ne-soient-pas-taxés-/43667216

[9] The statistic depends on different studies and methodologies: https://www.wwf.ch/fr/nos-objectifs/trafic-aerien; https://www.iet.hsr.ch/fileadmin/user_upload/iet.hsr.ch/Power-to-Gas/Kurzberichte/04_CO2-Fluesse_Schweiz.pdf

[10] https://www.wwf.ch/fr/nos-objectifs/trafic-aerien

[11] https://www.tagesanzeiger.ch/schweiz/standard/die-schweizer-bekommen-nicht-genug-vom-fliegen/story/17335137

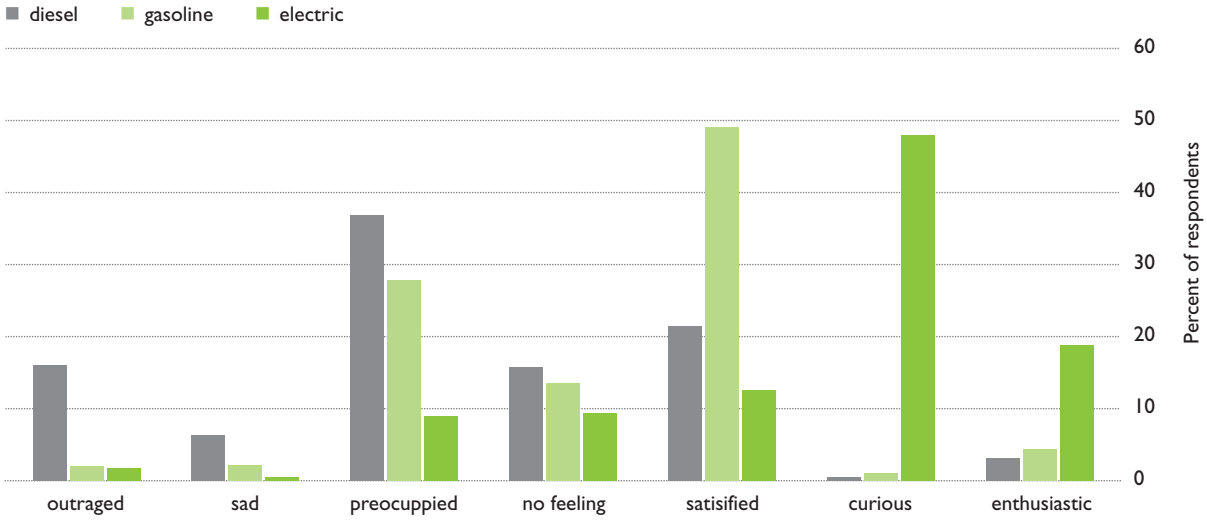
Mobility: Mixed feelings about combustion engines

Road transportation is a major source of air pollution and noise in cities[12] and a significant contributor to climate change[13]. In a recent decision, the Federal Administrative Court of Germany has ruled that cities can ban the most polluting diesel cars from their streets[14]. More generally, diesel cars have come under increased scrutiny since Volkswagen admitted, in 2015, to cheating in U.S. exhaust tests. The debate has spread across the industry and boosted investment in electric vehicles. Paris, Madrid, Mexico City and Athens have said they plan to ban diesel vehicles from their city centers by 2025, while the mayor of Copenhagen wants to ban new diesel cars from entering the city as soon as next year. France and Britain will ban new gasoline and diesel cars by 2040[14].

Transportation-related **air pollution in cities** appears to be a pressing issue on Swiss consumers' minds this year. For a majority of respondents (52%), cleaner air would be the main positive consequence of traffic reduction within cities, followed by less noise (22%) and more safety for children (10%). When asked about potential negative consequences of limiting inner-city driving, 28% of respondents say they are concerned that this might contribute to the decline of inner cities due to poor accessibility[15], while only 17% are concerned about longer travel times. As in the previous year, a majority of respondents (68%) indicate that if there was a popular initiative **banning the most polluting diesel vehicles in cities**, they would (rather) be in favor (N=1019). The acceptance of diesel bans is ten percentage points higher among female respondents (73%) than among male respondents (63%), and significantly higher among non-diesel car owners (78%) than among diesel car owners (39%).

In this year's Consumer Barometer, we also asked about the feelings respondents have with respect to different propulsion systems. As can be seen from the figure below, electric vehicles score the highest on positive feelings such as curiosity and enthusiasm. Diesel cars, in contrast, evoke negative feelings among a large part of consumers. Feelings are often a precursor of decision-making. Indeed, of those who indicated a negative feeling[16] towards diesel cars (N=603), 84% are (rather) in favor of banning diesel cars within cities while this number drops to 46% for those who expressed a positive feeling towards diesel cars[17]. However, a shift from diesel to electric cars might be slowed down by the fact that gasoline cars are positioned between the two extremes on the affective scale, being considered as the "lesser evil" compared to diesel and causing more satisfaction (54%) than preoccupation (32%). Automotive suppliers and other stakeholders who are interested in further diffusion of electric mobility should be aware of this possible **asymmetric dominance effect**[18].

"How do you feel when you think about the following types of cars?" (1019 respondents)



[12] https://www.bafu.admin.ch/bafu/en/home/themen/thema-laerm/laerm--daten--indikatoren-und-karten/laerm--indikatoren/indikator-laerm.pt.html
[13] Pollutant Emissions from Road Transport, 1990 to 2035 (FOEN)
[14] https://www.reuters.com/article/us-germany-emissions/diesel-cars-can-be-banned-from-german-cities-court-rules-idUSKCN1GA2XD
[15] https://www.forbes.com/sites/timworstall/2015/01/04/the-shopping-malls-really-are-being-killed-by-online-shopping/#79e1d76a6fbb
[16] Under the category "negative feelings", the following feelings were included: sad, outraged, preoccupied
[17] N=837 (only includes respondents who indicated both a feeling and an opinion towards a potential diesel car ban)
[18] cf. Rinscheid and Wüstenhagen (forthcoming), who identified a similar effect between coal, nuclear and solar power among Swiss voters.

Mobility: A Move from Diesel to Electric?

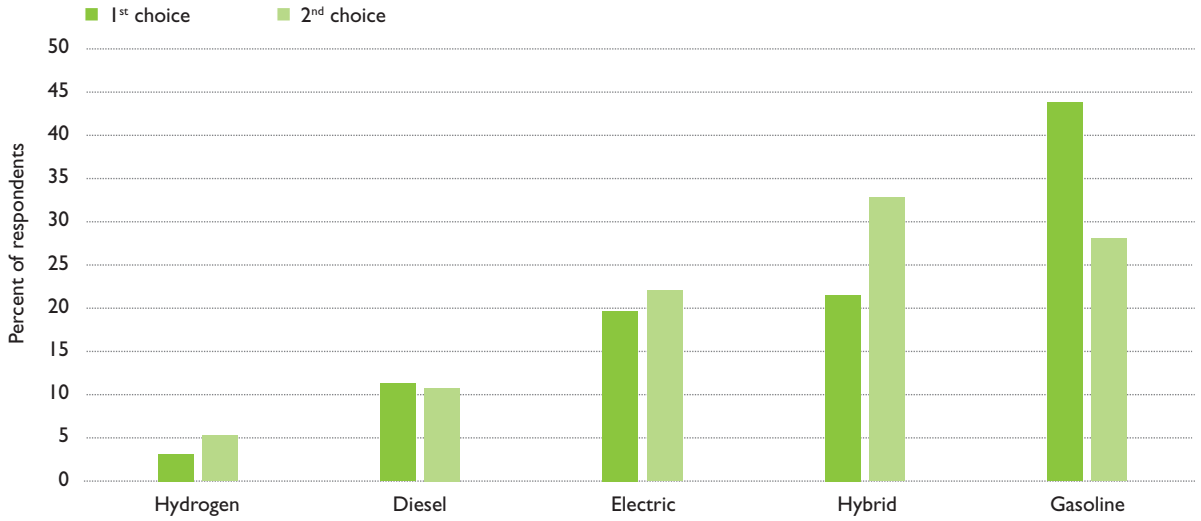
With about a third of Swiss carbon dioxide emissions originating from the transportation sector, there exists a large potential for **mobility-related climate change mitigation**. Apart from curbing traffic growth, shifting to electric mobility offers an opportunity to lower emissions. Indeed, electric vehicles not only reduce air pollution in cities, but – especially in combination with renewable energy – also carbon dioxide emissions. Globally, Bloomberg New Energy Finance[19] predicts that by 2040, 54% of new car sales and 33% of the global car fleet will be electric. In Switzerland, the Federal Council expects electric vehicles to account for 30-40% of the car fleet by 2050[20]. In Norway, every second car sold in 2017 was an electric or hybrid car[21].

We asked respondents for their preferences regarding their next vehicle purchase. 37% of respondents are interested in buying a car in the next five years (N=381). Respondents living in rural areas (located more than 10km away from the closest city), show a higher willingness to buy a car (45%) than those living in large cities (30%)[22]. Of those, the majority is interested in buying a gasoline car (44% as their first choice, 28% as second choice), hybrid vehicles come second (22% for the first and 33% for the second) and electric vehicles third (20% for the first choice and 22% for the second). Diesel cars only come in fourth position with 11% of respondents each indicating they would like to buy one as their first or second choice.

Among respondents who are interested in buying an electric car in the next five years, 32% are current diesel car owners, showing a significant potential for a transition from diesel to electric. Of those who are interested in buying an electric vehicle (N=155), 8% say they could imagine buying an electric vehicle within the next twelve months, an additional 29% in the next 2 to 3 years, 42% in the next 4 to 5 years and 17% at a later point in time.

This year, we asked again what are the most important reasons for or against buying an electric car. The respondents were presented with a list of drivers and barriers to e-mobility and asked to rank their importance. When it comes to **barriers to e-mobility**, 87% perceive a lack of public charging stations, followed by concerns about range (86%) and high purchase prices (82%). Given that we found that more than 42% of respondents underestimate the number of charging stations for EVs[23], increasing awareness regarding the existing infrastructure for electric vehicles could be an important step to reduce barriers to adoption. The most important drivers for e-mobility include protection of the environment (87%), convenient charging at home (80%) and fuel price independence (69%).

"What type of vehicle are you interested in?"*
(381 respondents who have indicated they would buy a car in the next 5 years)



*The figure excludes other answers (1%)

[19] Electric vehicle outlook 2017, BNEF, https://about.bnef.com/electric-vehicle-outlook/
[20] http://www.bfe.admin.ch/energie/00588/00589/00644/index.html?lang=fr&msg-id=57245
[21] https://www.theguardian.com/world/2018/jan/04/over-half-of-norways-new-car-sales-now-electric-or-hybrid-figures-show
[22] More than 50'000 inhabitants
[23] 42% think that there are less than 1000 charging stations, 43% between 1001 and 3000, 12% between 3001 and 5000 and 3% more than 5000 (Actual number is 4500 charging points and 2000 charging stations; source: LEMnet)

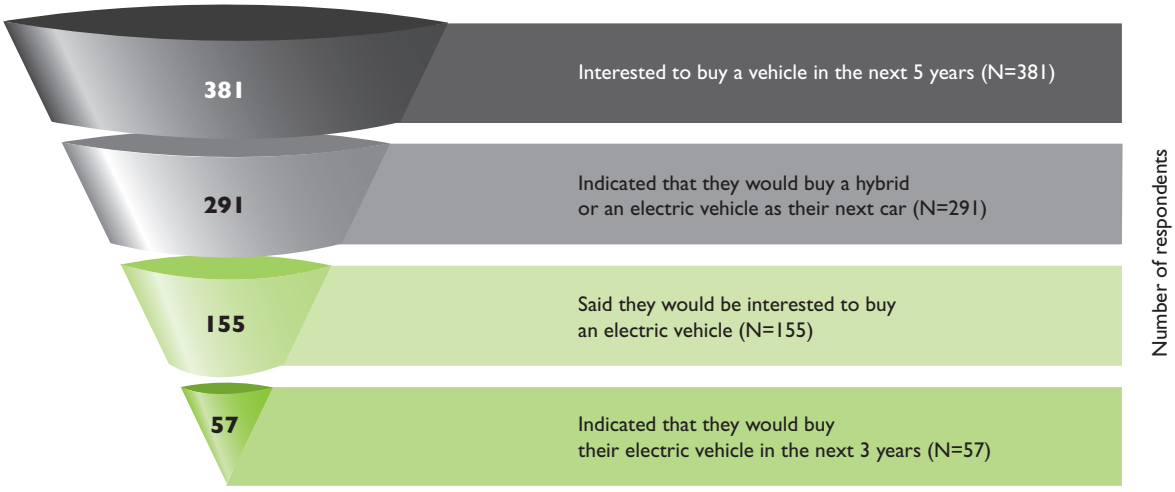
Electric Mobility: From Interest to Purchase

Moving **from intention to action in climate-friendly behavior** is a non-trivial task. Marketing practitioners therefore have to be mindful of the time it takes for consumers to move through the decision process, and ideally tailor their communications towards where people are in the sales funnel. To illustrate this, we have scrutinized people's **interest in electric mobility** through a variety of questions in this year's consumer barometer. While a large number of respondents expressed positive feelings towards electric cars (79% were either curious, enthusiastic or satisfied)[24], a somewhat smaller share (54%) have actually tried one. Moving closer to the actual purchase decision, we have to take into account that more than half of all respondents are not interested in buying a car in the next five years. Among potential car buyers (N=381), 42% say they would consider an electric car as either their first or second choice. To move from interest to purchase, **gaining first-hand experience** with an electric car can be a promising way to overcome initial concerns.[25] In fact, among those who have tried an electric car, we observed a 51% likelihood that they are interested in buying an electric vehicle in the next 5 years. This number drops to 38% for those who had no prior driving experience with an electric vehicle.

Given that short battery ranges have been a concern with earlier models, we asked what range an electric car should have in order for consumers to be able to use it on a daily basis. 23% of respondents indicate they would be satisfied with a range of 200km or more, 28 % with a range of at least 300km, 22% with a range of at least 400km, and 27% with a range of at least 500km. These results show that about half of the population is satisfied with the range currently offered by the new models of the most popular electric vehicles on the market[26]. Requirements for range varies across respondents with different political orientation: while 70% of SVP voters state that they require a range higher than 500km, this percentage drops to 31% for FDP voters and to 3% for GLP supporters.

When asked what support is needed to encourage the diffusion of electric vehicles, 48% would prefer tax incentives. However, only 11% are aware of any cantonal subsidy for e-cars and only 10% have proactively informed themselves about existing incentives. This shows potential for raising awareness about existing incentives for electric vehicles, which have already been introduced by several cantons and municipalities in Switzerland.

Market Potential for Electric Vehicles



[24] Among those who expressed a rather positive feeling (satisfied, enthusiastic or curious) towards electric vehicles, 49% of them indicated they had the intention to buy an electric car, while this number dropped to 12% for those who expressed a negative feeling (outraged, preoccupied or sad).
[25] https://www.suisseenergie.ch/page/fr-ch/eCar4Car-Echangez-votre-voiture-contre-un-vehicule-electrique
[26] www.eafo.eu/vehicle-statistics/m1

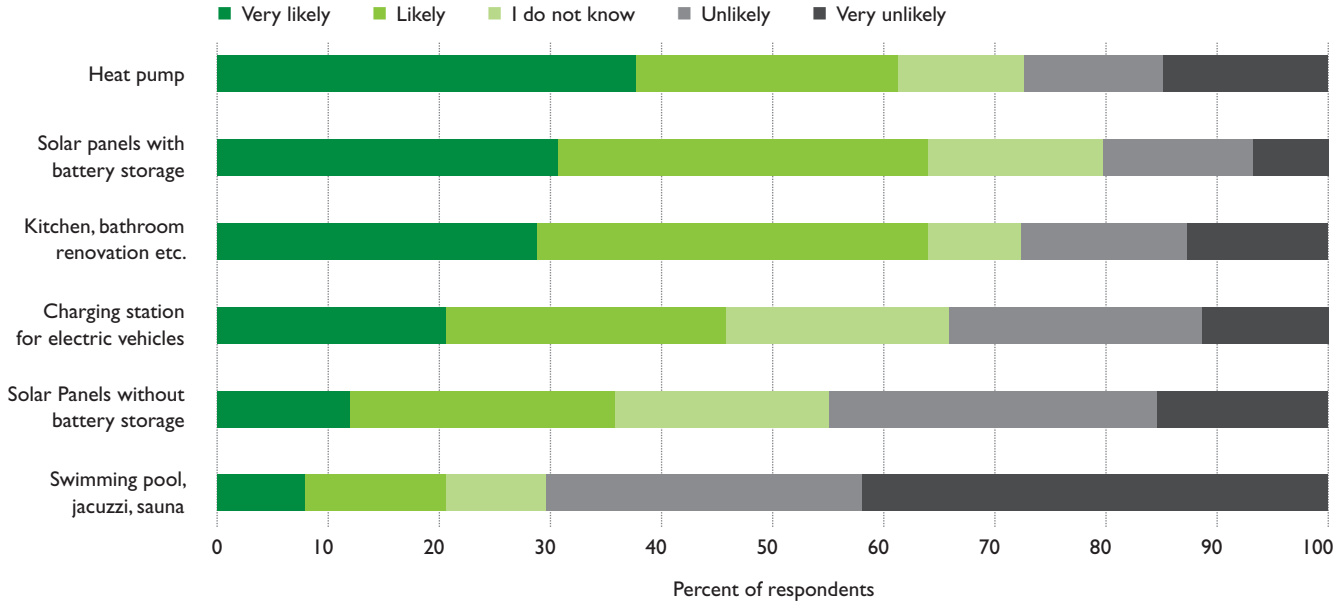
Preferences for Green Building Features

The Consumer Barometer has consistently shown positive attitudes among the Swiss population with regard to renewable energy and energy efficiency. However, building owners, property developers, financiers and state agencies are interested in knowing to what extent these attitudes are reflected in actual decisions. How do homeowners prioritize investments? Are renters more interested in apartments with solar panels or charging stations for electric vehicles? What are the motivations behind their choices?

Among the homeowners who have already installed solar panels or taken a decision to do so (N=92), 46% indicate that their main motivation is to **protect the environment**, while 37% say it is to reduce their electricity costs. Only 5% mention they are motivated by subsidies. Among those who have not decided yet or say they would never install solar panels (N=275), the main reasons indicated are a long payback time (28%) and a lack of capital (27%), which both suggest that there is potential for new financial services. Other reasons mentioned were possible problems linked to the complexity of the installation (16%), uncertainty regarding the subsidies (12%), and uncertainty with regards to the evolution of costs. 8% indicate other reasons. With regard to demographics, 42% of young respondents (below 30 years) indicate a reduction of electricity costs as a main reason to invest in solar panels, whereas the main reason for older respondents (above 59 years) is to protect the environment.

When homeowners (N=367) take decisions about **energy-related investments**, those compete with other investments in their house, such as a new kitchen or renovating the bathroom. Among energy-related investments, the most popular option is heat pumps. For the first time this year, more respondents are interested in installing a solar system with battery storage (64%) than to invest in solar panels without batteries (36%). Possibly reflecting the phasing out of feed-in tariffs and emerging opportunities for self-consumption, this finding indicates a **high market potential for PV with storage systems**.

"Imagine that you have savings available to make improvements to your home or future home, please indicate the probability that you would invest in the following": (367 respondents who are homeowners)



An aspiration for independence among renters and homeowners

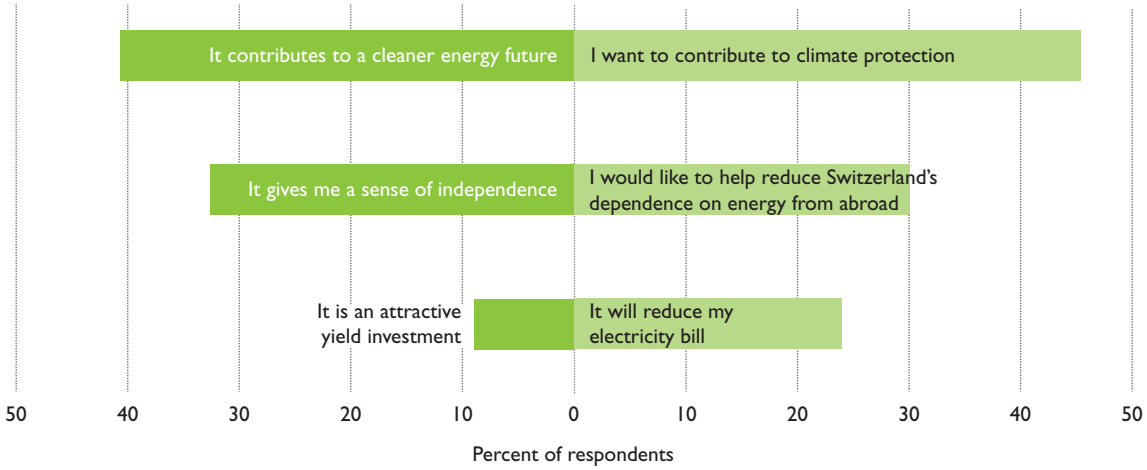
When asked about their motivation to buy a solar system with battery storage (N=236), the main two reasons respondents indicate are contributing to a **cleaner energy future** (41%) and obtaining a sense of independence (33%). A desire to benefit from modern energy infrastructures can also be found among tenants. If they have a choice between renting an apartment or home, with or without solar panels on the roof (all else being equal), 72% would prefer the solar option[27]. Similarly, 52% would prefer renting an apartment with charging infrastructure for electric cars over one without this option. New energy technologies also have some positive influence on tenants' willingness to pay. When offered a choice between an apartment with a solar roof and charging infrastructure for electric cars and an apartment without both, 54% of tenants prefer the former even at a premium of 50 CHF per month.

A desire for independence is also reflected in consumers' motivation to participate in so-called **"Community Solar"** investments. This relatively new product allows customers to financially participate in solar photovoltaics installations in their municipality, hence providing them an opportunity to invest even if they do not have their own roof to install solar panels on. We find that 63% of respondents would (rather) be interested in investing in such a project. When asked why they would invest in community solar[28], climate change mitigation (45%) and reducing Switzerland's dependence on energy imports (30%) are the top two reasons, while 24% say they would primarily invest to reduce their electricity bill. Among those who indicate they are not interested in investing in such a project (N=252), the main reason mentioned is a lack of financial means (33%). Other reasons are the fear to be committed for a long time period (28%), and not knowing enough about community solar to decide yet (21%).

Consumers' appetite for independence, and hence possibly their interest in community solar and PV with battery solutions, could further increase given that only 7% of respondents are aware of the extent to which Switzerland is dependent on energy imports. The overwhelming majority of consumers underestimates Switzerland's **import dependence**, which – when considering all areas of energy demand (heating, transportation, electricity) – currently stands at 75%.

"Among the following reasons, which is the main reason why you are interested in buying a solar system with battery storage?"
(236 homeowners who are interested to buy a solar system with battery storage)

"What is/would be the main reason that would motivate you or has already motivated you to invest in community solar?"
(658 respondents who are interested to invest in community solar)



[27] This question was only asked to renters who intend to move but are not interested in buying a property (N=208).
[28] This question was only asked those interested in investing in community solar or have already taken part in such a project (N=658)

Energy Efficiency of Buildings

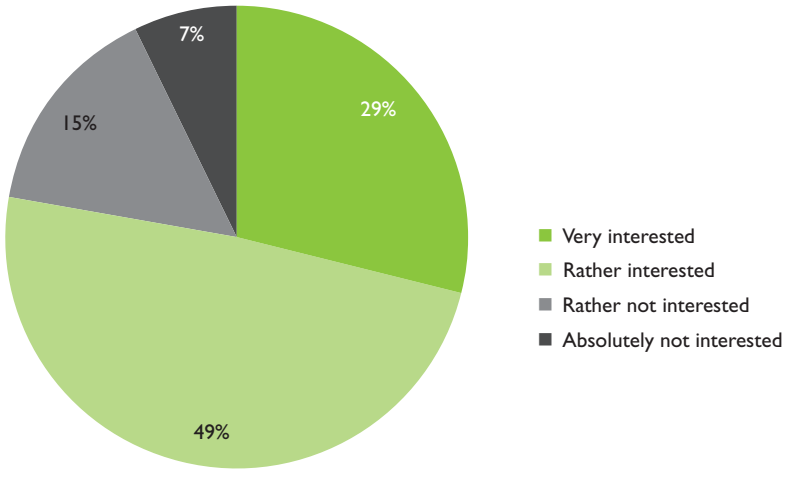
Energy labels and certification provide an opportunity for homeowners or potential buyers to get reliable information about a building's energy performance and related costs. This year, we asked respondents whether they are aware of the energy standard of the building in which they reside. 40% of renters and 41% of owners indicate that it meets the minimum legal requirements. An even higher share of renters (42%) and a somewhat lower share of owners (31%) say that they do not know. This shows that, in general, owners are more familiar than renters with the energy performance of the building they live in. However, it also reveals that awareness with regard to energy efficiency of buildings leaves significant room for improvement.

The Swiss energy performance label for buildings (Gebäudeenergieausweis der Kantone, GEAK) is an attempt to close this gap. Initially introduced on a voluntary basis, such a certification has become mandatory in some cantons, as well as in other European countries[29]. The label shows how much energy a building consumes for heating, hot water, lighting and other electricity use. It facilitates comparison with other buildings, and in the process, the owner gets suggestions for optimization measures.

When asked about their point of view regarding **mandatory energy efficiency certification** for buildings, 57% indicate that they are in favor (23% have no opinion). When asked to those in favor (N=577), what the greatest benefit of such a certification would be, 51% indicate it would help them to learn how to improve the efficiency standards of their homes, 25% say it allows them to better forecast energy costs and 22% mention it allows them to better assess the value of a property (2% had other reasons).

Swiss consumers also express an interest in improving their homes' energy efficiency and may be open to new service offerings by a variety of players involved in the building sector, including banks. Indeed, 29% of respondents who are owners (N=424) indicate that they would be very interested in a **service bundle** where their bank, in addition to a mortgage, would provide them access to a network of partners for energy efficiency improvements of their home. Another 49% say they are rather interested in such a service.

"Imagine that your bank would offer you, in addition to a mortgage, access to a network of partners to improve the energy efficiency of your home. To what extent would you be interested?" (424 owners of houses or condominiums)



Percent of respondents

[29] https://www.geak.ch

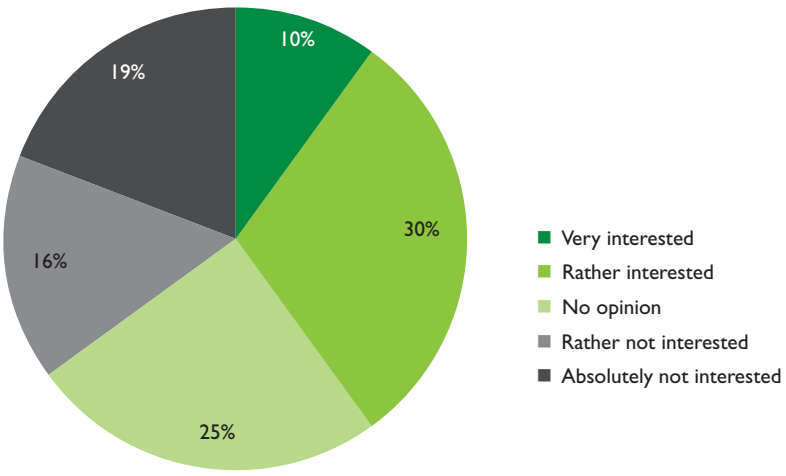
Swiss Consumers Care for Green Investments

The **financial sector** can play an important role in the diffusion of renewable energies and energy efficiency measures through offering various investments in renewable energy projects or offering loans to improve the energy efficiency of homes. This year, we asked respondents to which extent they would be interested in a variety of such products and services.

Improving the **carbon footprint of investments** is on the agenda of many financial institutions: the European Central Bank is aligning itself with the Paris Accords (COP21), no less than eight central banks (France, Great Britain, Germany, the Netherlands, Sweden, among others) are following suit by initiating an exchange network on ways to direct financial markets towards the fight against climate change, and the World Bank has announced that it will stop financing oil and gas infrastructure as of 2019[30]. While there is a lot of activity on the international level, our survey results show that there may also be interest among Swiss retail investors. One example are **green bonds**, issued by companies or public authorities to finance projects in renewable energy or energy efficiency. In fact, when asked whether they would be interested in investing in green bonds, 42% of respondents in our sample indicate they are (rather) interested, while 9% have no opinion.

In addition, we asked respondents whether they would be interested in investing part of their private pension plan (pillar 3a) in renewable energy projects. 40% of respondents indicate they would (rather) be interested, while 25% have no opinion, showing the potential to improve awareness. In terms of demographics, 46% of young respondents (below 30 years old) are (rather) interested while this number decreases to 29% for those above 59.

"If your bank gave you the opportunity to invest part of your private pension plan (pillar 3a) in renewable energy projects, how interested would you be?" (1019 respondents)



Percent of respondents

[30] https://m.24heures.ch/articles/29369144

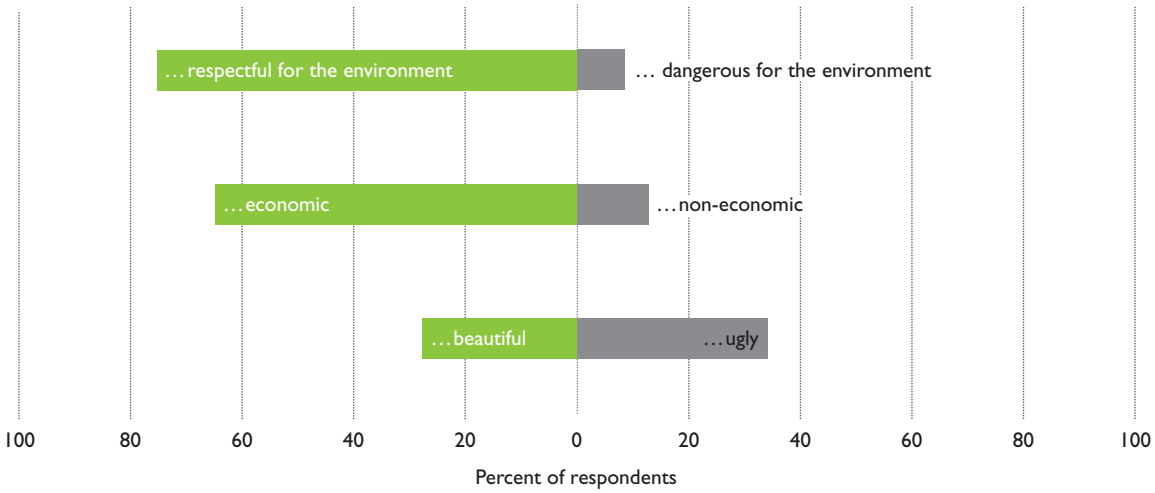
Social Acceptance of Wind Energy

One of the areas where progress towards the Swiss Energy Strategy 2050 targets has been slow is the implementation of wind energy projects. Wind energy currently contributes 132 GWh/a[31] to the Swiss electricity mix. In comparison, Switzerland's neighboring countries Austria, Germany, Italy and France combined already generate more than 150'000 GWh of wind energy per year, and onshore wind has become one of the cheapest forms of electricity generation in those countries[32].

A key challenge in Switzerland are very long **implementation times** of new wind projects, in some cases reaching 10 years or more, more than twice as long as in other European countries[33]. As an attempt to accelerate permitting procedures, the Swiss Energy Strategy 2050 promotes renewable power generation projects of more than 20 GWh per year to the status of national interest, implying that these are now on par with nature and landscape protection issues[34]. This could facilitate decision-making by authorities and courts in a timely manner[35]. Although this new legislation may cause some positive momentum for wind development in Switzerland, it is important to understand the **drivers of local acceptance of wind projects** in greater detail.

In the public debate about proposed wind projects, frequently mentioned issues are environmental concerns or doubts about the economic viability of wind energy. Our survey results put this perception into perspective and uncover a different factor that may be an underlying **driver of resistance**. 75% of respondents say they consider wind turbines to be environmentally friendly, while only 8% consider them to be harmful for the environment. Similarly, 65% of respondents consider wind turbines to be economically viable, whereas only a minority (13%), thinks they are uneconomic. In contrast, there is a lot more divergence when it comes to aesthetic preferences. While 28% of respondents think that wind turbines are (rather) beautiful, about a third thinks they are (rather) ugly. Moreover, the results show that the acceptance of wind turbines is thirty-five percentage points higher among those who indicate that they find wind turbines (rather) beautiful (N=282) than among those who indicate that they find them (rather) ugly (N=348)[36].

"I find wind turbines to be...*": (1019 respondents)



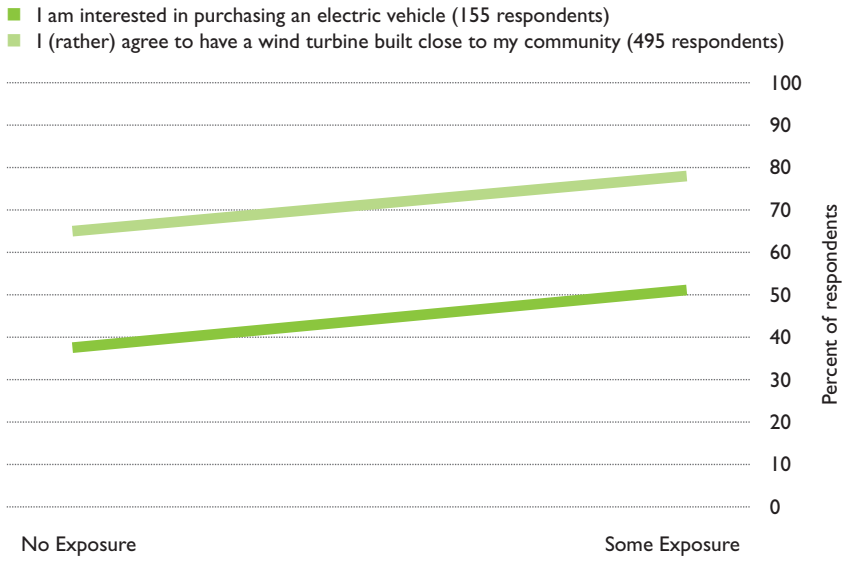
*This figure excludes the "no opinion" answer option.

[31] http://www.suisse-eole.ch/media/ul/resources/Suisse_Eole_Faktenblatt_Windenergie_Zahlen_201803_.pdf
[32] http://gwec.net/wp-content/uploads/2018/04/Global-Installed-Wind-Power-Capacity-MW-%E2%80%93-Regional-Distribution-1.jpg
[33] Wüstenhagen, R./Blondiau, Y./Ebers Broughel, A./Salm, S. (2017) Lowering the Financing Cost of Swiss Renewable Energy Infrastructure: Reducing the Policy Risk Premium and Attracting New Investor Types. University of St. Gallen/BFE.
[34] BFE. (2017). Wichtigste Neuerungen im Energierecht ab 2018. http://www.bfe.admin.ch/energiestrategie2050/ index.html?lang=de&dossier_id=06919
[35] BFE. (2017). Wichtigste Neuerungen im Energierecht ab 2018. http://www.bfe.admin.ch/energiestrategie2050/ index.html?lang=de&dossier_id=06919
[36] For this measure, N=577, excluding respondents who had no opinion regarding the aesthetic of wind turbines or whether they were in favor or against having one built close to their community.

Obviously tastes differ, but our results provide one potential hint on how some of the divergence on this issue might be reduced: the moderating effect of familiarity. While on average, 74% of respondents are (rather) in favor of having one built close to their community, this share increases to 78% among those who state they have already been close to a wind park. In contrast, among those who have never been close to a wind park, local acceptance drops to 65%. This points to a "Learning by doing" effect in social acceptance, similar to our findings in the electric mobility section, where first-hand experience driving an electric car was shown to be positively related to acceptance.

In terms of demographics, the highest level of acceptance of wind energy can be found among residents of large cities[37] as 84% of this group (rather) agree to having a wind turbine built close to their community. This number drops to 70% for those living further away from the cities[38]. Acceptance also varies among age groups: while 80% of respondents below 30 (rather) agree with having a wind turbine built close to their community, this number drops to 68% for those above 59. Moreover, we find that opinions on wind energy are less polarized than the issue of nuclear power. In fact, the majority of supporters of all parties are (rather) in favour of having a wind turbine built close to their community. Acceptance ranges from 64% for SVP voters to 82% for Green Party supporters, while 21% of SVP voters and 8% of Green Party supporters (rather) disagree.

Effects of Exposure on Acceptance



[37] Cities with more than 50'000 inhabitants
[38] More than 10km away from the next city

University of St. Gallen -
Students during an excursion at Haldenstein
in September 2017

Acknowledgments

Our special thanks go to Erol Bilecen of Raiffeisen and Raphael Zürcher of SwissEnergy for a productive and pleasant collaboration on the concept of the study. We would like to also thank Michael Schrackmann, Célina Wagner and Ellen Stockmar, for their professional support in preparing this publication.

Data and Methods

The study is based on a representative survey of 1'019 Swiss respondents aged 15 to 74, residing in the German- and French-speaking parts of Switzerland. The data was collected in April 2018 and the sample was drawn from the B2C online panel of intervista AG[39]. The sample is representative for gender (51% women) and education, with 38% 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, 24% in Alpine/Pre-Alpine regions, 22% in the Western Midlands and 29% in the Eastern Midlands. Since 2017, the Consumer Barometer sample is also representative for political orientation according to the results of the latest national elections. The sample includes 62% of home or condo owners and 38% of renters.

[39] http://www.intervista.ch/en/panel

From Attitudes to Behavior: A Note on Interpreting Survey Data

The 8th Consumer Barometer shows – similar to previous years – positive consumer attitudes towards renewable energies. Decision-makers who take the study results as a starting point for strategy development should be aware of the following points.

Consumer behavior 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*).
- **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*).

Chair for Management of Renewable Energies, University of St.Gallen

The Good Energies Chair at the Institute for Economy and the Environment, University of St.Gallen, focuses on issues related to management of renewable energies, including analysis of investment strategies and policy, as well as research on business models and consumer behavior. The Chair's research has been published in leading academic journals in the field and has informed decision-makers in Switzerland and internationally. The Chair was founded in 2009 and is led by Prof. Dr. Rolf Wüstenhagen.

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Raiffeisen Switzerland is Switzerland's leading retail bank with 3.7 million clients served in 912 locations across Switzerland. With a 17.5% share of the Swiss mortgage market and CHF 181 billion in loans to clients, we strive to advance sustainable investment together with our corporate and private clients, and as such understand the need to track and assess opportunities and risks of renewable energies. The "Consumer Barometer of Renewable Energy" provides context and valuable insight into customers' views on renewable energy as well as their expectations towards financial services providers. Raiffeisen Switzerland applies these findings by developing sustainability products and services tailored to our clients' needs.

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SwissEnergy: Raising Awareness for Energy Efficiency and Renewable Energy

Launched by the Federal Council in 2001, the SwissEnergy programme aims to increase energy efficiency and the use of renewable energies, thus making a substantial contribution towards achieving energy and climate policy goals. The programme focuses on raising awareness and on providing information and advice, basic and continuing education and training and quality assurance in various priority areas. A particular objective is to break down the barriers that prevent the full potential of energy efficiency measures and renewable energies from being realised. SwissEnergy supports the implementation of legislation, promotion programmes and market instruments related to energy and climate policy. Through innovative projects, partnerships, advice initiatives and other activities, SwissEnergy also encourages the implementation of voluntary initiatives in households, communities and businesses. Since 2011, SwissEnergy has focused more closely on end consumers, working with representatives of the private and public sectors and other organisations to support initiatives and campaigns.

www.energieschweiz.ch

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