



**6th Consumer Barometer
of Renewable Energy**
in Cooperation with Raiffeisen



Good Energies 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 the 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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Introduction

Since 2011, the Consumer Barometer of Renewable Energy has established itself as one of the largest and most comprehensive annual reviews of the Swiss population's preferences on energy topics. This year's edition introduces a number of novel themes, including the digitalization of the energy sector through smart metering, batteries, and electric mobility. The study includes a choice experiment on consumer preferences for green building attributes, including energy efficiency certification (GEAK) and rooftop solar with battery storage. For the first time, we also look at the energy-related attitudes of the Swiss youth, comparing and contrasting their views with those of the general population.

The study has been prepared by the Good Energies Chair at the University of St.Gallen, with financial support from Raiffeisen. Our special thanks go to the Corporate Social Responsibility department at Raiffeisen and especially to Dr. Ladina Caduff and Beat Stemmler for a productive and pleasant collaboration on the concept of the study. We would also like to thank Dr. Michael Schrackmann of intervista AG as well as Céline Wagner of misigno graphic-design for their professional support in preparing this publication.

Data and Methods

The study is based on a representative survey of 1,001 Swiss respondents aged 15 to 74, residing in German- and French-speaking parts of Switzerland. The data were gathered in January and February of 2016, and the sample was drawn from the B2C online panel of intervista AG¹, which includes more than 50,000 individuals. The number of men and women in the main sample is roughly equal. The sample is also representative of the broader Swiss population with respect to respondents' education level. A third of respondents obtained higher education and 42% have vocational training. Geographically, the sample corresponds to the distribution of the overall population among the German- and French-speaking regions of Switzerland. 29% of respondents reside in the Eastern Midlands, 24% in the Pre-Alpine region, and 22% in the Western Midlands. The remaining quarter of respondents live in the French-speaking part of Switzerland. Since the majority of energy-related decisions are made by property owners, we made sure that the sample includes 450 respondents who own their domiciles: 31% of all participants are house owners and 14% are apartment owners. The remaining 55% of respondents (N=551) live in rented apartments (51%) or rented houses (4%).

This year's edition of the Consumer Barometer includes an exploratory analysis of young people's energy-related views and preferences. Its purpose is to identify emerging trends among Swiss teenagers. The youth survey was conducted in German only and does not claim representativeness of the Swiss population, unlike the main Consumer Barometer. The youth sample consists of 144 teenagers (not included in the main sample of 1,001 respondents) between 14 and 18 years old who were recruited through intervista's online panel. 63% of young respondents are female and 37% male. In terms of age, 18-year-olds make up 44% of the youth sample, followed by 17-year-olds (28%), 16-year-olds (19%), and finally 14- and 15-year-olds, who comprise the remaining 8% of the youth sample. Most young respondents (64%) have already completed compulsory school, 19% have obtained a high school diploma and 10% completed vocational training. The majority of the young respondents live in houses (57%) or apartments (6%) owned by their families, while the families of the remaining third of respondents live in rented apartments (31%) or rented houses (6%). With respect to geographical distribution in the youth sample, the share of respondents living in the Eastern Midlands (33%), in the Pre-Alpine region (30%) and in the Western Midlands (27%) is roughly equal, with the remaining 10% residing in Western Switzerland.

¹ <http://www.intervista.ch/en/panel>

Executive Summary

- The most **popular sources of electricity** generation are solar, wind and hydropower. 69%, 61% and 59% of respondents respectively would like to see these three energy sources promoted in Switzerland. Among young people, the preference for renewables is even more pronounced. In contrast, a mere 6% of both adults and young people think nuclear power should be promoted. 72% of respondents and 81% of young respondents see a **wind turbine** as a symbol of a progressive energy supply.
- 92% think **local** energy resources should be used whenever possible. Many consumers expect green electricity to be **“made in Switzerland”** or even within their region. Nearly half (48%) of the respondents would prefer green electricity to be produced within Switzerland and an additional 38% would like the production to be even more local, i.e. within their municipality or region. Importing green electricity is approved by just 1% of respondents, and 12% were indifferent as to where green electricity originated.
- Lack of political support (59%), low oil prices (42%) and force of habit (40%) are seen as the top three **barriers** to further deployment of renewables in Switzerland. On the other hand, the contribution of renewables to climate change mitigation (86%), them being inexhaustible resources (62%), and their contribution to reducing energy dependence (54%) are the three most frequently mentioned **drivers** of renewable energy deployment.
- With respect to the federal government’s proposal to shift from the current system of feed-in tariffs to a system of **steering taxes**, our study finds some support for the new system, but not a clear-cut preference. While 29% support the Federal Council’s proposal to change the system, 16% would rather keep existing renewable energy policies, 25% find both systems useful and 21% have no opinion. Interestingly, only 9% of respondents reject both policies. One of the typical challenges with energy taxes is that there is a trade-off between effectiveness and acceptability. Higher taxation levels tend to have a stronger effect on behavior, while lower levels are more likely to be accepted by a majority of voters. This trade-off is also reflected in our results: if steering taxes were introduced, only a minority of respondents would accept taxes that increase the price of electricity and fuels by more than 10%.
- **Digitalization** in general and of the energy sector is seen as a mixed blessing. While many respondents see it as a gain in comfort (54%), and appreciate better interconnectedness in their everyday lives (52%), nearly half of the respondents express concerns about privacy and data security. 38% see digitalization as a danger to authentic interpersonal relationships. Among the positive aspects of digitalization of the energy sector, better transparency about energy consumption and the opportunity to integrate decentralized electricity generation (e.g. solar) are seen as most valuable.
- The idea of energy efficiency certification of buildings (such as the cantonal rating scheme **GEAK**) finds widespread support. Despite the fact that only 29% are familiar with GEAK, 59% of all respondents favor the idea of mandatory certification. This support for mandatory certification is higher among renters (66%), who may see building ratings as helping them pay less for energy, than among owners (50%).
- 74% of respondents think that **battery storage** might revolutionize the electricity supply. This is reflected in expectations of falling prices for battery systems similar to the cost reductions observed for solar panels in recent years. Only a minority of respondents (21%) think that buying battery storage is already a profitable investment today.
- While current market penetration of **electric vehicles** is low (only 2% say they regularly use an electric car), interest is definitely high. 23% say they have already tested an electric car, and another 55% expressed interest in trying one out. 25% of all respondents say they could imagine buying an electric car in the next two years. Among young people, 41% say they could imagine purchasing an electric car as their first vehicle.
- Among possible political **incentives for electric mobility**, an expansion of charging infrastructure (69%) and tax incentives for buying electric cars (47%) are clearly the most preferred instruments. Pilot projects to facilitate test drives also find widespread support (27%). Only 12% think that electric mobility should not be supported. Among young people, the top two reasons for supporting electric mobility are its contribution to climate protection (70%) and to improving air quality in cities (69%).

ELECTRIC MOBILITY

Only **2%** regularly use an electric car...
...but the interest is very high:



23% have already tried out an electric car.

55% expressed interest in trying it out.



25% could imagine buying an electric car in the next two years.

POLITICAL INCENTIVES FOR E-MOBILITY



47% would be for tax incentives to purchase electric cars.

69% would be for an expansion of the charging infrastructure.



A BATTERY REVOLUTION?



74% think that battery storage might revolutionize the electricity supply.

DRIVERS OF RENEWABLE ENERGY DEVELOPMENT



86%

see the contribution of renewable energies to climate change mitigation as a key driver.

62% appreciate the fact that they are inexhaustible sources of energy.



54%

consider their contribution to reducing energy dependence as a key driver.

BARRIERS TO RENEWABLE ENERGY DEVELOPMENT



59%

consider the lack of political support as a key barrier.



42%

see the low oil prices as an important barrier.



40%

think that force of habit is a key barrier.

ELECTRICITY „MADE IN SWITZERLAND“



48% prefer green electricity produced within Switzerland.

92% think that local energy resources should be used whenever possible.

MODERN ENERGY

72%

of adults, and

81%

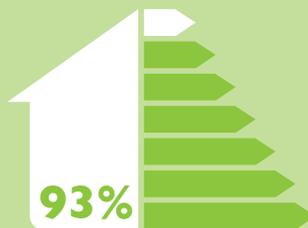
of young respondents see a wind turbine as a symbol of a progressive energy supply.



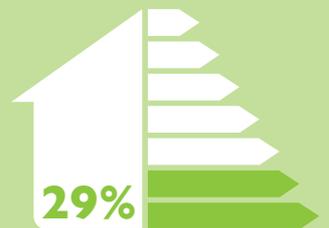
ENERGY EFFICIENCY IN BUILDINGS



are in favor of mandatory certification of buildings.



know the Minergie standard.



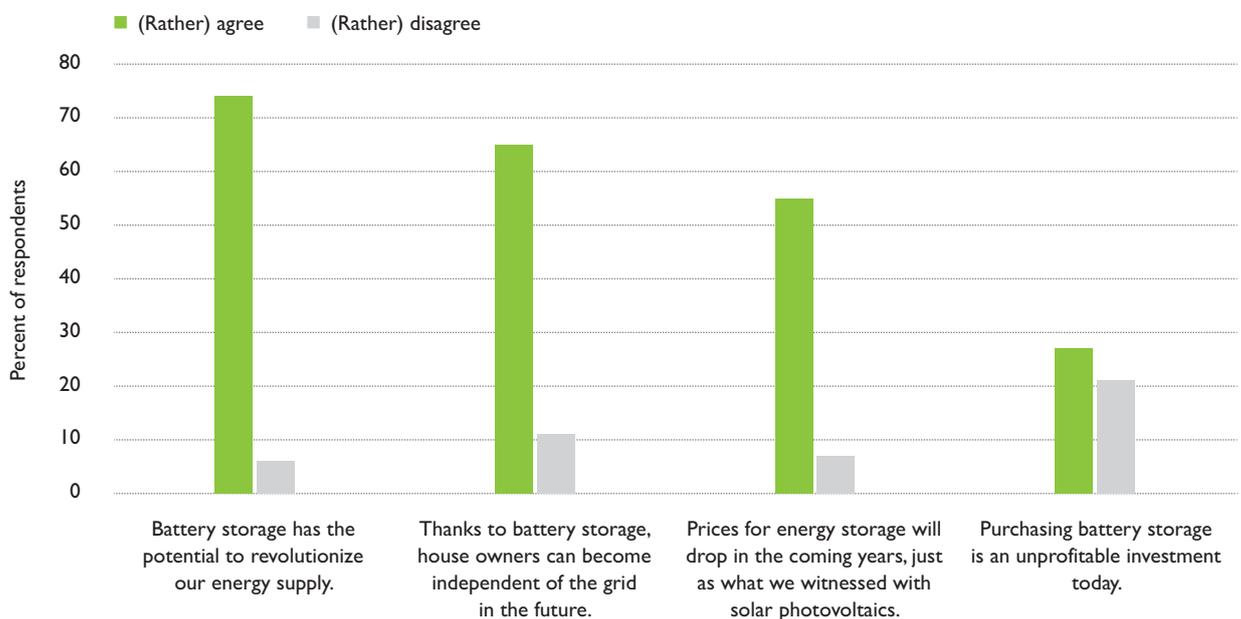
know the GEAK standard.

The Rise of the Solar Prosumer: Renting Out Roofs and Storing Sunlight in Batteries

The term “prosumer” has entered the vocabulary of energy professionals relatively recently. It refers to the group of **electricity consumers who also act as electricity producers**, for example, by owning a rooftop solar system and feeding electricity into the grid. In addition to the classical rooftop solar business model, where the homeowner owns and operates the photovoltaic panels, new business models have emerged that help prosumers finance the upfront cost of a solar system. Under **a solar leasing agreement**, the homeowner leases the roof to the installer, who keeps ownership of the solar system and sells the electricity generated. 84% of homeowners in our sample were open to the idea of leasing their roofs to host a solar installation in exchange for a monetary payment, up by 20 percentage points from 64% last year.

Flexibility is the key word not only for solar system ownership, but also for selling and purchasing electricity. Previously, there were only two options for prosumers: either to sell the energy back to the grid or to consume it immediately on site. With the introduction of **battery storage**, prosumers can now enjoy the flexibility of storing for a later use the green electricity they generate. Still far from the mainstream, energy storage has the potential to revolutionize the electricity system, a sentiment to which 74% of respondents agreed or rather agreed. In addition, energy storage makes prosumers less reliant on the grid, which was welcomed by 65% of respondents. While the current cost of energy storage is seen as a major barrier for its wide-spread adoption and only 21% view the purchase of battery storage as a profitable investment today, a majority (55%) of respondents expect the costs of batteries to drop significantly in the coming years.

“To what extent do you agree with the following statements?”



Energy Efficiency in Buildings

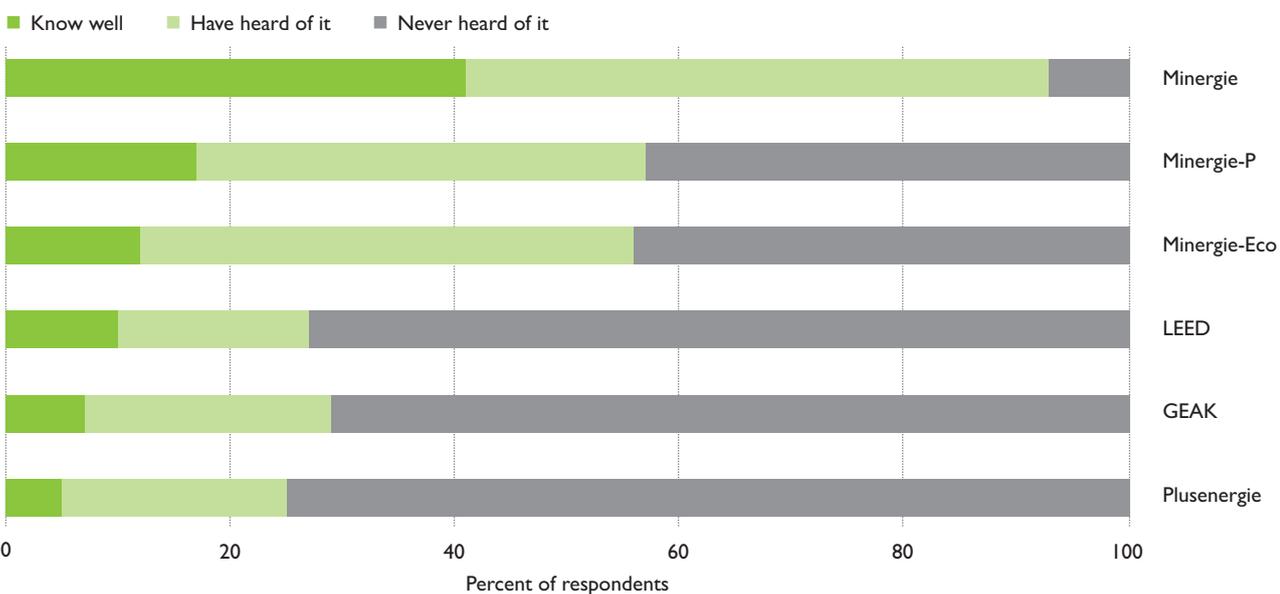
Independent energy certification schemes have become increasingly popular in recent years because they provide **reliable information about a building's energy performance**. 93% of respondents mentioned that they either “know well” or “have already heard” about the Minergie standard, an independent third-party certification scheme. Related standards such as Minergie-P and Minergie-Eco are less known. In contrast to the Minergie brand, which was introduced more than 20 years ago, the Swiss building energy performance certification scheme (GEAK², *Gebäudeenergieausweis der Kantone* in German), launched in 2009, is less known among the general population. Only 29% of respondents say they know GEAK well or have already heard about it. Awareness is higher among property owners (40%) than renters (21%). While GEAK certification is mandatory in some cantons, it is voluntary in most others. The idea of **mandatory GEAK certification** is supported by 59% of respondents – an increase of six percentage points over last year's Consumer Barometer. Support for mandatory certification is higher among renters (66%) than owners (50%).

45% of respondents could not say whether their residence has any certification or even meets minimal legal requirements with regard to energy efficiency. 16% of respondents in the sample reported that the building they live in had an energy efficiency label; most of these buildings were built after 2006 and complied with the Minergie standard.

Most of the respondents obtained **information about energy efficiency standards** from the media, such as magazines (48%), internet (37%), TV (33%), or radio (21%). 35% heard about building standards by word of mouth from their friends and family, while 22% obtained information through a property owners' or renters' association. Only a small share of respondents obtained information directly from experts such as architects (16%), a cantonal energy office (8%), or a bank (3%).

Compared to household appliances and cars, energy efficiency certification in the building sector still has some untapped potential. While only 32% of respondents say they would take an energy efficiency label into account when buying a house, 84% report considering an energy label when purchasing a refrigerator. Other product categories in which the energy efficiency label has gained **relevance for consumer decision-making** are washing machines (mentioned by 80% of respondents), freezers (79%), lamps (73%), driers (63%) and cars (57%).

“How familiar are you with the following energy efficiency standards for buildings?”



² <https://www.geak.ch/>

Do Renters and Buyers Value Green Building Features? A Choice Experiment

The Consumer Barometer consistently shows positive attitudes among the Swiss population with regard to renewable energy and energy efficiency. However, building owners, property developers, and financiers are interested in knowing whether these attitudes are reflected in **decisions to buy or rent property**. All else equal, do respondents prefer “green buildings” to other buildings? And specifically: do features like rooftop solar photovoltaics or favorable energy efficiency ratings add customer value?

Given that data on real estate transactions involving energy-certified houses and buildings with rooftop solar are still sparse in Switzerland, we investigate consumer preferences for green buildings by means of a **choice experiment**. Choice experiments are widely used in market research for innovative products, as these experiments allow for analyzing consumer preferences where market data is not (yet) readily available.

Respondents to our survey completed a series of ten choice tasks. Each task presents four alternative properties and asks the respondents to identify a property that they would be most likely to rent or purchase. The potential properties were described according to six attributes: **two “green” characteristics** (GEAK certification and rooftop solar with or without storage³), as well as four traditional features (location, size, interior fittings, and price). In the choice tasks, attribute levels were systematically varied, requiring respondents to make trade-offs between more and less desired properties. Observing respondents’ choices allows us to indirectly measure consumer preferences for certain attributes and their levels.⁴

The **results of the choice experiment** indicate that “green” building attributes indeed contribute positively to customer value. The fact that the relative importances of the two energy-related attributes add up to 28.5% suggests that (all else being equal) the respondents prefer buildings with higher energy efficiency ratings and/or solar panels on the roof. Between these two attributes, energy efficiency rating is slightly more important (16.5%) than rooftop solar (12%). Our experiment further yields some straightforward findings related to consumer preferences. Our estimations confirm the importance of traditional attributes such as location, size and price in determining property choices.

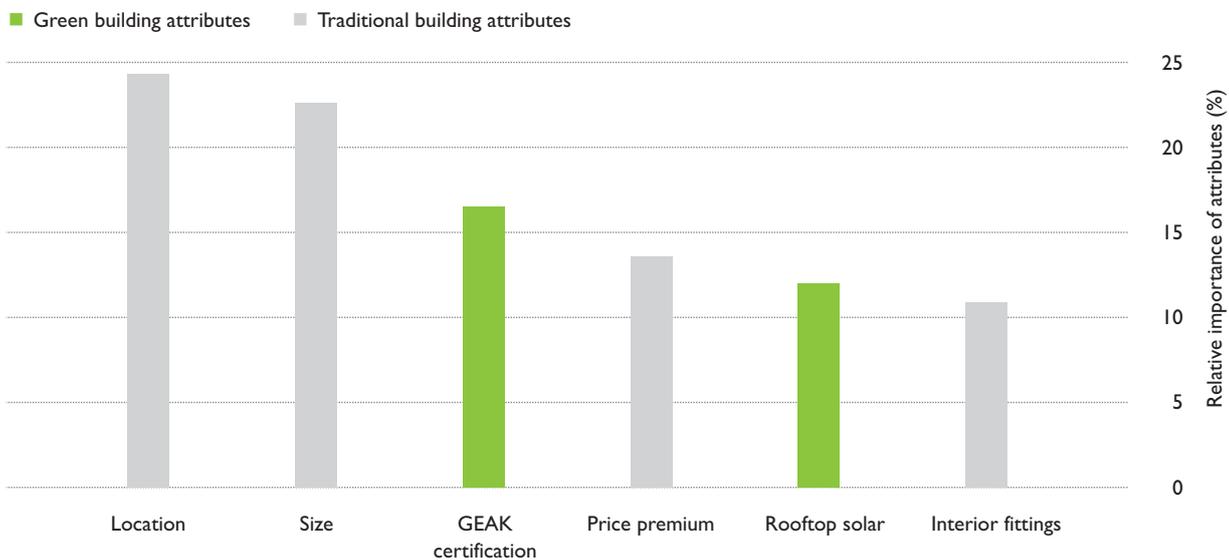
When it comes to green features, buildings certified with energy efficiency ratings A or B are strongly preferred over those with the lower D or F ratings. This preference is even more pronounced among the French-speaking respondents. Furthermore, it is interesting to observe that respondents exhibit interest in combining a solar system with full- or half-day battery storage. This finding indicates the potential for **marketing PV plus storage systems as an element of modern, high performance buildings**.

As a methodological note, choice experiments are popular in market research because they mirror a realistic decision situation, requiring respondents to make trade-offs between desired attributes and their levels. In interpreting the results of monetary attributes, however, it is important to be mindful of the experimental nature of the survey setting. As more real estate transactions involving green buildings occur, further research can validate the stated preference results with actual market data.

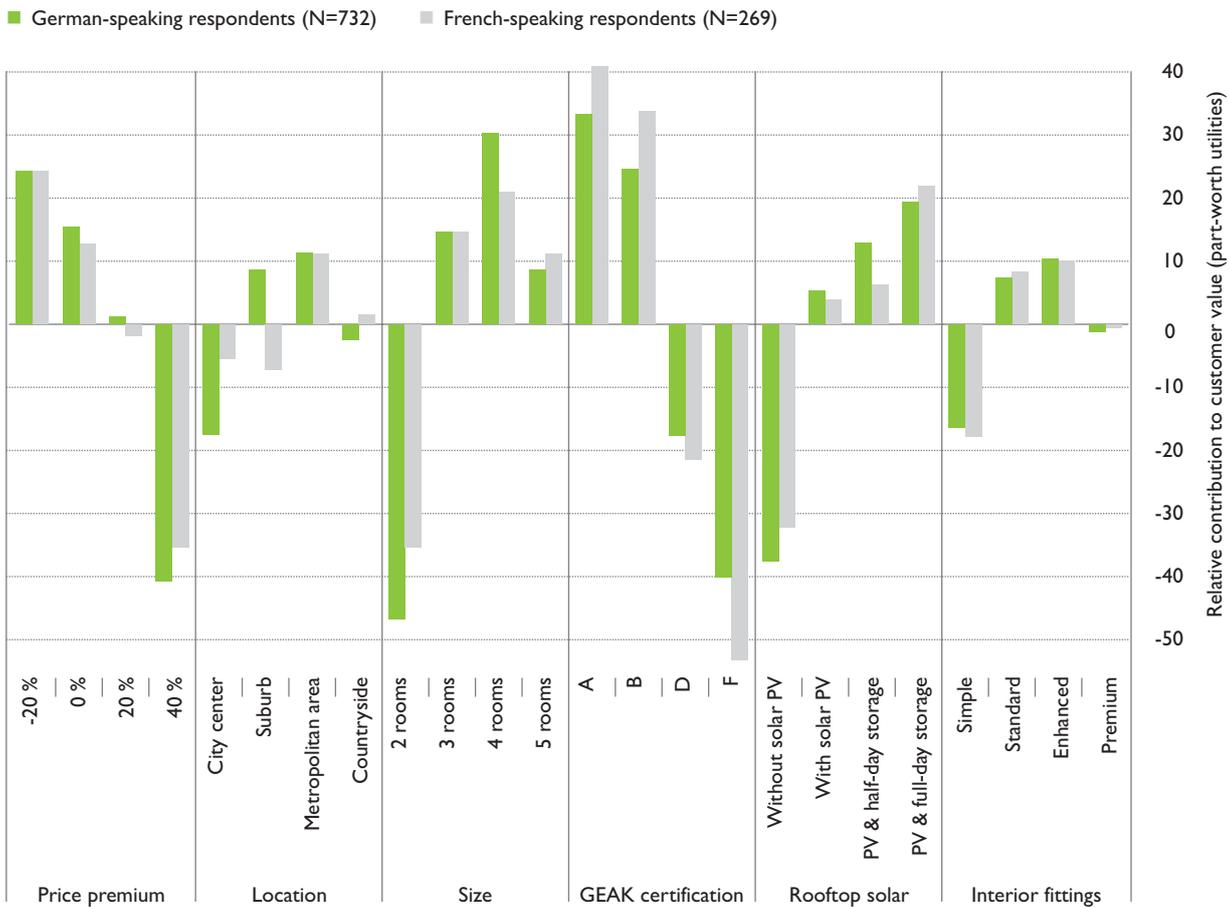
³ We assumed a solar PV system size of 6 kWp, a half-day battery storage capacity of 7 kWh, and a full-day battery storage capacity of 15 kWh, which should be enough to cover an average household electricity consumption of 5,400 kWh per year.

⁴ We used one of the most widely applied dedicated software packages, Sawtooth Software’s Choice-Based Conjoint Analysis (CBC) module, to design the choice experiment, and calculated part-worth utilities with Hierarchical Bayes estimation. For more information, refer to: <http://www.sawtoothsoftware.com/products/advanced-analytical-tools/cbc-hierarchical-bayes-module>

Relative importance of property attributes in a decision to purchase or rent



Contribution of property attribute levels to customer value



Electric Mobility: Reaching a Tipping Point?

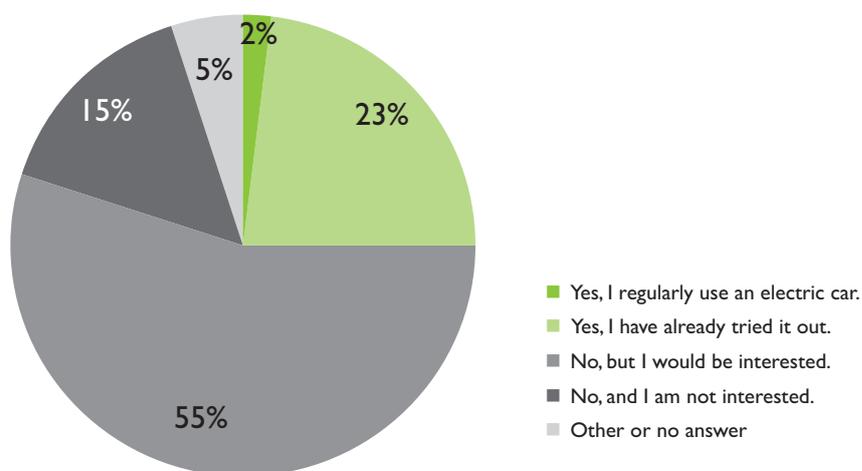
With 38% of Swiss carbon dioxide emissions originating from the transportation sector, there is clear potential for mobility-related emissions reductions.⁵ Therefore, we dedicated a section of the 2016 Consumer Barometer to transportation, and in particular **electric mobility**. A considerable share of respondents indicated that they often (36%) or always (32%) choose environmentally-friendly means of transport, and 35% reported that they actually do not need a car.

Electric vehicles not only reduce air pollution in cities, but – if charged with renewable energy – also carbon dioxide emissions. Globally, Bloomberg New Energy Finance⁶ predicts that electric cars will constitute 35% of new sales by 2040. In Switzerland, the Federal Council expects electric vehicles to account for 30-40% of the car fleet by 2050 and presents several other scenarios that predict even faster diffusion⁷. Currently, 41% of young respondents say they could imagine purchasing an electric vehicle as their first car. Looking at the near-term demand, 25% of respondents say they can imagine buying an electric vehicle in the coming two years.

In terms of the socio-demographic profile of potential electric car buyers, **willingness to purchase** an electric vehicle is positively correlated with income. While only 16% of respondents in the lowest income category (monthly household income less than CHF 3,000) can imagine buying an electric car, this share rises to 44% in the highest income group (over CHF 12,000). The residents of the French-speaking cantons show a slightly higher willingness to buy an electric vehicle. With respect to party preferences, voters of the green liberal party (GLP) stand out with 42% being (rather) interested in buying an electric car, compared to only 21% of Christian Democrats (CVP) and 22% of the supporters of the Swiss People’s Party (SVP).

The figure below shows respondents’ familiarity with and **interest in electric vehicles**. While the number of people regularly using electric vehicles is still small (2%), 23% of respondents indicate that they have already tried an electric car. Another 55% said they have never sat in an electric car, but would be interested in trying it out. Only 15% of respondents say they are not interested in e-mobility, and among the young respondents, the share of those not interested is even lower (10%). Compared to cars, familiarity with **electric bicycles** among the youth is already higher. 13% of young respondents say that they or someone in their family owns an e-bike, and two thirds say they have already tried it or would be interested in trying it.

“Have you ever sat in an electric car?”



⁵ Bundesamt für Statistik (2016). Ressourcenverbrauch und Auswirkungen auf die Umwelt. [in German]. Neuchâtel. <http://www.bfs.admin.ch/bfs/portal/de/index/themen/11/06/blank/02.html>

⁶ Randall, T. (2016). Here’s How Electric Cars Will Cause the Next Oil Crisis. London: Bloomberg New Energy Finance. <http://www.bloomberg.com/features/2016-ev-oil-crisis/>

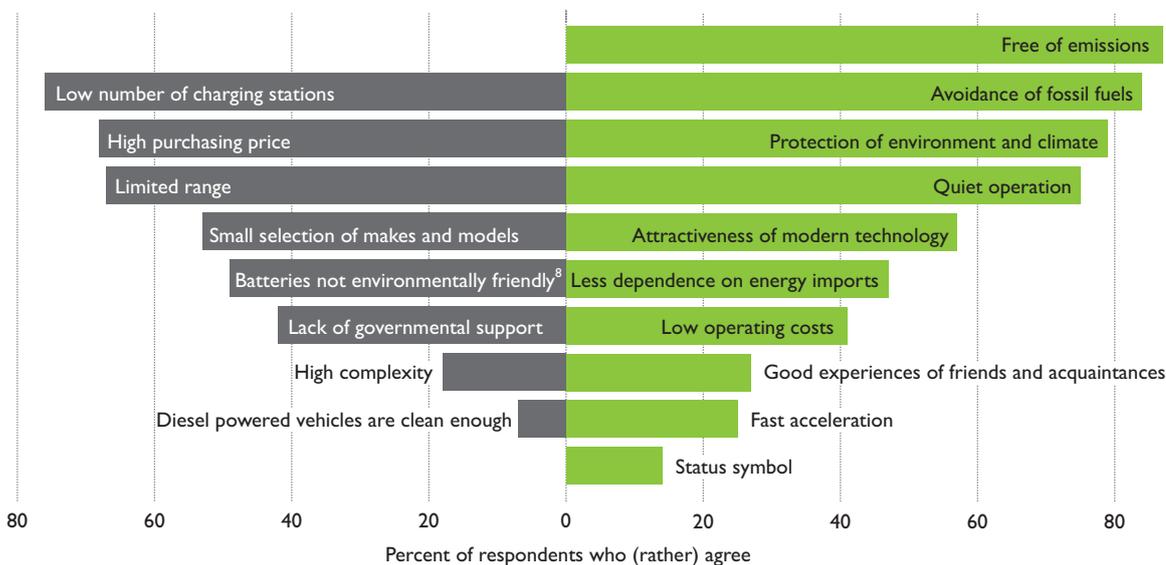
⁷ Bundesrat (2015). Bericht in Erfüllung der Motion 12.3652 – Elektromobilität. Masterplan für eine sinnvolle Entwicklung [In German]. Bern, pp. 16-17. <http://www.bfe.admin.ch/energie/00588/00589/00644/index.html?lang=de&msg-id=57245>

Electric Mobility: Drivers and Barriers

Our study investigates the most important reasons in favor of or against buying an electric car. The respondents were presented with a list of drivers and barriers to e-mobility and asked for their importance. When it comes to **barriers to e-mobility**, 76% (rather) agree that there are not enough charging stations, followed by high purchase price (68%) and limited range (67%). Lack of government support is mentioned by 42% of respondents. In contrast, only 18% feel that the complexity of electric vehicles is an important barrier, and just 7% (rather) agree to the statement that diesel cars are clean enough. The most important **drivers for e-mobility** included ecological considerations, such as electric cars being emissions-free (87%), fossil fuels-free (84%), or helping protect the environment and mitigating climate change (79%). Quiet operation (75%) and the attractiveness of modern technology (57%) are also seen as (rather) important drivers by the majority of respondents. In contrast, the positive experience of friends or acquaintances (27%), faster acceleration (25%), and an electric car serving as a status symbol (14%) are less frequently mentioned as important reasons for buying.

In terms of **what the government could do** to support market diffusion of electric mobility, the clear favorite is to increase the number of charging stations, supported by 69% of respondents. The second most favored supporting mechanism are tax incentives. Of the various types of tax incentives, 47% state that incentives should be offered for purchasing an electric vehicle, while 33% approve of an annual motor vehicle tax exemption, and 31% prefer a cash bonus at the time of car purchase. Public authorities could also support e-mobility in non-financial ways, for example by initiating pilot projects for test driving electric vehicles (27%) or granting preferential parking for electric cars (19%). 12% of respondents believe that no government intervention is necessary to support electric mobility.

“Which reasons speak against and in favor of purchasing an electric car?”



⁸ While batteries represent a significant part of the environmental footprint of manufacturing electric cars, several life-cycle assessments have shown that the environmental impact of cars is dominated by the use phase. Because of their higher efficiency, electric cars tend to have lower overall impact than most cars running on gasoline or diesel, and their environmental advantage is particularly pronounced when the electricity comes from renewable sources. For more information, see: Girardi et al. (2015). A comparative LCA of an electric vehicle and an internal combustion engine vehicle using the appropriate power mix: the Italian case study, *International Journal of Life Cycle Assessment*, 20, 1127–1142; Notter et al. (2010). Contribution of Li-Ion Batteries to the Environmental Impact of Electric Vehicles, *Environmental Science & Technology*, 44(17), 6550–6556.

Smart Meters, Smart Washing Machines, and Data Privacy Concerns

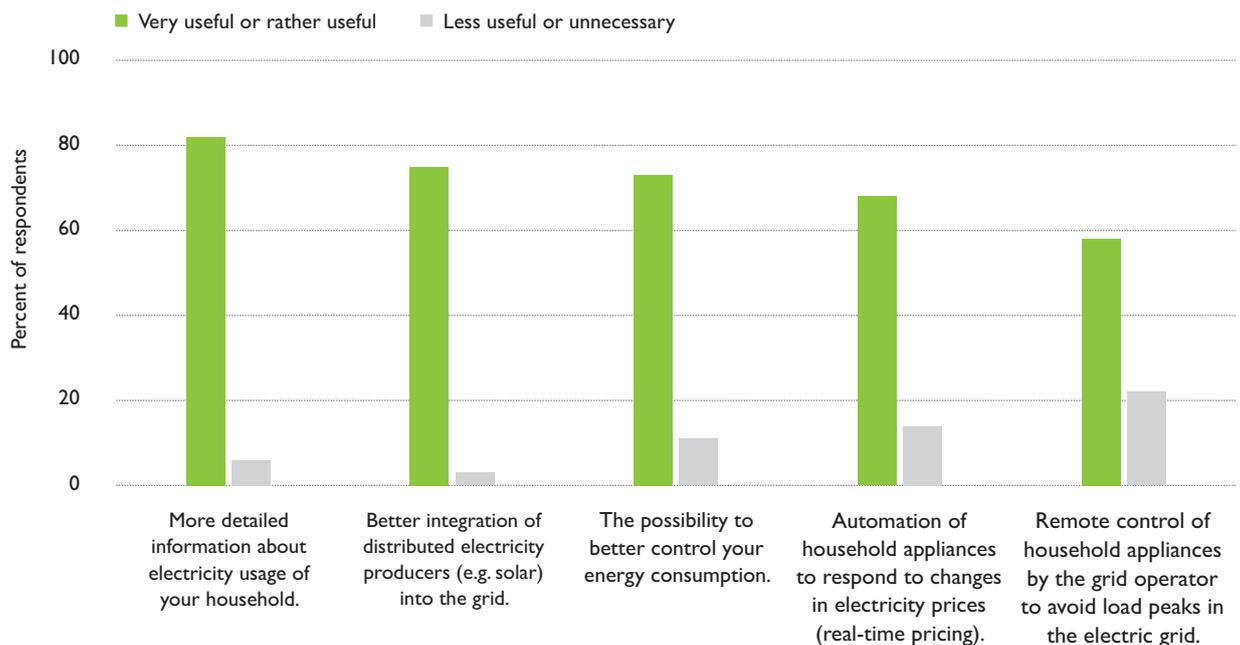
In recent years, a variety of players including grid operators, utilities, and service companies have embraced digital devices to manage electricity supply and demand. Homeowners can make use of these new technologies to reduce their electricity bills by installing smart meters, which capture information on real-time demand. Smart meters are usually connected to a larger network and have the ability to transfer the data to an energy management system or directly to the electricity service provider.

According to our respondents, the **most useful aspects of the digitalization of the energy sector** are: availability of more detailed information about residential electricity consumption (82%) and better grid integration of decentralized energy sources like solar photovoltaics (75%). Being able to manage their energy consumption, for example with a smartphone app, is seen as beneficial by 73% of respondents, while 68% think that it would be useful to have smart appliances (e.g. smart washing machines) to benefit from real-time electricity prices.

When it comes to smart meters, the prospect of cost savings is the most important aspect for 71% of respondents, followed by protection of the environment (57%). Other than that, respondents have less pronounced preferences with regard to other **benefits of smart meters**, such as them being an innovative technology (38%) that provides increased comfort (32%) and contributes to a secure energy supply (29%).

An often-mentioned concern in discussions about digitalization of the energy sector is the **issue of data privacy**. Not surprisingly then, 37% of respondents (rather) agree that their privacy could be at risk if their energy consumption data would end up in the wrong hands. Nonetheless, a slight majority of 51% would agree to having their energy consumption data sent to the grid operator, while 46% would prefer to be the only ones with access to their consumption data. A small group of digitalization enthusiasts (16%) would be comfortable with their data being freely available on the Internet in anonymous form. Notwithstanding all these concerns, only 18% agree or rather agree that digitalization has gone too far and should not be extended further in the electricity sector.

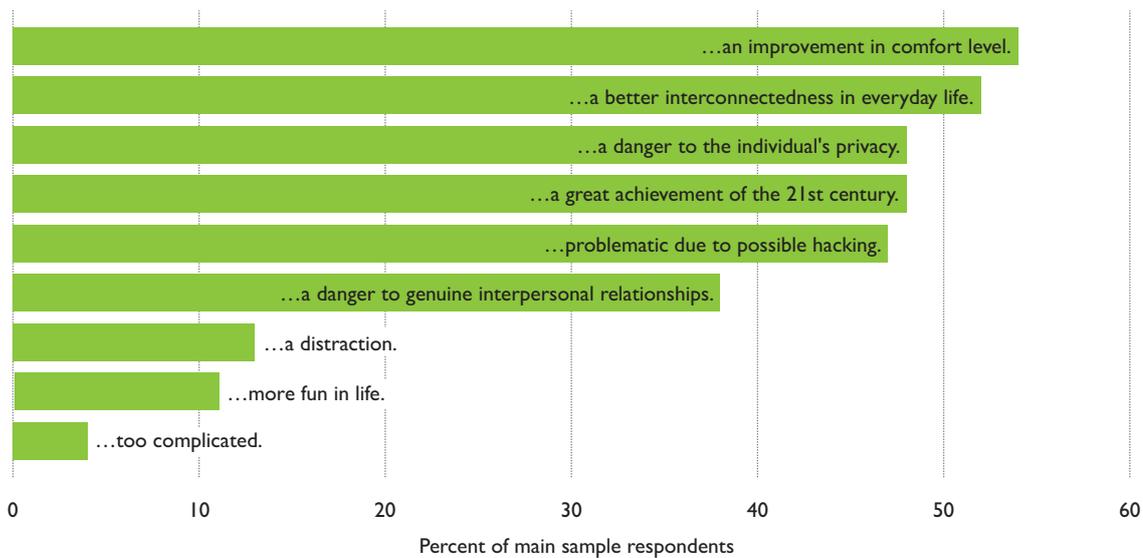
“How useful do you find the following aspects of the digitalization of the energy sector?”



The Two Faces of Digitalization

In addition to its role in the energy sector, we also asked respondents some general questions about digitalization. While the majority of respondents in the main sample agreed that digitalization increases comfort (54%) and interconnectedness (52%) of everyday life, they were also concerned about privacy (48%) and data vulnerability to hacker attacks (47%). 38% see digitalization as a danger to genuine interpersonal relationships.

“I view digitalization as...”



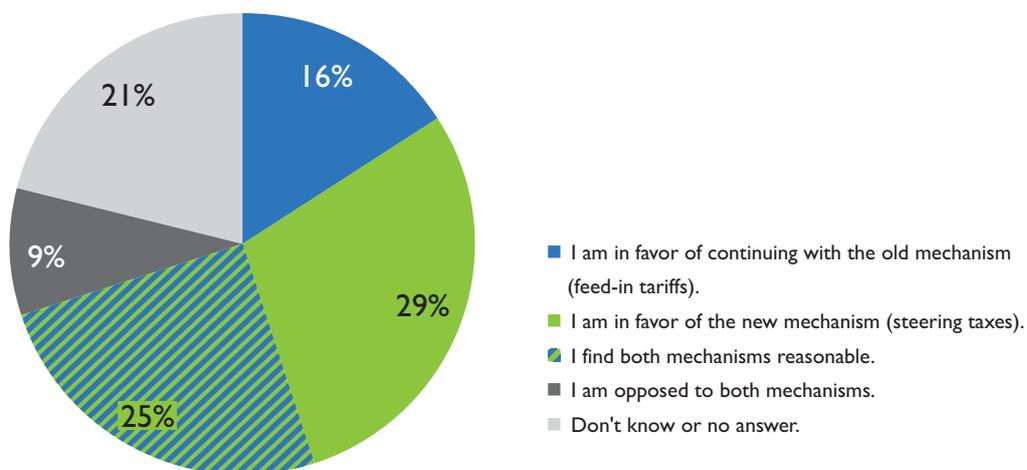
This nuanced perception of digitalization is mirrored among young people, also referred to as the *Digital Natives*. **On balance, the youth have a slightly more positive view of digitalization, but they are also more aware of critical aspects.** Even though a large majority (79%) of youth believe that digitalization makes our lives easier, 70% report that sometimes digitalization is “too much” for them and 66% (rather) agree that people are spending too much time with digital media (a view supported by 78% of the main sample of respondents). 53% of young respondents report that some of their friends “live only online”. Even though 69% of the teenagers wonder what companies like Facebook, Apple and Google are doing with their personal data, 17% say they cannot live without Facebook and other social media channels. 88% of the young respondents report that they always carry their mobile phones with them and check their phones multiple times a day. The teenagers also use a number of **social media** apps simultaneously, the most popular ones being WhatsApp (used by 94%), Instagram (59%), Facebook (57%), and Snapchat (54%). Only one respondent in our youth sample reported not using any apps at all. The young respondents use social media for a variety of purposes, which are not limited to chatting with friends (reported by 90%) and looking at pictures and comments (58%), but also include reading interesting articles (60%) and news stories (59%).

Steering Taxes, Carbon Levies, and Market Liberalization: Consumers' View on Future Energy Policy

The electricity market is one of the most complex and highly regulated markets in Switzerland, with a number of mechanisms to guarantee a secure power supply at an affordable price. We asked respondents about their opinion with regard to the much-discussed **liberalization of the electricity market** for end consumers. 42% of respondents are (rather) in favor of liberalization, 22% are against, while a quarter of respondents maintained a neutral attitude. When it comes to price awareness, 44% of respondents do not know how much they are paying for electricity and an overwhelming majority is unable to tell the size of the surcharge that they are paying for the feed-in-tariff (*KEV-Zuschlag* in German). This **feed-in-tariff surcharge** is currently the main federal instrument in place to support renewables, as its proceeds are used to provide producers a guaranteed revenue for every kilowatt hour of renewable electricity that they generate. The 8% of respondents who ventured a guess at the size of their feed-in-tariff surcharge estimate it to be around CHF 130 per year – an overestimation of more than a factor two if we assume an average household consumption of 4000 kWh per year (the surcharge is currently 1.2 ct/kWh, which adds up to CHF 48 per household and year). At the same time, more than half (52%) of respondents state that they have noticed the carbon levy (*CO2-Abgabe* in German) reimbursement on their yearly health insurance statement. With an average estimation of CHF 37 per year, the respondents underestimate the **reimbursement of the carbon levy**, which amounted to CHF 52.20 for 2014 and CHF 62.40 for 2015⁹.

The Swiss Federal Council considers changing the current renewable energy support scheme by introducing a **new steering tax** (in German *Lenkungsabgabe*) that shall be levied on fossil fuels and electricity starting in year 2021. Such a tax is supposed to incentivize a reduction in the use of polluting energy sources, such as gasoline, and is designed to be revenue neutral. Most of the levy would be reimbursed to the general population and businesses, while a certain share would fund renewable energy and energy efficiency programs during a transition period. Our results show some support for the new approach, but no very clear-cut preferences. 29% of respondents say they support the new system of steering taxes, while 16% say they are in favor of feed-in tariffs and 25% support both policies, while another 21% have no opinion. Only 9% of respondents reject both support schemes. Among those respondents who are either in favor of the steering tax or both systems, less than half are willing to accept a price increase of more than ten per cent for electricity (25% of respondents) and gasoline (43%).

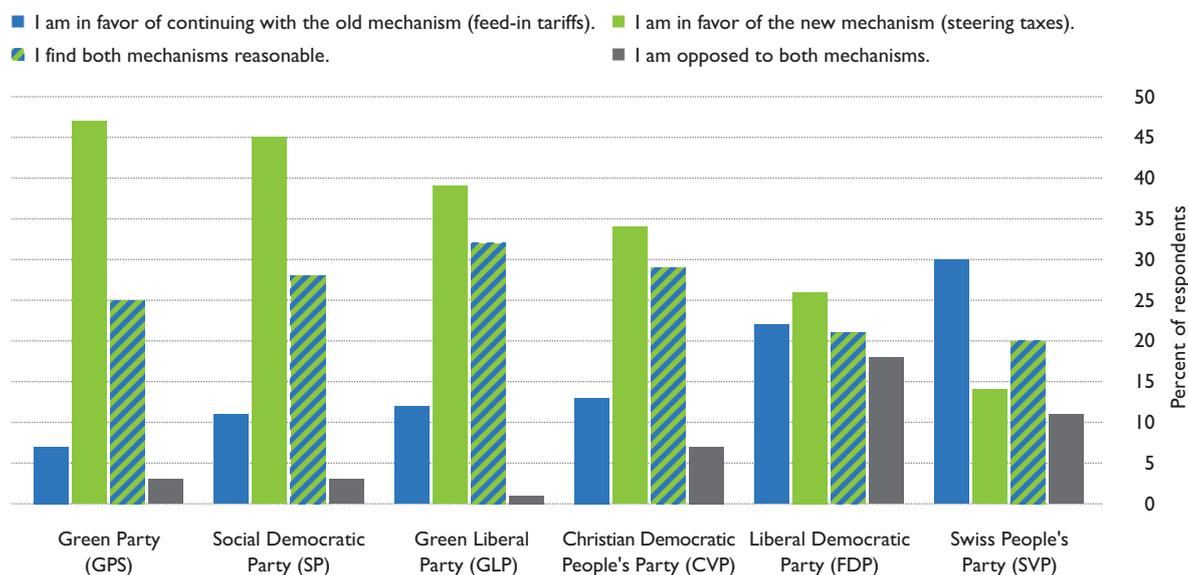
“What is your opinion about the proposed change in support mechanism for renewable energy?”



⁹ Federal Office for the Environment. 2015. Redistribution of the CO2 levy. <http://www.bafu.admin.ch/klima/13877/14510/14749/index.html?lang=en>

Whether respondents prefer the existing system of feed-in tariffs or the proposed new system of steering taxes is closely linked to their political orientation, although in somewhat surprising ways. **While many economists would view a steering tax as a market-based approach to environmental policy, this idea gets the most traction on the left side of the political spectrum, while voters of conservative parties show higher support for the current system.** Four factors may explain this apparent paradox and highlight promising avenues for further research. First, for respondents unfamiliar with the details of the two systems, resorting to more general preferences for “continuing with the old” versus “supporting the new” may serve as a mental shortcut. Second, previous research has shown that conservative respondents tend to be sensitive to anything that is labeled as a “tax”¹⁰. Third, environmentally-minded people on the left side of the political spectrum might be frustrated with challenges of the existing system, which has resulted in a long waiting list to receive a feed-in tariff. Fourth, while the feed-in tariff surcharge only affects electricity prices, the proposed steering tax would eventually address all kinds of energy consumption, including transportation fuels. Hence, respondent views may be related to car use as well as political orientation. In fact, 56% of the Swiss People's Party (SVP) voters say that a private car is their preferred means of transport. The same applies to only 19% of Green Party voters, possibly making the latter more likely to accept higher fuel prices. It is worth noting that voters of the Liberal Democratic Party (FDP) are the most likely to oppose both policies (18%), whereas supporters of the Green Liberals (GLP) are the most likely to accept both policies (32%), highlighting different views among the two parties when it comes to addressing market failure.

“What is your opinion about the proposed change in support mechanism for renewable energy?” (by political party affiliation)



¹⁰ Hardisty, D. J., Johnson, E. J., & Weber, E. U. (2010). A dirty word or a dirty world? Attribute framing, political affiliation, and query theory. *Psychological Science*, 21(1), 86-92.

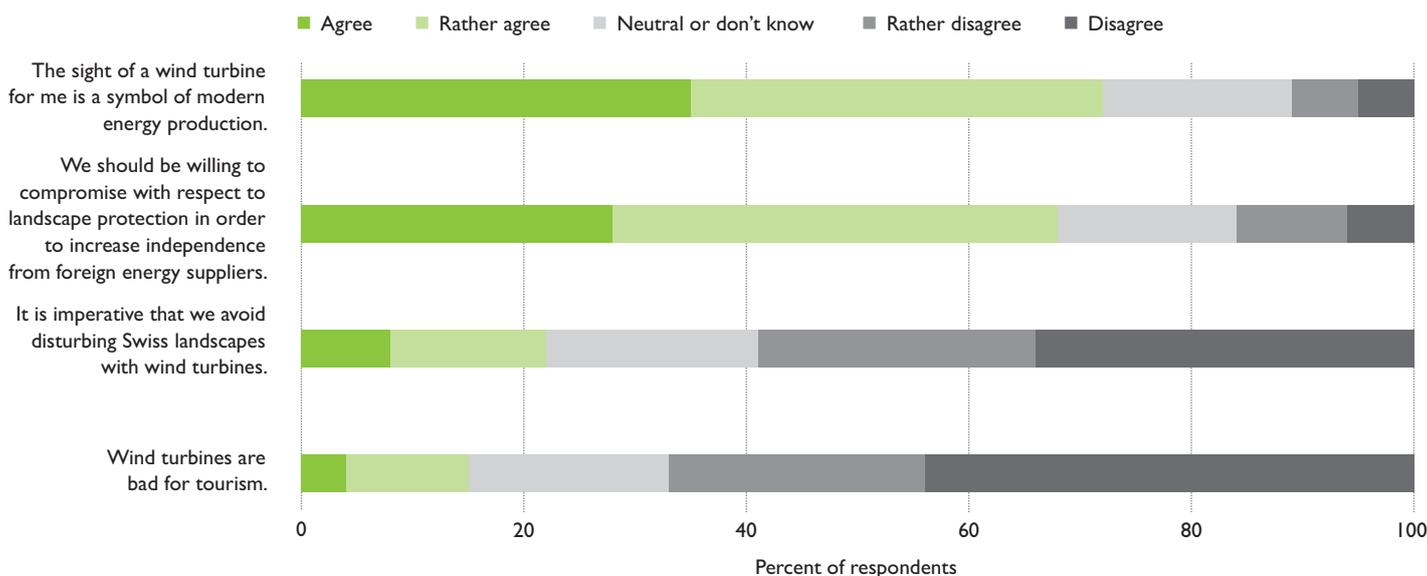
NIMBY or PIMBY? Preferences for Energy “Made in Switzerland”

The survey showed that the location of production of green electricity is also important to consumers. There is strong support for **power generation from local sources**: 92% of respondents (rather) agree that, whenever possible, one should use locally available energy sources. Nearly half (48%) of respondents would prefer green electricity to be produced within Switzerland and more than a third (38%) would like production to be even more local, i.e. within their municipality or region. Only 12% of respondents are indifferent to the location.

While these findings comport with the well-known tendency of Swiss consumers to prefer other local products, such as food, generating renewable energy locally also creates **local environmental impacts**. For example, building wind turbines locally rather than relying on imports from offshore wind power in the North Sea implies changes to the domestic landscape. In contrast to the often-heard NIMBY (“not in my backyard”) hypothesis, many respondents seem to rather express a PIMBY (“please in my backyard”) attitude. 72% of adults and 81% of young respondents view a **wind turbine as a symbol of modern energy supply**. 68% of the main sample respondents agree that we should compromise in terms of landscape protection in order to increase independence from foreign energy suppliers. In contrast, only 23% think it is imperative to avoid disturbing the landscape with wind turbines, and 15% think that wind turbines are bad for tourism.

These findings have **implications for both utilities and policymakers**, suggesting there is a market potential for green electricity “made in Switzerland”, even though realization of this potential may take time given inertia in the electricity market. To cater to consumer preferences, utilities could participate in local renewable energy projects (either on their own or in partnership with local community finance endeavors) and inform consumers about the origin of their electricity. Our findings should also encourage policymakers to aim at reducing energy imports and streamlining permitting procedures for renewable energy projects in Switzerland.

“To what extent do you agree with the following statements?”

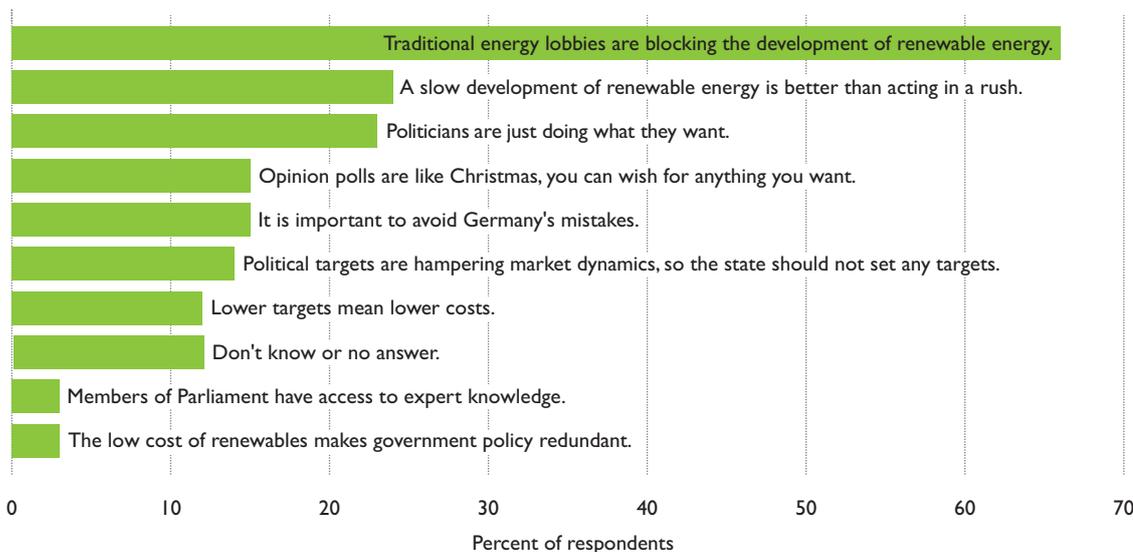


Political Obstacles to Renewable Energy Deployment

Year after year, the Consumer Barometer has shown high approval ratings for renewable energy among the Swiss population. At the same time, the Swiss Parliament has rejected proposals to set a firm timeline for phasing out nuclear power and instead agreed to phasing out support for renewable energy and reducing the 2035 renewable energy targets by around 20%. When asked about this **discrepancy between public opinion and the parliamentary debate**, 66% of respondents suggest that the energy lobby has been hindering the growth of renewable energy. Coming a distant second in the list of possible explanations, 24% of respondents agree that a slower ramp-up of renewables is better than acting in a rush. 15% think it is important “to avoid Germany’s mistakes”. 23% of respondents express general skepticism about politicians’ dedication to acting in accordance with citizens’ preferences, while 15% were skeptical about the reliability of surveys. Interestingly, 14% agree with the statement that political targets only decelerate market dynamics and that the government should refrain from setting renewable energy targets. 12% believe that lower targets lead to lower cost of energy transition. In contrast, 65% (rather) disagree and only 9% (rather) agree with the statement that the high cost of supporting renewable energies puts jobs at risk. When asked **which energy sources should be supported** in Switzerland, the majority of respondents place new renewable energies on the top of the list, including solar thermal (74%), solar photovoltaics (69%), and wind power (61%). Hydropower enjoys similar approval ratings (59%), whereas only 6% believe that nuclear energy should be promoted.

In terms of **energy-related knowledge**, two thirds of respondents could correctly identify the two major sources of electricity generation in Switzerland: hydropower and nuclear energy. However, the importance of nuclear power is overestimated compared to hydropower. Only 32% know that hydropower (which accounts for nearly 60% of Swiss electricity supply) makes a bigger contribution to the Swiss electricity supply than nuclear, whereas 34% believe it is the other way round. The confusion is even stronger among youth, of whom only 16% could correctly identify the higher importance of hydro-power relative to nuclear. Correcting these prevailing misconceptions would lead to a more informed debate about the future of the Swiss electricity supply.

“Opinion polls show a high level of support for and acceptance of renewable energies in the Swiss population. Why do you think the Federal Parliament wants to reduce renewable energy targets by around 20%?”



The Heat is On: Renewable Energy and Climate Change

Respondents recognize that renewable energies create a number of environmental, social, and economic benefits for Switzerland. One of the most remarkable observations of this year's Consumer Barometer is the rise of climate change to the top of consumers' minds. We cannot discern to what extent this may have been driven by recent events such as the extremely mild winter 2015/16 or media coverage around the UN climate conference in Paris, which took place a few months before the survey was conducted, but the evidence is clear. An overwhelming majority (86% of respondents) recognizes **climate protection as the most pressing reason for supporting renewable energy**. The socio-economic benefits of renewable energy are also gaining increasing recognition. Such benefits include export opportunities for innovative Swiss companies (46%) and local economic development (32%). Higher involvement of citizens and communities in energy production is mentioned as a driver of the energy transition by 17% of all respondents. Furthermore, respondents recognize a number of additional benefits of renewable energy deployment. First, renewable energy is an inexhaustible source (62%). Second, it allows a diversification of the energy supply, thus reducing dependence both on a single energy source (54%) and on foreign countries (31%).

In accordance with the results of previous Consumer Barometer surveys, much of the Swiss population sees an important role for the state in the promotion of renewable energy. Again this year, lack of political support is cited by 59% of respondents as a major barrier for the development of renewable energy. Amongst the youth, this view is supported by 39%. What are the other **barriers** to a flourishing renewable energy sector? 42% of respondents mentioned low oil prices, which points to a psychological effect more than a factual relationship, as most renewable energy sources produce electricity and therefore do not directly compete with oil. In fact, global investments in renewable energy reached record levels in 2015 despite low oil prices.¹¹ Nearly half of youth respondents (48%) and 39% of the main sample respondents attributed the low penetration of renewable energy sources to their relatively high costs. A similar share of respondents (40%) acknowledged the power of habits and routines as a hindering factor for renewable energy development.

When it comes to **environmental behavior**, a majority of respondents report to "always" or "often" separate waste (97%), conserve electricity (85%) and heat (64%) at home, or purchase biological and environmentally-certified goods (51%). In contrast, 41% of respondents (as well as 24% in the youth sample) say that they would "rarely" or "never" forgo air travel. Given that a single intercontinental (round-trip) flight generates 2-3 tons of carbon dioxide emissions per person¹² (which is more than what climate scientists say is a sustainable per-capita carbon budget for an entire year), increased awareness of the relative impacts of different activities could help consumers make more informed decisions that reduce environmental impacts.

¹¹ <http://www.bloomberg.com/news/articles/2016-01-14/renewables-drew-record-329-billion-in-year-oil-prices-crashed>

¹² <http://co2.myclimate.org>





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