



Energy

National Research Programmes 70 and 71

Synthesis

Acceptance





Acceptance

In order to ensure that the transformation of the energy system can be implemented successfully, strategies that are effective and gain widespread acceptance need to be identified at both the socio-political and the local level. In view of this, numerous NRP 70 and NRP 71 projects set out to directly or indirectly examine the degree of social acceptance in the context of energy supply, with respect to locations for electricity production and transmission or behavioural measures.



1. Acceptance is a matter of trust



What will it take to change the behaviour patterns of the citizens of Switzerland? What is decisive for gaining support for technologies and infrastructure projects? The NRP Energy has identified numerous acceptance factors. The synthesis brings these factors together and goes as far as to make specific recommendations for action.



Information / communication # Costs / benefits

1.1. Core message



On balance, the results of the NRP Energy studies show that the people of Switzerland have a fundamentally positive attitude towards a transformation of the energy system.

However, if the focus is placed on more concrete issues such as specific technologies, projects or personal behaviour it is no longer clear that the necessary level of acceptance is forthcoming. Instead, acceptance needs to be established with targeted measures. These include the provision of credible and transparent information as a basis for all other actions. Building on this, the population and economy need to be able to recognise the overall advantages as well as the individual benefits. Greatest success is promised by approaches that focus on people's local and personal environment including specific examples that work in a way they can understand and relate to.

These key messages from the NRP Energy acceptance studies all have a common denominator: acceptance is not least a matter of trust!



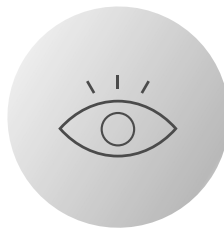
Public administration # Associations and NGOs # Energy suppliers # Businesses # Politics
(federal government, canton, municipality)

1.2. Key recommendations



Use local links as an effective argument!

If Swiss investors and, where possible, even regional firms or public companies are behind a project, the level of acceptance is markedly higher.



Create visibility for positive examples!

Positive experiences
– where possible in close proximity to people's living environment
– increase both the acceptance of technologies and the willingness to change behaviour.



Target co-benefits with respect to quality of life and health!

Health, quality of life, convenience, security and time availability are much more significant than energy consumption when it comes to the opinion-forming process.

Acceptance of technology, infrastructure and behaviour is not a constant, but rather an ongoing process that is determined by the interaction of numerous factors. By consolidating the acceptance factors that have been found in more than 100 individual NRP Energy projects, it was possible to derive ten specific recommendations for action for energy suppliers, businesses, administrative bodies, politicians, NGOs and associations (see **“Ten sources of impetus for the future”**). It is to be assumed that the level of acceptance for measures aimed at transforming the energy system will increase with these recommendations for action.

An echo group comprising eight specialists from the worlds of administration and practice has assessed these recommendations with a view to their impact and feasibility (see **“Multi-stage synthesis process”**) and identified three key recommendations:

All recommendations for action are explained in the section **“Ten sources of impetus for the future”**.

2. Essential and within a marked framework

In order to gain a differentiated picture from the research results incorporated in this synthesis, a framework was defined with the most important action areas and influencing factors. The starting point is formed by the acceptance of individual activities, which is essential in Switzerland.



Behaviour # Guidance # Steering / promotion

2.1. Acceptance is essential for the successful transformation of the energy system



Switzerland finds itself on a path that will see it face a challenging energy future. Energy Strategy 2050 should help to overcome the obstacles on the way to ensuring the sustainable production and use of energy. In order to achieve the objectives formulated, solutions need to be found at a socio-political level that are accepted by a majority.

In many cases, technical and regulatory solutions are now available. However, they often fail to win a majority among politicians. For example, the “**Promotion or steering-based energy policy**” project can demonstrate that a steering system would reduce costs for the economy by up to four-fifths relative to the current practice of subsidisation.¹ Despite this, parliament recently opposed such a steering policy. On the other hand, the “**Energy reduction potentials of elderly people’s households**” project shows that it is possible to renovate buildings in such a way that solutions emerge which benefit not only the residents, but also the environment.² These examples show illustratively that the transformation of the energy system to ensure a reliable, environmentally friendly and economic supply of energy is greatly dependent on the acceptance of the affected stakeholders – both as individuals and as members of social, political or business groups.

Relevant research products

- Isabelle Stadelmann on the acceptance of renewable energy



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Notes and References

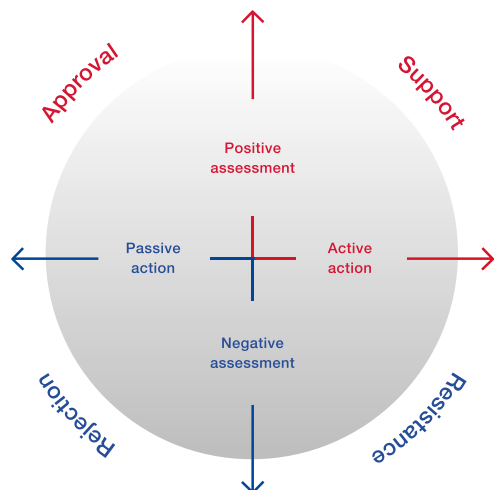
1 Project "Promotion or steering-based energy policy".

2 Project "Energy reduction potentials of elderly people's households". Film:

<https://www.youtube.com/watch?v=xUwrjFNhS2E>.

Population # Businesses

2.2. Acceptance can range from passive approval to active support



Dimensions of acceptance Source: based on Zoellner et al. 2009.¹

To ensure that we are all speaking about the same thing, it is appropriate to put the notion of “acceptance” in a wider context. A differentiation can be made between two dimensions with respect to an individual’s stance towards a subject: the assessment and action dimensions. Acceptance comes from a more or less strong positive assessment of the matter at hand. The opposite of acceptance – a more or less strong negative assessment – is rejection or objection. Linked to this assessment is invariably the dimension of action, which ranges from passive to active. A passive positive assessment leads to approval, while a passive negative assessment leads to rejection. An active positive assessment means support and an active negative assessment results in objection.

In Switzerland, it is especially important that energy policy objectives and measures are accepted. This is because political decisions are subject to direct democratic codetermination.² In various research projects, it has been possible to show that suitable measures can be used to gain acceptance for projects that are progressive in terms of energy policy. It has been demonstrated, for example, that the acceptance of imported energy from renewable sources is considerably higher if the plants are owned by Swiss companies (see “Swissness promotes acceptance”).³ And it has been shown that it was possible to gain approval amongst the population for a run-of-river power plant at the Walibach in the municipality of Graftschaff thanks to carefully managed dialogue.⁴

Acceptance is therefore the endorsement of an issue to a greater or lesser extent. In order to gain a viable level of acceptance, however, negative views – ranging from tolerance to active resistance – need to be taken just as seriously.

Notes and References

1 Zoellner, J, Rau, I & Schweizer-Ries, P 2009, *Akzeptanz Erneuerbarer Energien und*



sozialwissenschaftliche Fragen, Magdeburg.

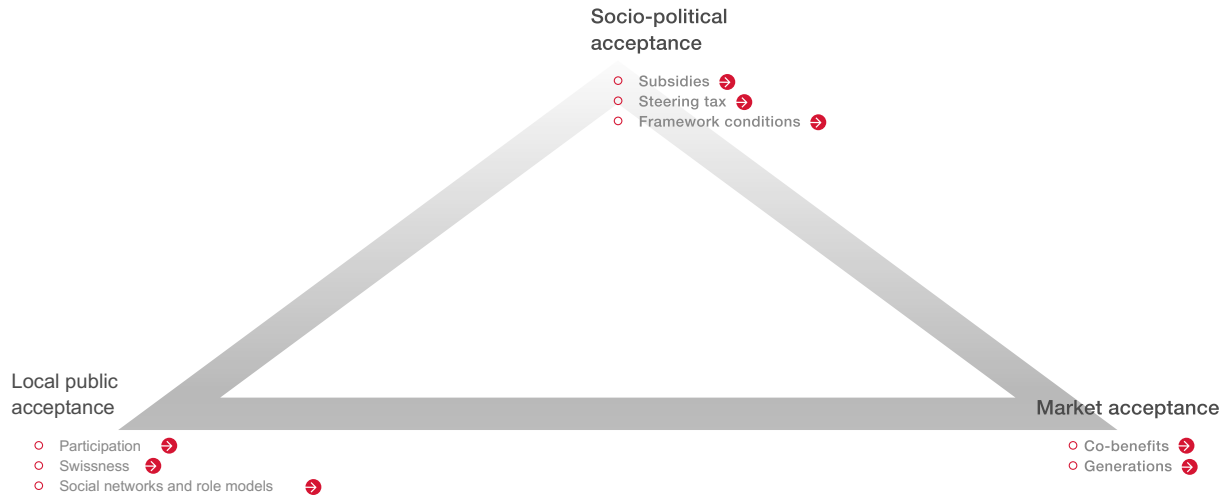
2 Project “**Acceptance of renewable energy**”, especially Dermont, C, Ingold, K, Kammermann, L & Stadelmann-Steffen, I 2017, “Bringing the policy making perspective in: A political science approach to social acceptance”, *Energy Policy*, 108, pp. 359–368.

3 Project “**Trade-offs in switching to renewable electricity**”.

4 Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, *Acceptance of renewable energy*, Berne, chapter 6, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-6.pdf>. Project “**Acceptance of renewable energy**”.

Costs / benefits # Population # Businesses

2.3. Three action areas characterise the discussion



Three action areas of social acceptance Source: based on Wüstenhagen et al. 2007.¹

The starting point for discussions on the acceptance of measures for the transformation of the Swiss energy system is often formed by a supposed contradiction. It is indeed true that the Swiss population is generally positive when it comes to the expansion of renewable energies.² However, specific projects, for example the expansion of hydropower plants or the construction of new wind farms, are often confronted with strong opposition.³

This contradiction between the generally high level of acceptance for renewable energy production and the considerably lower level of acceptance for specific infrastructure projects at a local level is often explained by the NIMBY principle (*not in my back yard*). As long as it is unclear who will have to bear any negative consequences, people are in favour (e.g. in a national vote on the promotion of renewable energies). Yet when people are confronted with the impact of a wind turbine in their own environment, they are against it. In practice, however, the relationships are often more complex. In order to understand them, it is helpful to differentiate three actions areas: socio-political acceptance, local public acceptance and market acceptance.

Socio-political acceptance relates to the general approval of the population as well as political decision-makers with respect to legislative proposals (e.g. steering tax, planning guidance and utilisation planning, building regulations) and new technologies (e.g. wind energy, geothermal power). Local public acceptance pertains to, in particular, the acceptance of the local population as regards specific location decisions (e.g. wind turbines, the expansion of reservoirs). Market acceptance concerns the question of how the market receives innovations (e.g. the sharing of vehicles). It is about mechanisms which accelerate or hinder the diffusion



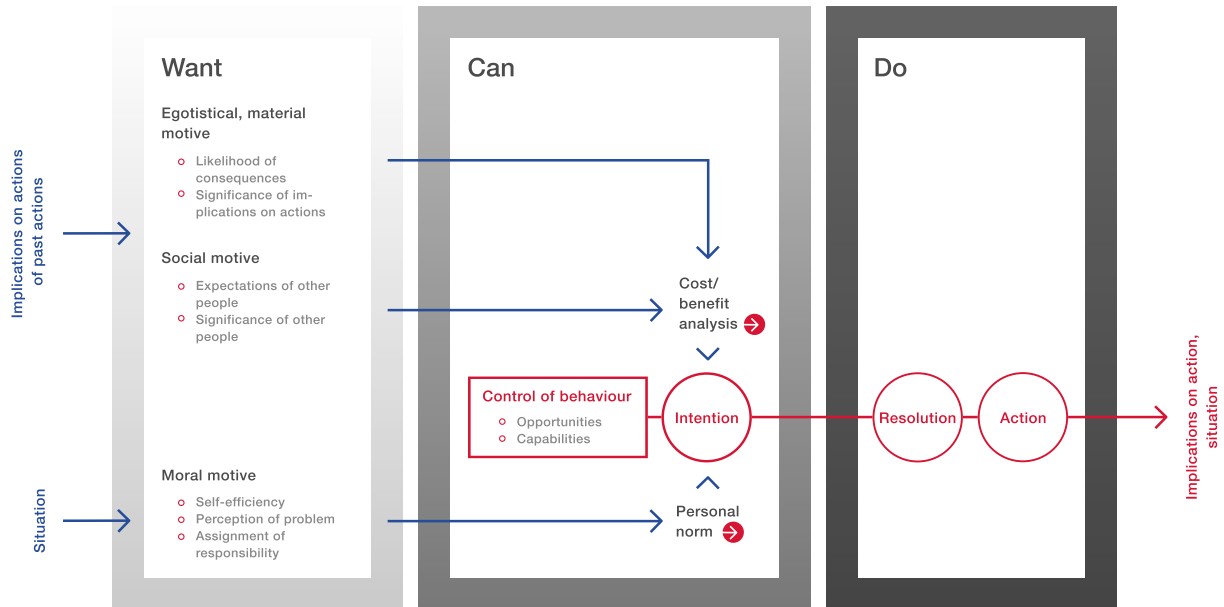
of innovations.

Notes and References

- 1 Wüstenhagen, R, Wolsink, M & Bürer, MJ 2007, Social acceptance of renewable energy innovation: An introduction to the concept, *Energy Policy* 35(5), pp. 2683–2691.
- 2 Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, *Acceptance of renewable energy*, Berne, chapter 5, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-5.pdf>. Project “Acceptance of renewable energy”.
- 3 Data can be found here: <https://ipwenergy.shinyapps.io/preferences/>. Project “Acceptance of renewable energy”.

Behaviour # Population

2.4. Behavioural changes involve several levels



Source: Artho et al.¹

The very catchy “Want-Can-Do” model provides a better understanding of the process involved in behavioural changes in the energy sector. For a person to perform a particular action, the motivation, opportunity and ability to do so must be in place. Where these conditions are met, the chances are good that people will transform intentions into action. These three areas can be summarised with the keywords “Want”, “Can” and “Do”. The illustration shows a simplified schematic diagram of the important social psychological mechanisms.

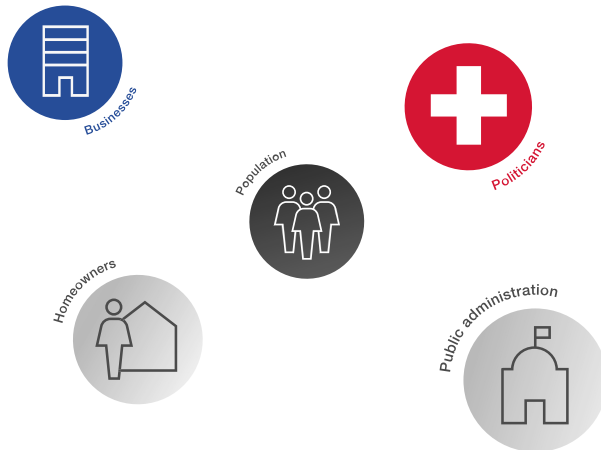
Notes and References

1 Artho, J, Jenny, A & Karlegger, A 2012, *Wissenschaftsbeitrag. Energieforschung Stadt Zürich*, Bericht Nr. 6, Forschungsprojekt FP-1.4, <http://www.energieforschung.ch>.



Public administration # Building owners # Population # Businesses # Politics (federal government, canton, municipality)

2.5. Stakeholders and roles in the Swiss discussion



The fundamental transformation of the energy system affects everyone who lives and works in Switzerland. The population because they are required to use less energy and give preference to renewable energy sources; industrial firms and workshops which need to come up with energy-related innovations and promote energy-efficient processes; building owners who need to address the issue of energy-efficient construction methods even more closely; public administrative bodies who are required to formulate construction and transport regulations in such a way that energy-efficient solutions can be quickly realised; politicians who need to agree on a legal framework within which the transformation is possible.

With respect to the acceptance of measures, it must also be borne in mind that an individual usually belongs to several groups that may each adopt very different stances. For example, those who own their own home have an interest in a lower electricity price in their role as power consumers. However, if they have mounted a photovoltaic system on the roof of their home, they want to be able to sell the power that they do not use themselves at the highest possible price. The same applies to citizens in their role as consumers. It was established by the “Exploring ways towards societal consensus” project that, in their role as citizens, people base their decisions on the values of quality of life, justice and the preservation of an intact environment. As consumers, however, they constantly weigh up available resources, their time budget and pending obligations in optimising their everyday decisions.¹ These different priorities can lead to conflicts. The findings of the “Acceptance of renewable energy” project indicate that the consumer perspective dominates in such situations.²

Those looking at the topic of acceptance therefore need to define precisely which social group assumes which role in the focus area in question.

Notes and References

1 Project “Exploring ways towards societal consensus”.



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2 Project "**Acceptance of renewable energy**". Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, *Acceptance of renewable energy*, Berne, chapter 5, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-5.pdf>.

Associations and NGOs # Population # Politics (federal government, canton, municipality)

2.6. Acceptance is a feature of Swiss politics



Switzerland's political system is remarkable due to two special qualities: the strong emphasis given to direct democracy and the country's marked degree of federalism. In no other country is the level of direct democratic participation of citizens – not only in elections, but also in referendums on specific issues – so advanced as in Switzerland. Viewed on an international level, the Swiss are by far the nationality most frequently called to the ballot box in order to make the final decision on policy issues.¹

There is also the fact that the Swiss cantons enjoy a uniquely strong position within the federal state. Based on elements such as their own constitutions, the equal rights of the Council of States and the National Council and the various other channels for influencing the legislative process of the federal government, including the consultation procedure, the cantons to some extent represent "miniature nations".² For example, all tasks which the Federal Constitution (FC) does not expressly assign to the federal government fall under the jurisdiction of cantons. In keeping with the principle of subsidiarity, these in turn pass on competencies to the municipalities. With respect to energy policy, the cantons are primarily responsible for the area of construction (Art. 89(4) of the FC).

During the formulation of energy-policy measures and the implementation of these measures, Switzerland's political system therefore places particularly high demands on the cantons and municipalities in terms of acceptance. This is shaped by the necessity to achieve broad and active support from citizens. On the one hand, this has the disadvantage that significant hurdles have to be overcome before something changes. On the other, once a decision has been made, the change already enjoys a broad level of acceptance and can generally be implemented without major resistance.³



Notes and References

- 1 Sager, F, Ingold, K & Balthasar, A 2017, *Policy-Analyse in der Schweiz. Besonderheiten, Theorien, Beispiele*, NZZ-Verlag, Zurich, p. 22.
- 2 Vatter, A 2014, *Das politische System der Schweiz*, Nomos, Baden-Baden, p. 427.
- 3 Project “**Acceptance of renewable energy**”, especially Dermont, C, Ingold, K, Kammermann, L & Stadelmann-Steffen, I 2017, “Bringing the policy making perspective in: A political science approach to social acceptance”, *Energy Policy*, 108, pp. 359–368.

2.7. Multi-stage synthesis process



In the NRP Energy, more than 100 individual and joint projects have been completed. Given the considerable number and great variety of projects, the identification of key findings regarding the topic of acceptance was a challenging process that was not possible without making compromises. Not all relevant results from the research projects were incorporated in the synthesis and important research results that were yielded outside the NRP could only be included in exceptional cases. The synthesis does not claim to be exhaustive in terms of the topics it covers or its content. Areas that have not been covered or that have only been partially addressed by the projects are only marginally discussed. These include, for example, the phenomenon of prosumers who, for example, are active in the area of electricity production both as consumers and producers as well as the impact of Switzerland's cultural diversity on the level of acceptance in different regions and among different social groups.

The synthesis was created as part of a multi-stage process. Those responsible for the projects addressing the topic of acceptance were already summoned back in October 2016 when the researchers were still in the middle of conducting their work. During a workshop, they exchanged information on their approaches and the issues addressed by their projects. Half a year later, the researchers met with representatives from associations, federal offices, cantons and relevant NGOs in order to find out more about the expectations placed on the projects.

At a further meeting of the researchers in June 2018, the key findings from a research perspective were collected and consolidated. The synthesis of Andreas Balthasar (lead), Daniel Meierhans and Frédéric Varone was subsequently drafted.

An echo group comprising eight specialists from the worlds of administration and practice have reflected on the draft synthesis and assessed it from their perspective (see "[Publication details](#)"). They also assessed the recommendations with a view to their impact and feasibility.



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Following further revisions and additions, the report was approved in January 2019 by the Steering Committees of the NRP Energy.

3. Six subject areas are key



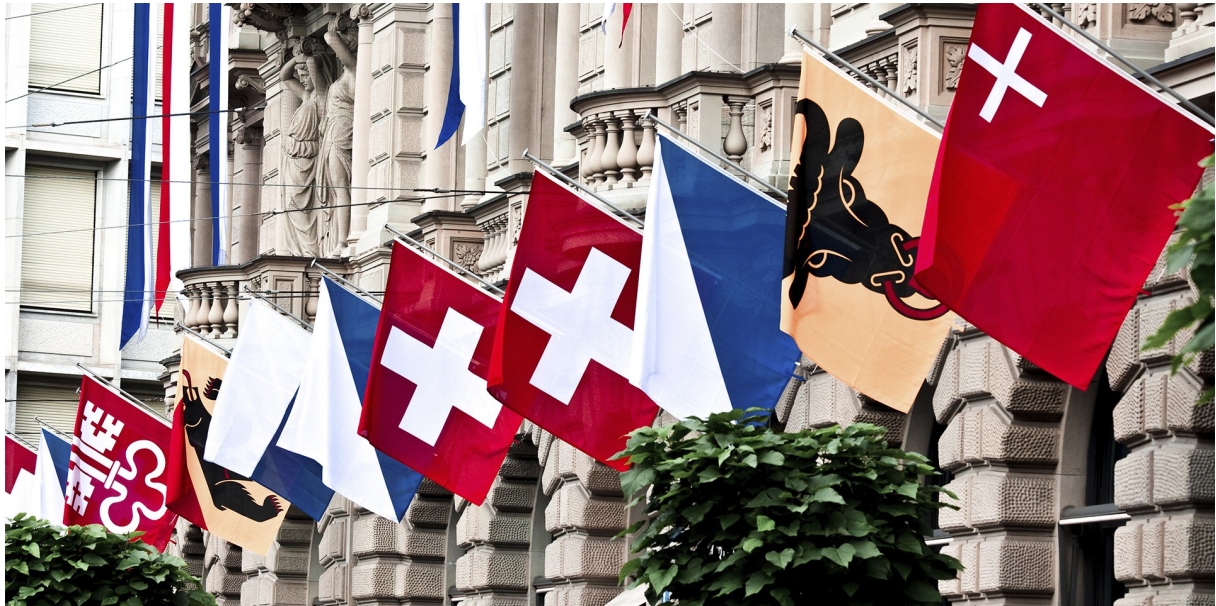
Six key challenges can be derived from the acceptance factors identified within the framework of the NRP Energy. They address the following areas: “external framework”, “effects”, “personality”, “society”, “information” and the “ability to change”.

3.1. The external framework

The national and international legal frameworks set the limits with respect to the possibilities for sustainable energy production and activities for the promotion of environmentally friendly energy consumption. They also determine to a large extent in which environment acceptance needs to be achieved.

Participation # Consensus

3.1.1. Federalism invariably also necessitates local support



The Swiss political system is characterised by a marked degree of federalism. The responsibility for many state tasks that are important for the conversion of the energy system, including those relating to construction, regional infrastructures and large parts of regional planning, lies with the cantons.¹ There is also the fact that the cantons in turn delegate many tasks to the municipalities in keeping with the principle of subsidiarity. In connection with direct democratic instruments, this proximity to those affected leads to a high level of acceptance with respect to the decisions made. However, it can also lead to difficulties with the implementation of nationwide strategies. Projects and initiatives can generally only be realised if they gain a viable level of local acceptance in addition to support at a national level.

For example, significant interventions that have an impact on the existing landscape quality² or fears of negative health-related effects³ can have a negative impact on acceptance levels in a specific region. Positive effects give rise to local benefits, for example in the form of jobs or monetary payments.⁴

Either way, the direct democratic rights and marked degree of federalism make finding solutions very challenging. Like other policies in Switzerland, energy policy is therefore not primarily evidence-based, but rather the result of political compromises.⁵ However, where solutions come about that have a broad level of support, the chances are good that they will also be recognised and implemented.

Notes and References

1 Vatter, A 2014, *Das politische System der Schweiz*, Nomos, Baden-Baden.



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2 Project “**Energyscapes**”.

3 Project “**Hybrid overhead power lines for Switzerland**”.

4 Project “**Risk governance for geothermal and hydro energy**”.

5 Rissi, C & Sager, F 2013, Types of Knowledge Utilization of Regulatory Impact Assessment (RIA), Evidence from Swiss Policy-making, *Regulation & Governance*, 7(3), pp. 348–364.



Bonus / penalty # Guidance # Steering / promotion

3.1.2. Different state steering options

	Regulatory steering (rules and bans)	Financial steering (subsidiaries, taxes, etc.)	Persuasive steering (information, advice, etc.)	Procedural steering (networks, voluntary agreements, etc.)
Buildings	Model provisions of the cantons in the energy sector	Building programme; tax incentives; CO ₂ levy; cantonal funding programmes	SwissEnergy (Competence Centre for Energy Efficiency in Buildings, Minergie) Building energy certificate of cantons	
Renewable energies (Electricity and heat)	Regulations for systems and devices; electricity market regulation	Compensatory feed-in remuneration (KEV); Cantonal funding programmes	SwissEnergy (agency for renewable energies; networks; infrastructure facilities)	SwissEnergy (agency for renewable energies; networks; infrastructure facilities)
Industry and services		Competitive tenders; CO ₂ levy (exemption)	SwissEnergy (energy-efficient devices and large devices)	SwissEnergy (Energy Agency of the Swiss Private Sector target agreement)
Mobility	CO ₂ emission regulations	SwissEnergy (EcoCar)	SwissEnergy (Quality Alliance Eco-Drive); Energy label	SwissEnergy (auto-schweiz target agreement)

Red = primarily cantonal instruments. SwissEnergy is a platform for questions on energy efficiency and renewable energies. It is managed by the Swiss Federal Office of Energy and should also play a key role in the implementation of Energy Strategy 2050. SwissEnergy finances and supports projects of partners from the public and private sectors.

Instruments of Swiss energy policy *Source: Balthasar/Walker 2015.¹*

The modern state has a broad range of steering instruments at its disposal for achieving political objectives. Here, a figurative differentiation is made between 'carrots', 'sticks' and 'sermons'. The challenge lies in 'correctly' combining these instruments. What is deemed correct depends on the assessment criteria: generally speaking, state steering instruments should be effective, efficient and not give rise to any undesirable side effects.

In the area of Swiss energy policy, voluntary agreements and market mechanisms have traditionally been given preference over regulations, subsidies and tax instruments. Studies as part of the NRP Energy show that this approach is successful with respect to the investments of companies in sustainable energy technologies.² Voluntary agreements and demand on the part of customers do indeed facilitate the introduction of so-called green technologies and energy-efficient processes within the economy. Major effects can, however, be achieved via taxes and regulations. But their impact quickly levels off as soon as the set requirements have been met. Subsidies can be beneficial when it comes to the targeted promotion of certain technologies. Viewed from a long-term and macroeconomic perspective, market-based instruments, such as a CO₂ tax, exhibit the best cost-benefit ratio. Generally, steering at a macroeconomic level is considerably more efficient and up to five times more cost-effective than promotion.³ Clear and stable conditions are fundamental for investments in sustainable energy technologies in all cases. The long-term nature of Energy Strategy 2050 is thus likely to encourage investment.

Notes and References



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1 Balthasar, A & Walker, D 2015, Lenkungsabgaben alleine genügen nicht, *Die Volkswirtschaft*, 88(6), S. 44–47,

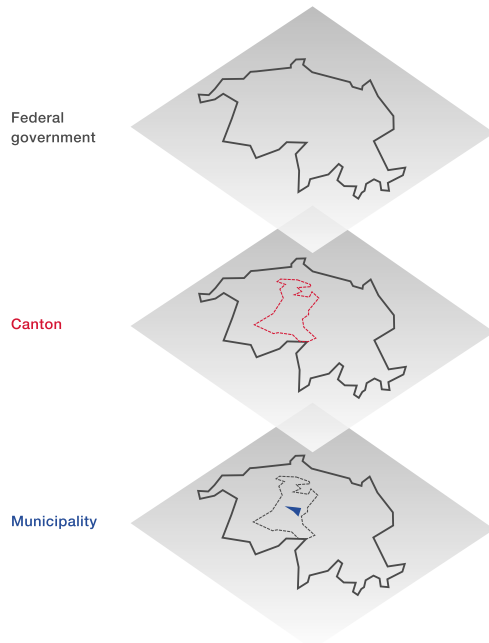
https://dievolkswirtschaft.ch/content/uploads/2015/05/13_Balthasar_Walker_DE.pdf.

2 Project “Energy-related innovations”.

3 Project “Promotion or steering-based energy policy”.

Guidance # Politics (federal government, canton, municipality)

3.1.3. Political steering must be consistent at all levels



The importance for the economy of stable state framework conditions with respect to energy policy is largely undisputed. This is made clear by a comparative survey of companies on the introduction of sustainable technologies. Political energy strategies thus have no negative effect on international competitiveness if they are clear and consistent. The comprehensive use of energy-efficient technologies even serves to increase levels of work productivity.¹

The impact of political steering is less promising if the political players interpret the requirements differently. This seems to be the case with Energy Strategy 2050 as shown by the “Trade-offs in switching to renewable electricity” project.² Inconsistencies in the interpretation of the strategy were identified between local, cantonal and federal stakeholders with respect to the promotion of energy efficiency as well as regards sustainable development and the protection of nature and landscapes.

In general, it can be said that although the cantons share the general focus of Energy Strategy 2050, they have different priorities when it comes to energy sources and steering instruments. These different priorities are based on their experiences, the geographic conditions and political preferences and need to be cleared up, for example, through intensified dialogue between the federal government and cantons in order to avoid delays in the implementation of Energy Strategy 2050. Against this background, it would also seem appropriate for the objectives defined by the federal government to leave room for manoeuvre in terms of the type of implementation to allow for different solutions at a cantonal level that provide the basis for local acceptance.³



Notes and References

- 1 Project “**Energy-related innovations**” and project “**Multi-energy hub systems and society**”. Krütli, P, Seidl, R, von Wirth, T & Stefanelli, A 2017, Local acceptance of distributed energy systems in energy systems transformations, Paper presented at the 8th International Sustainability Transitions Conference, 18–21 June 2017, Gothenburg.
- 2 Project “**Trade-offs in switching to renewable electricity**”. Díaz, P, Adler, C & Patt, A 2017, Do stakeholders’ perspectives on renewable energy infrastructure pose a risk to energy policy implementation? A case of a hydropower plant in Switzerland, *Energy Policy*, Volume 108, September 2017, pp. 21–28.
- 3 Project “**Acceptance of renewable energy**”. Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, *Acceptance of renewable energy*, Berne, chapter 4, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-4.pdf>.

Guidance # Europe / EU # Politics (federal government, canton, municipality)

3.1.4. Swiss energy policy is internationally embedded



Due to the physical dependencies of international electricity grids and the position of Switzerland as a transit country to Italy, European markets and legal provisions have always had a direct impact on the networked electricity market in Switzerland. Although the achievement of the objectives laid down in Energy Strategy 2050 will not directly hinge on whether an electricity market agreement is concluded with the European Union, the contributions made by such an electricity agreement towards ensuring supply security would facilitate the fulfilment of these goals.¹

It can be observed already today that the liberalisation of the markets and harmonisation of market regulations by the EU, which Switzerland has only replicated in part, has worsened trading conditions for Switzerland's major electricity companies, in particular. In the absence of an electricity agreement between Switzerland and the EU, cross-border electricity trading is likely to decline further as the European harmonisation of market regulations advances.

One of the biggest problems with respect to such an agreement is the question of state aid, which the EU defines as "an advantage in any form whatsoever conferred on a selective basis to undertakings by national public authorities". The EU monitors state aid to identify whether the internal market and the equal and fair playing field for companies are being compromised. Some aspects of Swiss energy policy are not currently compatible with the EU regulations on state aid, with this being especially true with respect to the special support measures in place for hydropower companies.² European law does, however, leave Swiss legislators with sufficient scope to support both large hydropower plants as well as smaller producers of renewable energy irrespective of an electricity agreement, for example through the application



of quota models, auctions, the definition of exemptions from competitive processes and the creation of good framework conditions.

The NRP Energy, however, makes clear that risks will emerge with respect to supply security if Switzerland is not securely linked to the European internal market in electricity. This is especially true with a view to maintaining stable grid operations. In this regard, Swissgrid is already pointing to a growing number of expensive, stabilising interventions.³

Notes and References

1 Project "Switzerland and EU energy policy".

2 Project "The European electricity market: staying away will be expensive but will also open up room for manoeuvre".

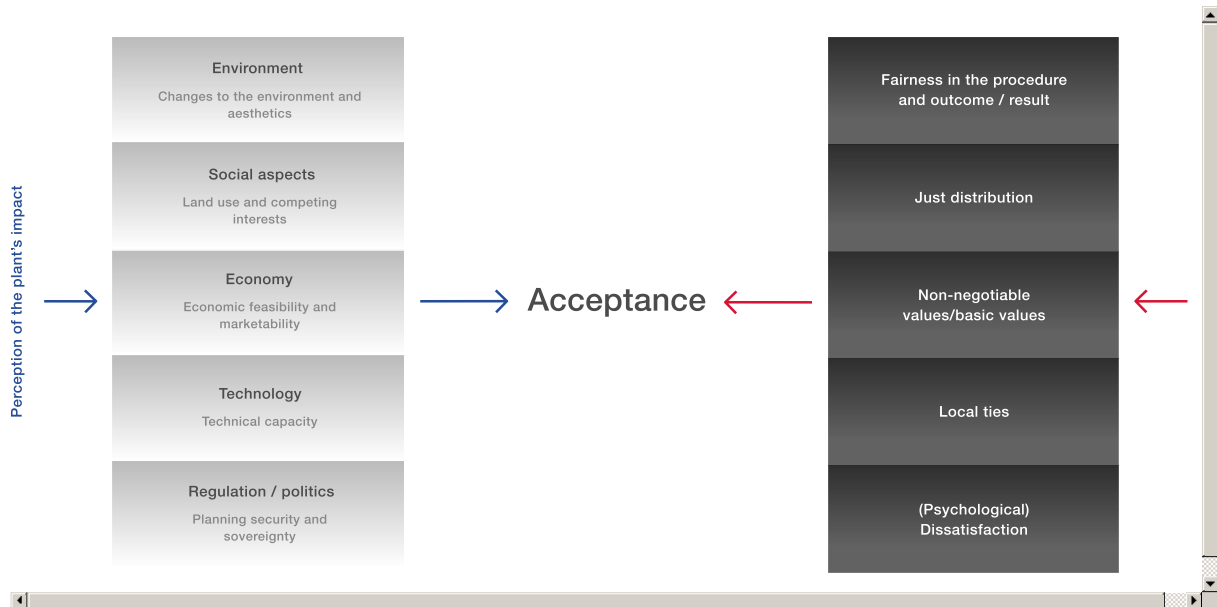
3 <https://www.tagesanzeiger.ch/schweiz/standard/eu-setzt-nun-auch-beim-strom-eine-frist/story/21785448>.

3.2. Impact

Cost-benefit considerations fundamentally influence the acceptance of changes to the status quo. Depending on the context, material advantages and disadvantages can, however, have impacts of varying magnitudes.

Industry # Behaviour # Decentralisation # Population

3.2.1. Costs and benefits are assessed subjectively



Factors that influence the acceptance of systems for the production of renewable energy *Source: Díaz et al. 2017.¹*

Acceptance not only hinges on the perception of the power plant and its impact, but also on the way the process is perceived locally. While stakeholder groups attach different levels of significance to the relevant factors relating to an energy project, the process-related factors ('fairness') are important to all stakeholder groups.² Costs and benefits are also assessed subjectively. For residents living close to a planned small hydropower plant, for example, the consequences that they can personally expect from a project and how any negative consequences are to be offset in the form of compensation are of relevance to them.³

Similarly, decentralised renewable energy systems (so-called multi-energy hubs) tend to be accepted if they are locally owned and bring benefits to the region. Here, the benefits need to be clearly demonstrated through highlighting specific advantages such as energy independence, supply security, potential CO₂ reductions and lower prices as well as potential financial assistance for investments.⁴ Energy cooperatives are especially attractive in this respect as they are strongly linked to the idea that they allow people to contribute to their own energy supply and thus also benefit directly.⁵ Photovoltaic systems on avalanche barriers are also endorsed if the project in question makes a contribution to the local economy.⁶

Notes and References

1 Project **"Trade-offs in switching to renewable electricity"**. Díaz, P, Adler, C & Patt, A 2017, Do stakeholders' perspectives on renewable energy infrastructure pose a risk to energy policy implementation? A case of a hydropower plant in Switzerland, *Energy Policy*, Volume 108,



September 2017, pp. 21–28.

2 Díaz, P, Adler, C & Patt, A 2017, Do stakeholders' perspectives on renewable energy infrastructure pose a risk to energy policy implementation? A case of a hydropower plant in Switzerland, *Energy Policy*, Volume 108, September 2017, pp. 21–28.

3 Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, Acceptance of renewable energy, Berne, chapter 6, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-6.pdf>. Project “Acceptance of renewable energy”.

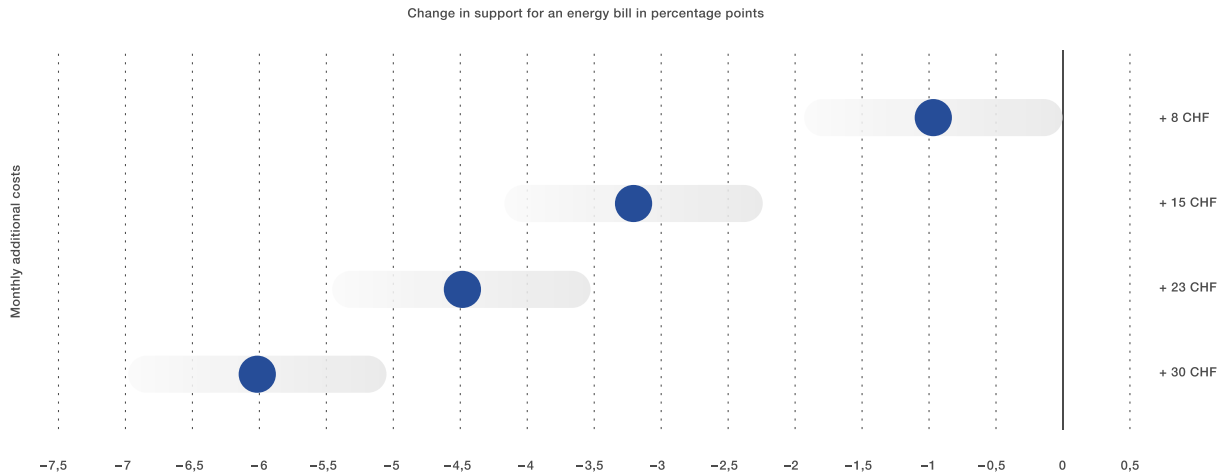
4 Project “Multi-energy hub systems and society”.

5 Project “Collective financing of renewable energy”.

6 Project “Trade-offs in switching to renewable electricity”.

Price # Costs / benefits

3.2.2. Short-term costs are decisive



Relationship between acceptance and financial burden: results of an experiment

Source: Stadelmann-Steffen et al. 2017.¹

The costs expected for an individual's own household are the most important factor in explaining the rejection of measures for the conversion of the energy system: "The more a bill pulls on a household's purse strings, the more likely it is to be rejected". This can be seen in the following illustration. It shows, for example, that additional costs of just CHF 8 each month per household give rise to a significantly lower level of support for a bill (around 2.25 percentage points) relative to one with no cost implications.

The marked negative impact of expected costs on the level of acceptance relates to the fact, among others, that costs are perceived as a concrete risk by citizens. The potential benefits, in contrast, remain hypothetical in nature. In such situations, most people decide in favour of preserving their current level of well-being and against future-oriented projects. This applies in equal measure to political decision-makers. In both national votes and with a view to local projects, they also show a strong aversion to costs: here, too much weight is given to short-term costs and benefits, while too little consideration is given to long-term effects. The challenge for energy policy lies in the fact that costs are generally incurred in the short term, while the resulting benefits only emerge further down the track.

The provision of thorough information and positive experiences have an impact on the way in which the cost-benefit ratio is viewed. For example, it has been shown that the willingness to pay for green power can be increased if customers have been convinced of the benefits for the environment generated by the purchasing of electricity produced in this way.² The influence of positive experiences is also demonstrated by the fact that the acceptance of small



hydropower plants is comparably high in locations where a plant of this kind is already in operation.³

Notes and References

1 Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, *Acceptance of renewable energy*, Berne, chapter 5, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-5.pdf>. Project “Acceptance of renewable energy”.

2 Litvine, D & Wüstenhagen, R 2011, Helping “light green” consumers walk the talk: Results of a behavioural intervention survey in the Swiss electricity market. *Ecological Economics* 70, 2011, pp. 462–474.

3 Project “Acceptance of renewable energy”.

Area # Landscape

3.2.3. Perceived landscape quality restricts new uses



The transformation of the energy system requires the construction of new infrastructures such as solar energy, wind and hydropower plants as well as additional power lines. Such constructions often have a significant impact on the landscape and thus represent a visible disadvantage for the population. Here, individual assessments of landscape quality are decisive for the acceptance of new uses.

As part of the NRP Energy, it has been possible to show that the acceptance of infrastructures for the supply of renewable energy is greatly dependent on the landscape type and the existing use of an area.¹ The link is clear: the closer to nature a landscape is perceived to be, the greater the rejection of new structures. On the other hand, solar power plants, wind turbines and power cables are accepted by a majority even in alpine landscapes if they are optically integrated into existing infrastructures such as cable cars. This finding corresponds to a specific study in the area of overland power lines.² The conversion of existing overhead power lines in order to increase capacity is thus significantly better accepted than the building of new structures. In line with this, analyses on the construction of new plants for the production of renewable energy have shown that it is usually the 'hard' technical components such as size, location and the impact on nature that represent the main reason for rejection.³

Where new technologies are associated with a minimal impact on nature and the environment, there is also negligible scope for the development of resistance. Authorities and project sponsors should therefore not exclusively focus on maximising production output as part of their projects, but rather attach equal significance to the minimisation of potential negative effects on the landscape.



Notes and References

1 Project “**Energyscapes**”.

2 Project “**Hybrid overhead power lines for Switzerland**”.

3 Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, *Acceptance of renewable energy*, Berne, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-1.pdf>. Project “**Acceptance of renewable energy**”.

Tariff # Price # Bonus / penalty

3.2.4. Energy tariffs can encourage saving



Less than half of the Swiss population knows how high their electricity bill is!¹ Energy prices can therefore only have an insignificant impact on the consumption of private households. Nevertheless, in order to have an impact on consumption via prices, additional instruments are required. For example, energy tariffs that combine an incentive to achieve an energy saving goal (bonus) and act as a deterrent to not meeting this objective (penalty) are a promising tool. A quarter to one-third of all Swiss households would opt for a tariff with a symmetrical bonus and penalty of 30 % of their energy bill. This would allow for power consumption to be reduced by 1.6 % to 2.2 %.²

Against the backdrop of a liberalisation of energy markets, the introduction of such tariffs entails risks, however. Should private households in future be given the opportunity to select their energy provider freely, they could systematically give preference to the lowest tariff. Studies of the NRP Energy show, however, that both households and companies do not only base their decision only on price when selecting their product. For example, 80 % of the investigated households and 70 % of the companies also stuck with the more expensive standard electricity products comprising renewable energies five years after their introduction.³ Whether the cost distribution is viewed as fair is, however, important with respect to the acceptance of this kind of 'prodding' or 'nudging' in the direction of sustainability.⁴ If people have the feeling that, for example, they are being disadvantaged relative to businesses, the level of acceptance quickly drops.⁵

Notes and References

1 Filippini, M, Blasch, J, Boogen, N & Kumar, N 2018, "Energy efficiency, bounded rationality and energy-related financial literacy in the Swiss household sector", final report, pp. 52–53; for Western Switzerland: "Understanding household energy consumption".

2 Project "Understanding household energy consumption".

3 Project "Soft incentives and energy consumption".



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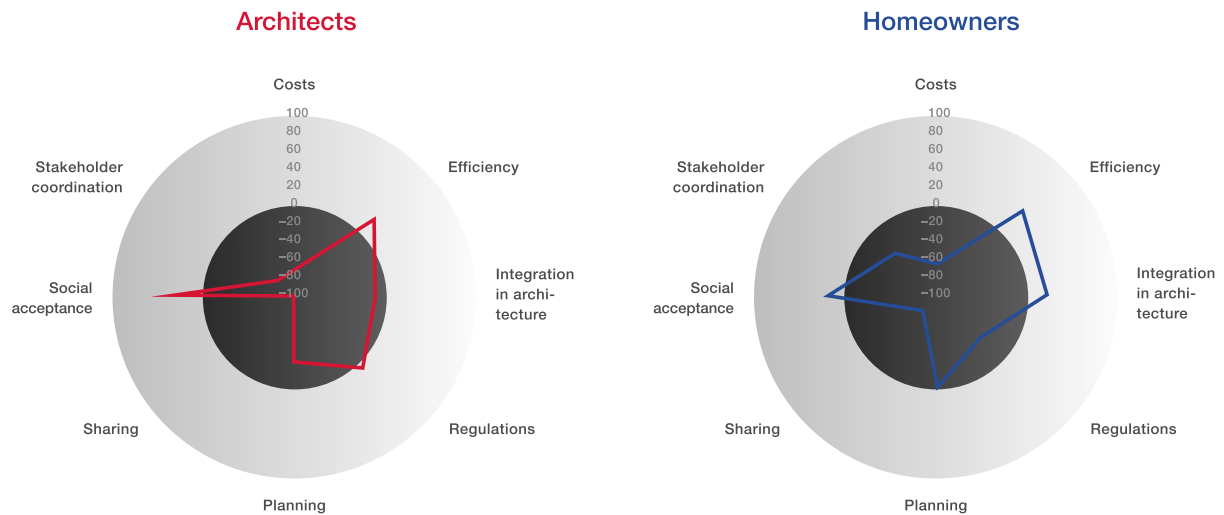
4 Osuna, E, Köng, A-L & Holenstein, M 2018, Schweizer Bevölkerung zu mehr Nachhaltigkeit “stupsen”, *Die Volkswirtschaft* 10/2018, p. 24–27,

https://dievolkswirtschaft.ch/content/uploads/2018/09/09_Osuna_Koeng_Holenstein_DE.pdf.

5 Project “Exploring ways towards societal consensus”.

Just distribution # Costs / benefits # Building owners

3.2.5. Ownership structures are key for motivation



Building-integrated photovoltaics Source: Project *“Accelerating PV applications”*.

Owners of their own home demonstrate significant intrinsic motivation to implement energy saving measures. For around two-thirds of the implemented renovation projects, energy saving motives are the predominant issue. Interestingly, it is chiefly idealistic motives that are decisive and less so financial reasons. The critical factors for energy saving measures tend to be found at an operational level: How should I proceed? Where can I find independent specialist support? Can I increase my mortgage? Where will we live during the renovation work? Such obstacles can be overcome with suitable advisory and support offers. Together with the Swiss Homeowner Association, the **“Energy reduction potentials of elderly people’s households”**¹ project has developed corresponding advisory offers. The **“Sustainable lifestyles and energy consumption”** project has developed guidelines for energy-saving living in cooperation with cities which also include recommendations for the target group of homeowners.²

In contrast, rental property owners are much less motivated to use the most energy-efficient construction methods possible as the savings are made via ancillary costs and thus do not benefit the investor. This also applies to the implementation of architecture principles that promote behaviour that saves as much energy as possible. It is therefore important to gear measures and programmes towards the specific ownership structures. Studies on the acceptance of multi-energy-hub systems (MES) that could produce energy in a sustainable and decentralised manner in close proximity to the consumers are consistent with these observations.³ While attitudes towards such systems are generally positive, ownership structures and security are identified as stumbling blocks. The feasibility of MES thus depends less on the technology and more on the available financing, ownerships structures and the



system controls.

The picture is similar for building-integrated photovoltaic systems. The vast majority of the surveyed architects are prepared to use this technology. However, they would not recommend it to homeowners on their own initiative. Architects are of the opinion that the initiative here should come from the homeowners. The political framework conditions should thus be structured in such a way that homeowners have an interest in utilising building-integrated photovoltaics.⁴

The left-hand side of the illustration above shows how architects assess building-integrated photovoltaics with a view to costs, efficiency, architectural integration, regulations, planning, knowledge, social acceptance and the coordination of stakeholders, while the views of homeowners are shown on the right. Lacking knowledge, requirements with respect to the coordination of stakeholders and costs emerge as the key obstacles to implementation.

Notes and References

1 Project "Energy reduction potentials of elderly people's households": <https://www.hev-schweiz.ch/>.

2 Project "Sustainable lifestyles and energy consumption": <https://www.hslu.ch/de-ch/hochschule-luzern/forschung/projekte/detail/?pid=707>.

3 Project "Multi-energy hub systems and society".

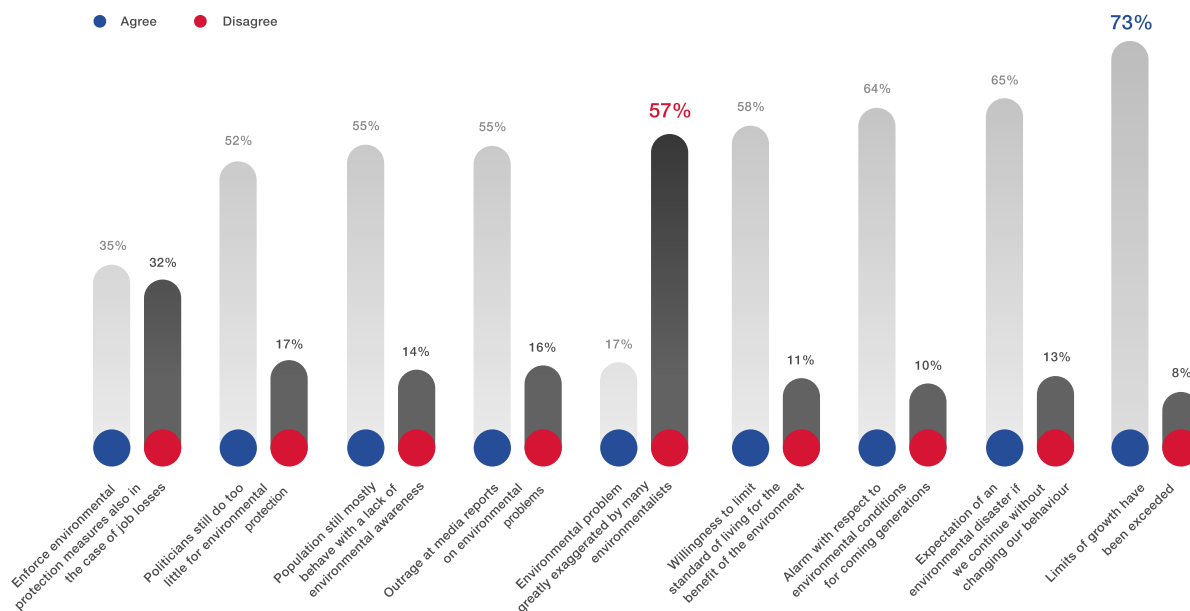
4 Project "Accelerating PV applications".

3.3. Personality

Attitudes towards factual issues are to a large extent dependent on both an individual's established personal values and their current living situation.

Climate # Information / communication

3.3.1. Views on sub-aspects can form the basis for consensus



How great is the environmental awareness of the Swiss population? Source: *Environmental Survey 2018.*¹

The stance adopted by citizens towards the national energy strategy takes account of views on specific sub-aspects. Here, established general attitudes such as stances towards climate and environmental issues play a key role. These principles can only be influenced to a limited extent. For example, around 20 % of those questioned in the Swiss Environmental Survey do not believe that global warming is taking place. On the other hand, around 30 % state they have a pronounced environmental awareness. In between there is a group of people whose views are less firm. Information campaigns are particularly effective when they are aimed at this group.² Campaigns that adopt attitudes towards the different versions of energy production as a starting point are especially promising. Here, a study into the trade-offs in switching to renewable electricity shows that a broad consensus appears possible on the basis of solar energy produced in Switzerland.³

Overall, the environmental awareness of the people of Switzerland is relatively high. For example, 65 % fully or tend to agree with the statement that “if we continue as before, we are heading for an environmental disaster”.

Notes and References

- 1 Project “Soft incentives and energy consumption”. Diekmann, A & Näf, M 2018, *Swiss Environmental Survey, third panel wave 2018*, ETH Zurich.
- 2 Project “Soft incentives and energy consumption”. Diekmann, A & Näf, M 2018, *Swiss Environmental Survey, third panel wave 2018*, ETH Zurich.



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3 Project "Trade-offs in switching to renewable electricity"

Standard of living # Building owners

3.3.2. Different starting points required for different generations



Digital natives are more technology-savvy than older people. At the same time, younger individuals are also used to a high level of consumption from an early age. A great deal can therefore be achieved with young people in the area of energy-saving behaviour with smartphone apps that use gaming elements.¹

In contrast, the baby-boomer generation, who will reach retirement age in the coming years, has a relatively high proportion of homeowners. It is worthwhile motivating this group to make structural changes. This is especially because per capita energy consumption among them is relatively high.² This is generally because the properties of homeowners are inhabited by ever fewer people as the children move out.

A positive starting point is the high level of motivation for homeowners to make energy-saving investments. In addition to improved living comfort, climate protection and the energy saving are the main reasons for elderly people to undertake structural densification measures and energy-efficient renovations. In contrast, specific operational questions such as “Where can I find independent specialist support?” and “Where will we live during the conversion work?” emerge as stumbling blocks. Such obstacles can be overcome with suitable advisory and support offers.³

Notes and References

1 Project “[Virtual competition for energy-efficient mobility](#)” and project “[Understanding household energy consumption](#)”.



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2 Project "Energy reduction potentials of elderly people's households".

3 Project "Sustainable lifestyles and energy consumption". <https://www.hslu.ch/de-ch/hochschule-luzern/forschung/projekte/detail/?pid=707>.

Consensus # Population

3.3.3. Opinions determined by group affiliation



Everyone belongs to several social groups at the same time. These groups in some cases adopt very different stances towards a specific topic. Depending on the group context in which an individual feels addressed, they can also represent different positions with respect to one and the same issue. This is exemplified by the different relevance assigned to the costs of the energy transition for consumers and citizens, as identified as part of the NRP Energy.¹ While electricity prices have practically no influence on energy-saving behaviour in terms of private consumption,² possible consequential costs are a real 'killer criterion' for voting citizens.³ On the one hand, activities and information must therefore be tailored as closely as possible to the group within the context of which people are being addressed. On the other, resistance can be minimised if issues are introduced to people within a group that is known to have a positive attitude towards a matter. Studies as part of the NRP Energy have shown, for example, that it is easier to get people enthusiastic about cycling via their sports club.⁴

The tool Energyactors.ch describes the energy-related room for manoeuvre of around 40 potential implementation players for communal energy policy, including many project examples.

Notes and References

1 Project "Exploring ways towards societal consensus".

2 Project "Understanding household energy consumption".

3 Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, *Acceptance of renewable energy*, Berne, chapter 1, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-1.pdf>. Project "Acceptance of renewable



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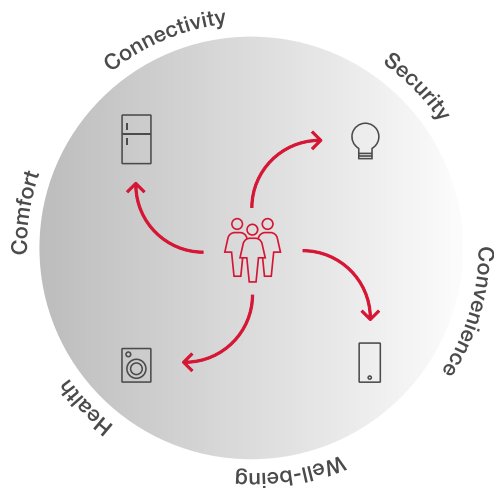
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energy”.

4 Project “Promoting energy-sufficient behaviour in cities”.

Standard of living # Costs / benefits

3.3.4. Co-benefits often more convincing than environmental arguments



Topics with relevance for household energy consumption *Source: Sahakian/Bertho 2018.*¹

While energy and environmental issues are an important concern for many Swiss citizens, they are in most cases not their top priority. Instead, emphasis is placed on issues that are related to personal quality of life, such as health, well-being, convenience, connectivity, comfort and security.² Regular washing, for example, is linked to subjective requirements concerning hygiene. Lighting not only allows us to see better, but also provides a feeling of security. For many people, connectivity is a condition for social participation.

These relationships need to be taken into account for activities aimed at reducing the energy consumption of households and, where possible, used in a targeted manner. The more energy-conscious behaviour is linked to an additional benefit with respect to personal quality of life, the greater the effect of the campaign. Instead of saving, which tends to be perceived as a restriction, an aspect with positive associations is placed in the spotlight. As an argument for shorter washing cycles, for example, time saving can be highlighted, while health effects can be pointed to as a motivation for cycling and the creation of a pleasant and comfortable atmosphere can be referenced as a benefit of reducing lighting intensities. And as a motive for the installation of a photovoltaic system, the argument that this will allow individuals to become independent of their energy provider is often far more convincing than the associated benefits for the environment.

Notes and References



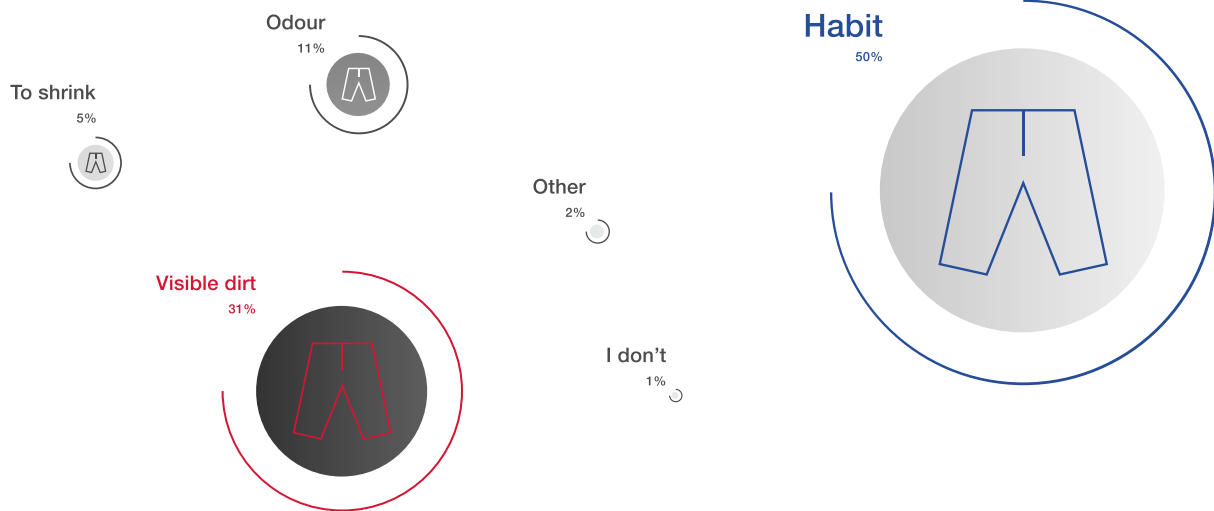
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- 1 Sahakian, M & Bertho, B 2018, *L'électricité au quotidien: le rôle des normes sociales pour la transition énergétique suisse*, Genève, https://www.unige.ch/sciences-societe/socio/files/9415/3502/7352/Brochure_PNR71_DEF.pdf.
- 2 Project "Understanding household energy consumption".

Standard of living # Behaviour

3.3.5. Personal values key to determining consumption behaviour



How do you decide when to wash your jeans? Source: Jack 2013.¹

Fundamental personal values have a significantly greater influence on environmental behaviour than specific views with respect to environmental and energy issues. These values – together with social norms – form the basis on which both the energy consumption behaviour and opinions about technologies are built. On the one hand, for example, an individual’s sense of order and cleanliness often conflicts with calls for the more frugal use of energy-intensive cleaning appliances.² On the other, personal beliefs such as views on health risks and the way in which people define their own quality of life are likewise given considerably greater weighting than the benefits of energy-conscious behaviour.³ An effective lever for affecting the values of people is the fact that they are largely based on social norms. For example, a community “jeans challenge” succeeded in measurably reducing the number of clothes washing cycles of the participants.⁴ Here, participants wore a pair of jeans for four weeks without cleaning them and together looked closely at the topic of hygiene.

Notes and References

- 1 Jack, T 2013, Nobody was Dirty: disrupting inconspicuous consumption in laundry routines. *Journal of Consumer Culture*, 13(3), pp. 406–421, http://portal.research.lu.se/portal/files/44118258/Jack_2013_Nobody_was_Dirty.pdf.
- 2 Project “Understanding household energy consumption”.
- 3 Project “Hybrid overhead power lines for Switzerland”. Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, *Acceptance of renewable energy*, Berne, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-1.pdf>. Project



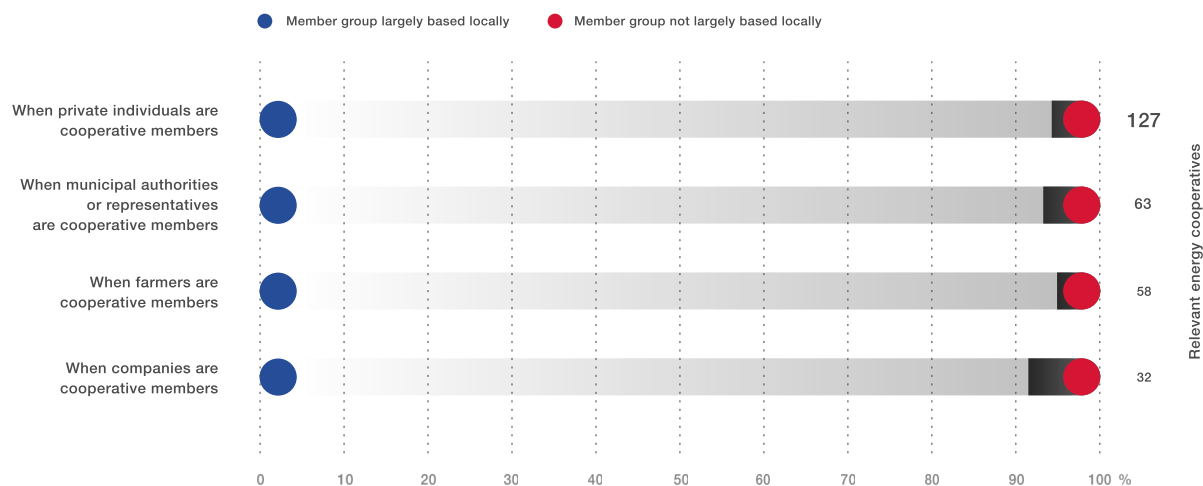
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“Acceptance of renewable energy” and project “Exploring ways towards societal consensus”.
4 Project “Understanding household energy consumption”.

Energy cooperative # Prosumers # Cooperation

3.3.6. “Swissness” and regional roots promote acceptance



Geographical proximity of members to the cooperative’s registered office by member category (reading aid for top bar: of 127 cooperatives with private individuals as members, 95 % stated that these members are largely based in the municipality of the cooperative’s registered office or in a neighbouring community). Source: Rivas/Schmid/Seidl 2018.¹

Swiss citizens better accept renewable energies if produced in Switzerland or if they are generated by a Swiss company should they be sourced from abroad. Studies conducted as part of the NRP Energy reveal, among other things, that the level of acceptance for imported energy from renewable sources is considerably higher if the plants are owned by Swiss companies.² The repeated rejection of the privatisation of electricity production in communal and cantonal votes suggests that state ownership of production activities also has a positive impact on acceptance. The finding that energy production organised as part of a cooperative also enjoys a very high level of acceptance points in a similar direction.³ If the municipalities as well as citizens are also incorporated in the cooperatives, this can have an even more positive effect on people’s views towards projects. At present, most energy cooperatives have a membership structure with strong local roots. A national link with respect to ownership structures the decisions of investors. The “Swissness” of the plants is also a key criterion for them.⁴

Notes and References

¹ Project “Collective financing of renewable energy”. Rivas, J, Schmid, B & Seidl, I 2018, *Energiegenossenschaften in der Schweiz. Ergebnisse einer Befragung*, Birmensdorf,



<https://www.wsl.ch/de/publikationen/energiegenossenschaften-in-der-schweiz-ergebnisse-einer-befragung.html>.

2 Project "Trade-offs in switching to renewable electricity".

3 Project "Collective financing of renewable energy".

4 Wüstenhagen, R, Wolsink, M & Bürer, MJ 2007, Social acceptance of renewable energy innovation: An introduction to the concept, *Energy Policy* 35(5), pp. 2683–2691.

3.4. Society

Everyday behaviour is primarily determined by two factors that largely have an unconscious effect: social norms are automatically adopted by society and routines mechanically follow the same processes.

Transport # Behaviour

3.4.1. Social practices and norms determine individual opinions



The norms and practices of communities in which individuals go about their lives to a large extent determine people's opinions and thus also the acceptance of technologies. They also have an effect on behaviour. This is underlined by several results from NRP Energy projects. For example, a decisive role in the opinion-forming process in all social groups is played by role models. The studies show that both personal values and individual consumer behaviour as well as the willingness to introduce new technologies as an entrepreneur are shaped by the views of opinion leaders and popular figureheads.¹ Even more successful is the incorporation of behavioural changes in the practices of existing communities. For example, marked success has been recorded in encouraging individuals to use a bike instead of a car as part of campaigns within their association.² Ultimately, it was found that people not only make use of carpooling options because in doing so they can make a contribution towards a more sustainable form of mobility. At least as important is that carpooling is accepted as a legitimate means of transport by others in their environment.³

Notes and References

1 Project "[Understanding household energy consumption](#)". Wüstenhagen, R, Wolsink, M & Bürer, MJ 2007, Social acceptance of renewable energy innovation: An introduction to the concept, *Energy Policy* 35(5), pp. 2683–2691. Project "[Sustainable lifestyles and energy consumption](#)".

2 Project "[Promoting energy-sufficient behaviour in cities](#)".

3 Project "[Sharing economy: hype or promise?](#)", insbesondere: Bachmann, F, Hanimann, A, Artho, J & Jonas, K 2018, What drives people to carpool? Explaining carpooling intention from



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the perspectives of carpooling passengers and drivers, *Transportation Research*, Part F 59, pp. 260–268.

Behaviour

3.4.2. Make use of routine behaviour or change it carefully



The lion's share of our everyday behaviour follows engrained routines. Changing these automatism is considered to be very difficult. Several research projects therefore emphasise that ensuring the compatibility of a desired, environmentally friendly behavioural trait with people's everyday habits is one of the most important success factors of campaigns and activities.¹ Significant life events such as marriage, the birth of a first child or a move to a new home can, for example, be used as possible starting points for breaking through undesirable automatism.² Such events mean that individuals have to change their accustomed behaviour in any case. The fact that a central laundry room in a multi-family dwelling reduces the number of washing cycles relative to having washing machines in every flat also shows that framework conditions set in a considered manner can likewise achieve the desired objective with respect to routines.

Notes and References

¹ Project "Sharing economy: hype or promise?", project "Exploring ways towards societal consensus" and project "Understanding household energy consumption".

Multipliers # Behaviour # Building owners

3.4.3. Visibility encourages replication



As social beings, people base their values and actions to a large extent on their environment. Initiatives can and need to exploit this fact as much as possible by, for instance, making positive examples visible. However, the NRP Energy provides results that at first glance contradict this statement. On the one hand, several projects have shown that involvement in group activities can make a decisive contribution to initiating and also anchoring changes in behaviour.¹ On the other, it was not possible to achieve a significant impact with so-called signalling.² Individuals who had adopted environmentally friendly behaviour traits and communicated this visually with stickers, umbrellas or similar tools were hardly ever copied.

In order to establish a corresponding social norm, people need to believe that “everyone else is doing it, not only me”. To this end, activities with a higher level of visibility are required, such as stands set up by municipal authorities, the involvement of the commercial sector or public personal undertakings by known personalities.³

The situation is similar when it comes to winning companies over to use a new technology or motivating homeowners to optimise their property from an energy perspective: visible role models also serve to convince people in these contexts.⁴ Here, emphasis is placed on the communication of positive experiences. If a homeowner can talk to another homeowner who has had positive experiences with, for example, a heat pump, this has a very motivating effect. These findings suggest that visibility can chiefly trigger a change in thinking if there is a concrete link between the sender of the message and the addressee. Impersonal messages, in contrast, are largely blanked out by those they are aimed at.

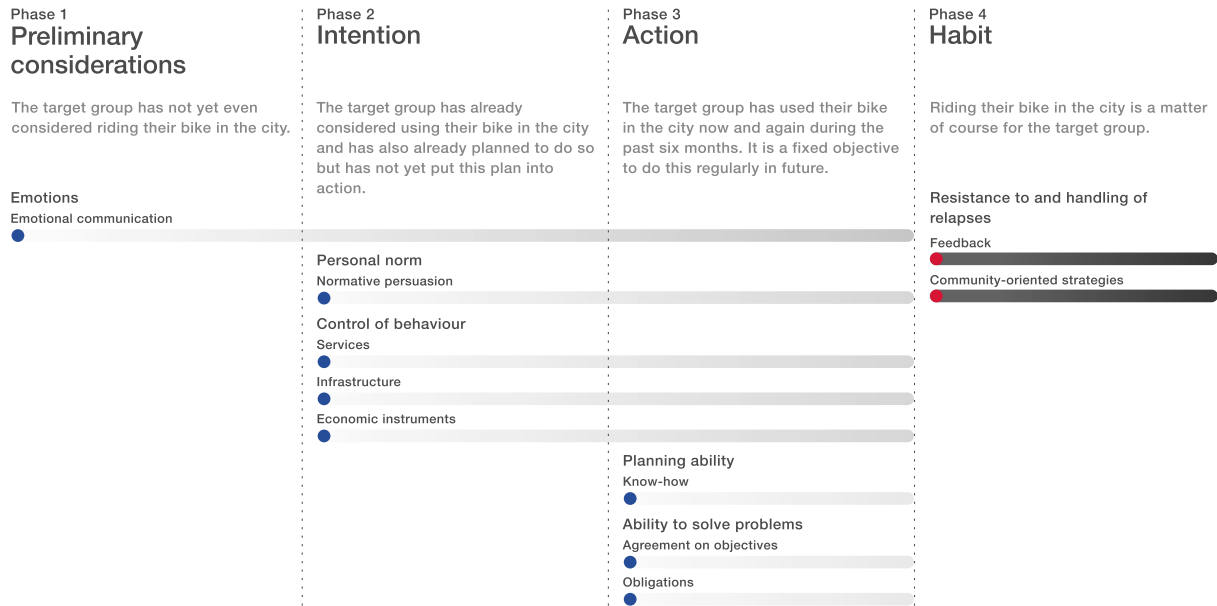


Notes and References

- 1 Project “**Understanding household energy consumption**” and project “**Promoting energy-sufficient behaviour in cities**”.
- 2 Project “**Soft incentives and energy consumption**”.
- 3 Mosler, H-J, Gutscher, H & Artho, J 2001, Wie können viele Personen für eine kommunale Umweltaktion gewonnen werden? *Umweltpsychologie*, 5(2), p. 122–140.
- 4 Wüstenhagen, R, Wolsink, M & Bürer, MJ 2007, Social acceptance of renewable energy innovation: An introduction to the concept, *Energy Policy* 35(5), pp. 2683–2691. Project “**Modernising waste management**”.

Transport # Behaviour

3.4.4. Overriding social trends influence consumption behaviour



In which phase is the target group? Source: Ohnmacht 2018.¹

Demographic changes and lifestyle trends have a major impact on energy consumption. For example, the growing share of older people in Switzerland is leading to an increase in single-person households.² This is giving rise to increased energy consumption even if individual usage behaviour is not changing. Advancing urbanisation is having the opposite effect. In most cases, the denser the building development, the better the links to public transport or sharing offers, for example. This can lead to a considerable decrease in energy consumption per person. As part of the NRP Energy, it has been shown that a smartphone app for promoting more sustainable individual mobility in the metropolitan city of Zurich is far more successful than in the much less urban Bellinzona agglomeration.³ Activities and campaigns that either consciously exploit overriding social trends to achieve their objectives or address these in a targeted manner can thus expect significantly greater success. Conversely, the chances of success of initiatives that conflict with underlying social trends are correspondingly smaller. A toolbox that was developed within the framework of the NRP Energy⁴ provides city administrations with guidelines with which they can reach addressees with their campaigns and activities aimed at promoting environmentally friendly behaviour in a targeted manner.

Notes and References

1 Ohnmacht, T 2018, *Velofahren – Massnahmen für die Reduktion des Energieverbrauchs, Ein Leitfaden mit zielgruppenorientierten Empfehlungen*, Competence Centre for Mobility of the Lucerne University of Applied Sciences and Art – Department of Economics, Lucerne, <https://www.hslu.ch/de-ch/hochschule-luzern/forschung/projekte/detail/?pid=707>.



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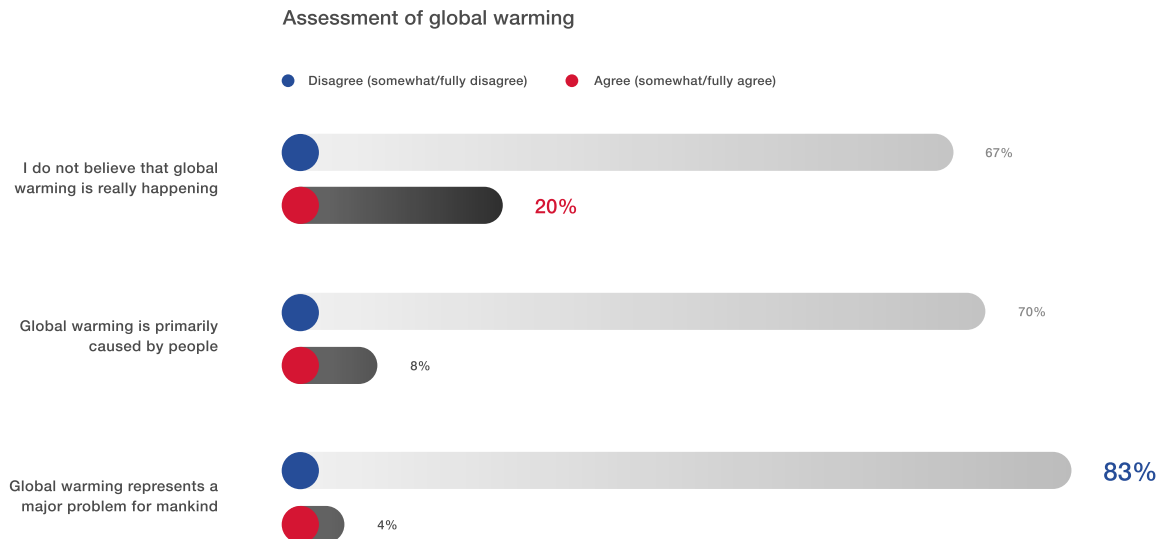
- 2 Project "Energy reduction potentials of elderly people's households".
- 3 Project "Virtual competition for energy-efficient mobility".
- 4 Project "Sustainable lifestyles and energy consumption".

3.5. Information

Knowledge is an important prerequisite for energy-efficient actions. However, knowledge alone isn't enough.

Information / communication # Behaviour

3.5.1. Knowledge is of fundamental importance



Assessment of global warming *Source: Environmental Survey 2018.¹*

Within the population, there are in some cases significant knowledge gaps with respect to energy and climate issues.² This manifests itself, for example, in the fact that a surprisingly high share of 20 % of the population do not believe that scientifically proven global warming is actually taking place.³

However, knowledge alone is not enough to make people behave in an environmentally friendly manner. The additional benefits of environmentally friendly behaviour, such as its positive impact on health or its role in saving time (see **“Co-benefits are often more convincing than environmental arguments”**) and the strengthening of social norms that bring about environmentally friendly behaviour (see **“Social practices and norms determine individual opinions”**) are usually just as effective in the short term at least.

Over the long term, however, it is especially important in directly democratic Switzerland that the population is aware of and understands the challenges posed by energy policy and acts accordingly. After all, knowledge is of fundamental importance for the opinion-forming process. This therefore raises the question of how this knowledge gap can be filled. Various studies of the NRP Energy show that campaigns that incorporate the social environment of the people being addressed and are based on their direct involvement or personal experiences generate much better results than achieved by purely providing information. The researchers are also in agreement that the world of science can assume an active role as a credible provider of information.



Notes and References

- 1 Project “**Soft incentives and energy consumption**”. Diekmann, A & Näf, M 2018, *Schweizer Umweltsurvey, Dritte Panelwelle 2018*, ETH Zürich.
- 2 Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, *Acceptance of renewable energy*, Berne, chapter 5, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-5.pdf>. Project “**Acceptance of renewable energy**”.
- 3 Project “**Soft incentives and energy consumption**”.

Information / communication

3.5.2. Negative information has an advantage



Studies in areas as different as corporate investments, political opinion-forming processes and views with respect to new technologies come to the conclusion that in situations of uncertainty negative information generally generates a greater effect than positive information.¹ Using a survey, the population's view on hybrid overhead power lines has been investigated, for example. These make possible a grid expansion within the existing system without the construction of additional lines. Depending on how the respondents had been informed about the necessity of the grid expansion and the possible effects of the new technology, they supported this to varying degrees. In particular, information on potential negative effects such as noise and electrical fields gave rise to broad resistance among more than 60 % of respondents. In the absence of this knowledge, the technology gained an equally strong level of approval of in excess of 60 %. When respondents were made aware of the necessity of the grid expansion, as many as three-quarters of them came out in favour of hybrid overhead power lines.

This can be explained by, among other things, an asymmetric perception of risk. Threat information triggers negative emotions and these in turn promote selective perception. Here, diffuse uncertainties are perceived as real risks and thus shift people's views towards rejecting the matter at hand. This fundamental drawback of changing the status quo can be offset from as soon as the initial project planning steps by, for example, involving the affected parties at the earliest possible stage and through the use of participatory processes.²

Notes and References



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1 Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, *Acceptance of renewable energy*, Berne, chapter 1, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-1.pdf>. Project “Acceptance of renewable energy” and project “Trade-offs in switching to renewable electricity”.

2 Project “Trade-offs in switching to renewable electricity”; project “Acceptance of renewable energy”, project “Acceptance of renewable energy”, project “Hybrid overhead power lines for Switzerland” and project “Hydropower sustainability”.

Multipliers # Behaviour

3.5.3. Good experiences and examples prevent rejection



Knowledge based on concrete experiences has a sounder base and also has a greater impact on individual attitudes towards certain projects.¹ In line with this, functioning examples, such as pilot plants that demonstrate the feasibility of a technology, can decisively increase levels of approval within economic and political circles.² The distribution of multi-energy hubs can, for example, benefit from pilot plants co-financed by the state if they show they can be operated reliably and economically.³

Positive individual experiences can also prevent negative information from quickly spreading. There is also the fact that personal involvement leads to a growing sense of identification with a matter. This is also demonstrated by the finding that people who can be encouraged to use an e-bike for a large part of their mobility over an extended period also use this form of transport significantly more over the long term.⁴

Notes and References

1 Project “**Soft incentives and energy consumption**” and project “**Promoting energy-sufficient behaviour in cities**”.

2 Project “**Collective financing of renewable energy**”. Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, *Acceptance of renewable energy*, Berne, chapter 1, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-1.pdf>. Project “**Acceptance of renewable energy**”.

3 Krütli, P, Seidl, R, von Wirth, T & Stefanelli, A 2017, Local acceptance of distributed energy systems in energy systems transformations, Paper presented at the 8th International Sustainability Transitions Conference, June 18–21, 2017, Gothenburg. Project “**Multi-energy**”.



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hub systems and society”.

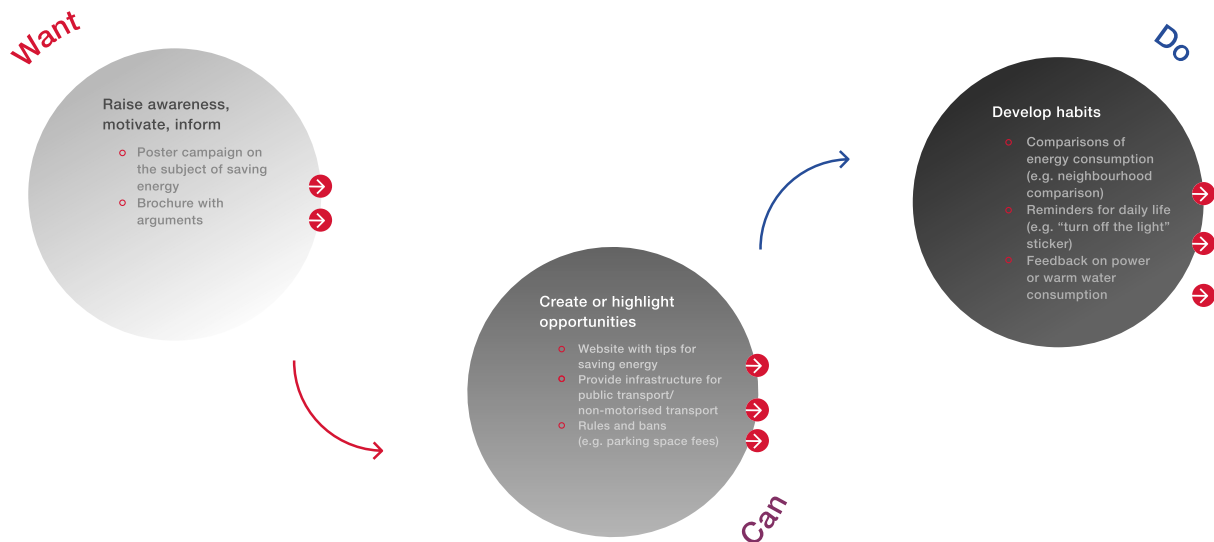
4 Project “Promoting energy-sufficient behaviour in cities”.

3.6. Ability to change

In order for Switzerland’s energy consumption to be reduced on a sustainable basis, changes in behaviour are essential alongside technical measures. To achieve this goal, it is necessary to understand the mechanisms of behavioural change and identify the most effective levers.

Information / communication # Behaviour

3.6.1. “Want-Can-Do” model provides starting points



Different goals of behavioural interventions in the energy sector with specific implementation examples *Source: Moser et al. 2017.¹*

Three starting points for promoting energy-efficient behaviour can be derived from the “Want-Can-Do” model (see “Behavioural levels incorporate many stages”).

- Inform the population about the subject of energy and raise their awareness about this issue. (Want)
- Create or demonstrate possibilities for reducing individual energy consumption. (Can)
- Offer assistance in turning good intentions into actual energy-saving behaviour. (Do)

Depending on whether raising awareness, creating new possibilities or implementing specific actions is the objective of a campaign, various approaches can be used to achieve the goal in question. Information provided via brochures or poster campaigns helps to raise awareness levels. New possibilities can be created, for example, through the provision of corresponding offers, the introduction of bans or fees as well as the sharing of specific tips. Where actual changes in behaviour (actions) are the objective, these can be supported with tools such as neighbourhood comparisons, reminders or direct consumption feedback.²

Notes and References

1 Moser, C, Blumer, Y & Seidl, R 2017, *Local interventions and campaigns for the promotion of energy-sufficient behaviour: findings from the research project "Promoting energy-sufficient*



Energy

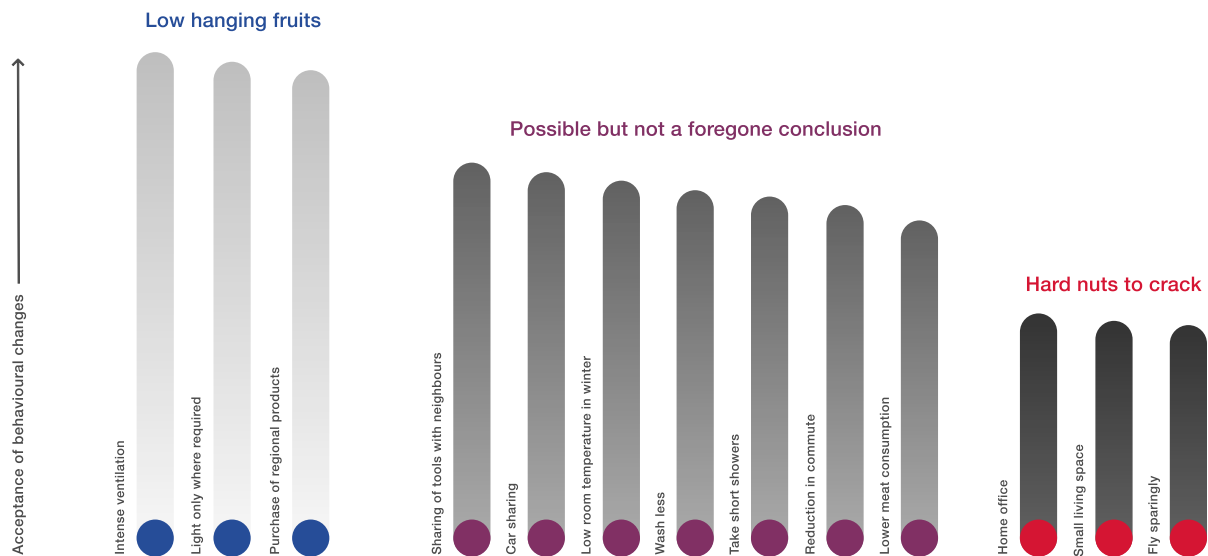
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behaviour in cities” of the National Research Programme NRP 71, Winterthur, p. 5. Project “Promoting energy-sufficient behaviour in cities”.

2 Artho, J, Jenny, A & Karlegger, A 2012, Wissenschaftsbeitrag. Energieforschung Stadt Zürich, report no. 6, research project RP-1.4, http://www.energieforschung-zuerich.ch/fileadmin/berichte/Zusammenfassung_Bericht_Wissenschaftsbeitrag_FP-1.4.pdf.

Standard of living # Sufficiency # Behaviour

3.6.2. Willingness to change depends on the size of the change



The greater the change, the smaller the willingness to change Source: Artho et al. 2012.¹

Individual willingness to change our behaviour largely depends on how great the required change is and which areas of life this affects. To find out where interventions are worthwhile in a specific case, the acceptance of a measure must therefore also be assessed in addition to its energy-saving potential. Based on a survey on individual willingness to change our behaviour, a differentiation can be made into three groups:²

- “Low hanging fruits”: in these areas of life, people are often already well acquainted with energy-saving behavioural patterns and accept them. At the same time, the absolute savings effects are relatively minor because many people have already integrated the corresponding behavioural traits in their everyday lives. Such behavioural patterns include, for example, intermittent intense ventilation and the turning off of lights in unoccupied rooms.
- “Possible but not a foregone conclusion”: a certain level of willingness exists for behavioural changes in these areas of life. These changes include, for example, reduced meat consumption, the sharing and mutual lending of everyday objects, less frequent washing and car sharing. Willingness to implement a behavioural change, however, depends greatly on the specific situation and individual experiences with corresponding measures.
- “Hard nuts to crack”: in these areas of life, survey participants generally show little willingness to change their behaviour. Such changes include, for instance, a reduction in their living space or capping the amount they fly.

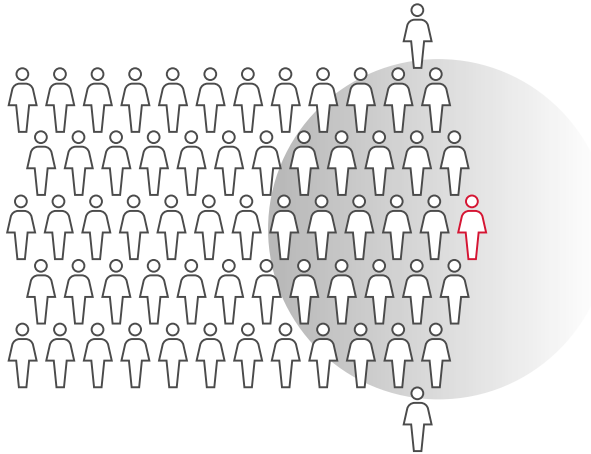


Notes and References

- 1 Artho, J, Jenny, A & Karlegger, A 2012, *Wissenschaftsbeitrag. Energieforschung Stadt Zürich*, report no. 6, research project RP-1.4, http://www.energieforschung-zuerich.ch/fileadmin/berichte/Zusammenfassung_Bericht_Wissenschaftsbeitrag_FP-1.4.pdf.
- 2 Moser, C, Blumer, Y & Seidl, R 2017, *Local interventions and campaigns for the promotion of energy-sufficient behaviour: findings from the research project "Promoting energy-sufficient behaviour in cities" of the National Research Programme NRP 71*, Winterthur, p. 3.

Multipliers # Behaviour

3.6.3. Multipliers boost the success of campaigns



The so-called snowball effect which sees an individual phenomenon develop into a broad social trend by means of a chain reaction can be triggered and utilised to a certain extent by the provision of suitable role models. As multipliers within their environment, role models increase credibility, in particular, and help to break down reservations and transport social norms. Here, the fact is exploited that people often act in conformity irrespective of their own beliefs.

In the world of business, for example, multipliers of this kind may be, for example, locally known entrepreneurs who act as pioneers in order to break up detrimental structures or establish new technologies.¹ In the private sphere, colleagues, associations, local initiatives as well as known personalities can assume this role.² With respect to politics, this function in Switzerland is traditionally performed by political parties and interest groups.³ In general, it can be said that initiatives and campaigns that do not make use of multiplier effects in one form or another quickly reach their limits.

Notes and References

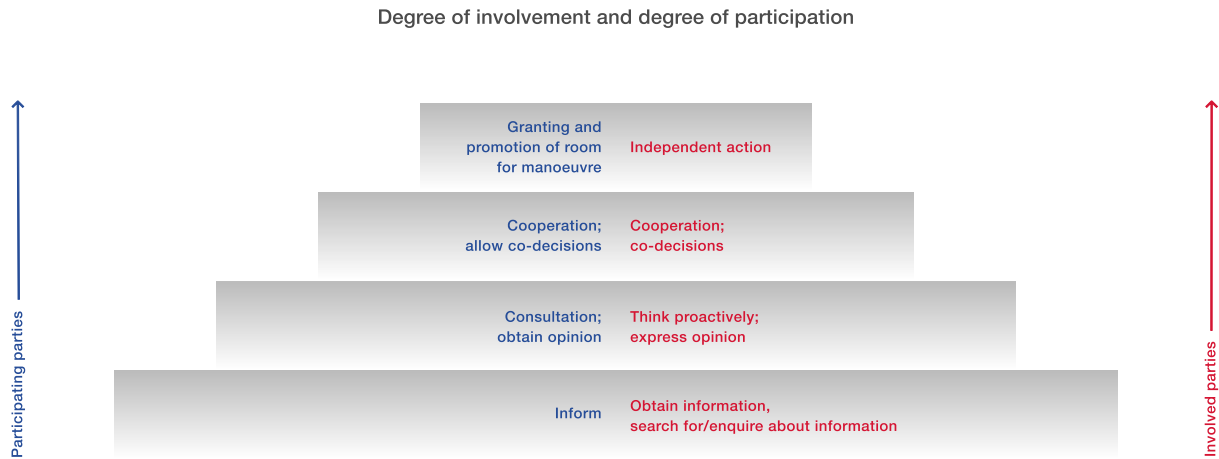
1 Project “**Modernising waste management**”. Wüstenhagen, R, Wolsink, M & Bürer, MJ 2007, Social acceptance of renewable energy innovation: An introduction to the concept, *Energy Policy* 35(5), pp. 2683–2691.

2 Project “**Sharing economy: hype or promise?**” and project “**Promoting energy-sufficient behaviour in cities**”.

3 Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, *Acceptance of renewable energy*, Berne, chapter 1, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-1.pdf>. Project “**Acceptance of renewable energy**”.

Information / communication # Population

3.6.4. Participation is a key element for approval



Participation pyramids Source: Zoellner/Schweizer-Ries/Rau 2012.¹

The participation of citizens, interest groups, users and other stakeholders is one of the key elements for achieving acceptance. Those who are involved look at matters significantly more intensely and can also become better informed as a result. This has been confirmed by the results of several NRP studies from a variety of subject areas. With respect to the decision-making process for infrastructure projects, for example, it can be said that the earlier this participation starts the better. For this involvement to be perceived as positive, clearly defined procedures and roles as well as transparency are required. This increases the level of trust in the participation processes.² As regards personal behaviour, participation also gives rise to a greater level of identification with an activity.

Notes and References

1 Zoellner, J, Schweizer-Ries, P & Rau, I 2012, Akzeptanz Erneuerbarer Energien, in Müller, T (Hrsg.), *20 Jahre Recht der Erneuerbaren Energien* Nomos –Verlag, Baden-Baden, p. 91–106.

2 Project “**Energyscapes**”, project “**Risk governance for geothermal and hydro energy**” and project “**Modernising waste management**”.

Information / communication # Just distribution

3.6.5. Only properly managed participation processes are successful



Switzerland's tradition of direct democracy means that the participation of the population is not only desired, but also expected. As a result, the group of participating stakeholders needs to be defined relatively broadly and the participation processes are thus challenging.

It is key that the participation processes are competently managed. Factors such as perceived procedural justice (fair decision-making process, early involvement of the local population), fair social distribution with respect to costs and benefits and the trust of the population in the authorities and stakeholders managing the process are key for success.¹ Poorly prepared processes, or processes that are even perceived to be unfair, can mean that a generally positive stance becomes the opposite. It is therefore important, for example, that residents are provided with information about the benefits and negative consequences that they can expect from a project in a balanced manner.

On the other hand, it is essential to remain realistic: while the right approach might break down obstacles and thus contribute to successful implementation, even fair processes will not convince individuals who have had a negative view from the outset to accept a project. Therefore a properly managed and fair process serves primarily to ensure that existing positive opinions do not become negative ones.

Notes and References

¹ Project "Hydropower sustainability", project "Acceptance of renewable energy" and project "Hybrid overhead power lines for Switzerland".

Behaviour # Steering / promotion

3.6.6. Considered changes to framework conditions are effective



A large part of human behaviour is automated and thus follows predictable patterns. So-called 'nudging' makes use of this fact.¹ Framework conditions are set in such a way that people automatically increasingly behave in a desired manner (see **“Energy tariffs can encourage saving”**). Several projects of the NRP Energy have shown that this mechanism can be successfully applied in the field of energy and climate. Particularly impressive is the effect generated by the specification of sustainably produced electricity as the standard variant for power procurement.² The share of so-called green power increased as a result of this simple measure from less than 2 % to more than 80 %. The considered specification of selection options offers great potential in general for triggering changes in behaviour. Targeted infrastructure interventions are also very effective. For example, structural measures such as a central laundry room reduce the number of washing cycles.³ It must be noted here, however, that nudges that are perceived as the authorities playing the role of schoolmaster or which even have disputed objectives can lead to resistance. Examples here include severe speed limits or fee hikes aimed at generating the greatest possible steering effects.⁴

Notes and References

1 Osuna, E, Köng, A-L & Holenstein, M 2018, Schweizer Bevölkerung zu mehr Nachhaltigkeit “stupsen”, *Die Volkswirtschaft* 10/2018, p. 24–27,

https://dievolkswirtschaft.ch/content/uploads/2018/09/09_Osuna_Koeng_Holenstein_DE.pdf.

On nudging – definition, examples, functioning, effectiveness and ethical discussion – see Artho, J & Jenny, A 2016, *Erweiterung der sozialwissenschaftlichen Grundlagen zur*



Konzeption von Interventionen im Umweltbereich, Energieforschung Stadt Zürich. Bericht Nr. 32, Forschungsprojekt FP-1.12, S. 29–49, https://www.energieforschung-zuerich.ch/fileadmin/berichte/FP-1.12_Bericht_v2.pdf.

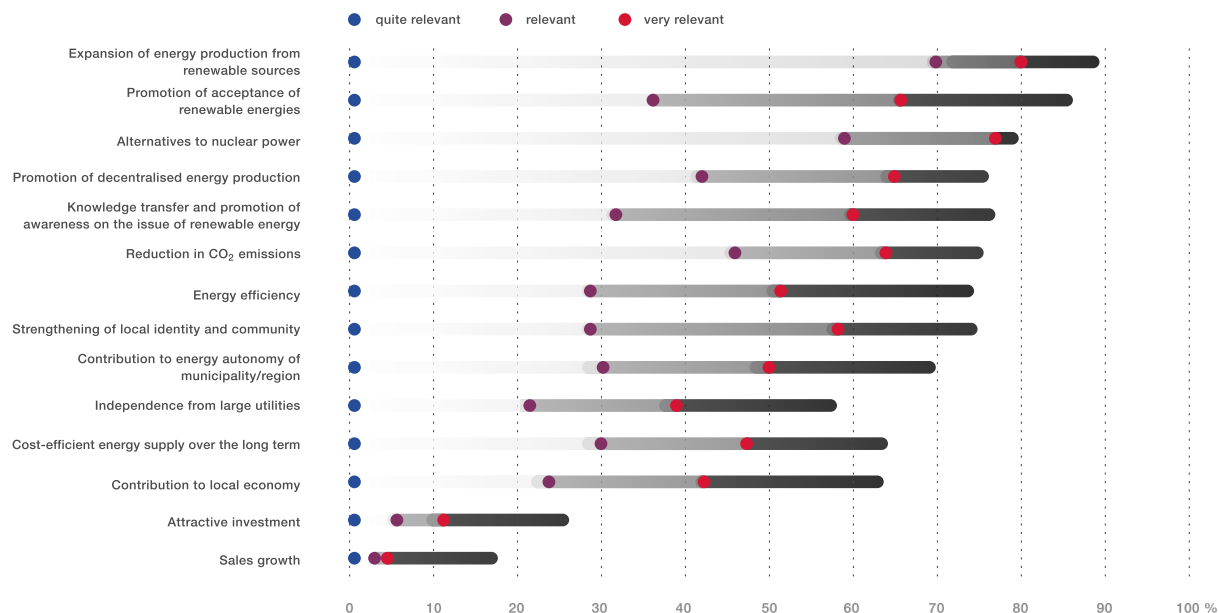
2 Project “Soft incentives and energy consumption”.

3 Project “Understanding household energy consumption”.

4 Project “Soft incentives and energy consumption”. Artho, J & Jenny, A 2016, *Erweiterung der sozialwissenschaftlichen Grundlagen zur Konzeption von Interventionen im Umweltbereich*, Energieforschung Stadt Zürich. Bericht Nr. 32, Forschungsprojekt FP-1.12, S. 29–49, https://www.energieforschung-zuerich.ch/fileadmin/berichte/FP-1.12_Bericht_v2.pdf.

Cooperation # Politics (federal government, canton, municipality)

3.6.7. Alliances widen the acceptance base



Relevant objectives from the perspective of energy cooperatives. (The number of energy cooperatives that responded in the individual answer categories is between 76 and 90. In the interest of clarity, the assessments “not relevant at all”, “not relevant” and “not really relevant” are not displayed.) *Source: Rivas/Schmid/Seidl 2018.¹*

The more an opinion gets noticed in public, the more it is able to spread. In the political sphere, broad coalitions between parties and influential groups have proven a tool in this respect that can serve to broaden the base for the acceptance of a project. This applies, in particular, to environmental and climate topics for which most centre parties and organisations decide between the poles based on their situation.²

The coalition principle has a comparable effect in an economic environment. For example, cooperatives in which several groups of stakeholders are included can create a broader basis for an energy infrastructure project.³ The illustration shows the relevance of various objectives for energy cooperatives in Switzerland and thus a basis on which different groups can come together.

Notes and References

- 1 Project “Collective financing of renewable energy”. Rivas, J, Schmid, B & Seidl, I 2018, *Energiegenossenschaften in der Schweiz. Ergebnisse einer Befragung*, Birmensdorf.
- 2 Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, *Acceptance of renewable energy*, Berne, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-1.pdf>. Project “Acceptance of renewable energy”.



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3 Project "Collective financing of renewable energy".

Steering / promotion # Costs / benefits

3.6.8. Subsidies are effective but often lead to deadweight effects



Companies respond quickly to financial energy-policy incentives as revealed by an internationally comparative survey of companies in Switzerland, Germany and Austria.¹ Subsidies therefore not only have a positive impact on the development and marketing of innovative energy technologies. In contrast to incentive taxes, they enjoy a broad level of acceptance among the population and in the economy.

In the construction sector, financial support from the federal government or the cantonal authorities can serve as a 'quality seal' and thus help the supported technologies to gain a better image. A public sector subsidy can also facilitate acceptance for the implementation of a measure that is linked to an investment by, for example, providing starting capital and simplifying the search for other investors.

Although subsidies can be relatively effective, they are not unproblematic. Firstly, all subsidies are confronted with the issue of deadweight effects. One such example is when a subsidy recipient already exhibits the intended behaviour prior to the subsidy being granted. It is to be assumed that 30 % of subsidies and more are wasted in this manner.² Secondly, compared to incentive taxes, subsidies have a clearly less favourable cost-benefit ratio.³ Thirdly, individuals or companies who have invested on their own initiative prior to the introduction of the subsidies can feel that they have been treated unfairly, leading to a decline in the willingness to invest. And fourthly, subsidies can give rise to the expectation that environmentally friendly behaviour has to be paid for.⁴

Notes and References

1 Project "Energy-related innovations".

2 Balthasar, A 2000, *Energie 2000: Programmwirkungen und Folgerungen aus der Evaluation*, Rüegger, Chur, Zurich, p. 74 and 87.

3 Project "Promotion or steering-based energy policy".

<http://www.snf.ch/de/fokusForschung/newsroom/Seiten/news-170222-medienmitteilung->



[energieverbrauch-lenken-oder-foerdern.aspx](#).

4 Artho, J, Jenny, A & Karlegger, A 2012, *Wissenschaftsbeitrag. Energieforschung Stadt Zürich*, Bericht Nr. 6, Forschungsprojekt FP-1.4, p. 202/203, http://www.energieforschung-zuerich.ch/fileadmin/berichte/Zusammenfassung_Bericht_Wissenschaftsbeitrag_FP-1.4.pdf.

Steering / promotion # Costs / benefits

3.6.9. Steering is unpopular but efficient



Incentive taxes place a levy on unwanted behaviour, thus making it less attractive relative to other behaviours. Incentive taxes have many benefits: they are significantly more efficient at a macroeconomic level and considerably more economic than promotion measures such as subsidies. Steering measures have an impact everywhere and on every energy-relevant decision taken by households and companies. This means the effects are spread more widely. On balance, almost all households also lose out with a funding strategy. This is because although they cough up for the financing they do not benefit. In contrast, with steering a third of households are even better positioned.¹

Nevertheless, steering measures are met with an above-average level of rejection. This is because a large share of citizens do not understand the different action mechanisms of steering and promotion measures.² Furthermore, measures such as fees and bans with which undesired behaviour is limited are largely assessed negatively.³

The same also applies to the economy. While regulations and steering taxes are predominantly rejected, companies hardly change their practices without being exerted to pressure.⁴ Generally speaking, companies support clear legal and regulatory framework conditions even if they are structured in a way that poses them with challenges.⁵ What is explicitly desired is state steering in the form of top-down support that is primarily linked to the promotion of new technologies.⁶ Either way, however, the form that state steering measures take appears to have very little impact on the international competitiveness of companies as shown by a comparative study of companies in Germany (strong emphasis on taxes and subsidies), Austria and Switzerland (primarily market and voluntary agreements).⁷



Notes and References

- 1 Project "Promotion or steering-based energy policy".
- 2 Project "Acceptance of renewable energy".
- 3 Project "Soft incentives and energy consumption" and project "Sharing economy: hype or promise?".
- 4 Project "Sharing economy: hype or promise?".
- 5 Project "Modernising waste management".
- 6 Project "Multi-energy hub systems and society".
- 7 Project "Energy-related innovations".

Planning # Information / communication

3.6.10. Transparency and time are important framework conditions



Changes take time. This applies to political processes¹ and the formation of opinions² as well as in cases in which new individual behavioural forms are to be anchored within a relevant share of the population. Campaigns should therefore adopt as long term an approach as possible and not be aimed at achieving a one-time success. Where activities are conducted in isolation, in particular, a relatively rapid decline in their impact can be observed.³ It is also important, however, that the processes do not take too long. Potential investors, in particular, may lose interest in making a commitment in such cases.⁴ A further important framework condition of change processes is transparency.⁵ This is especially required as part of participatory procedures. Only in this way can people's confidence in their involvement be assured.⁶

Among other things, transparency also means that the development and distribution of new technologies is accompanied by comprehensive sustainability assessments. This is made clear, on the one hand, by an analysis of hydropower projects which incorporates the regional economic impact of such plants during the construction and operation phases.⁷ On the other, a holistic assessment of CO₂ methanation along the entire value chain indicates that the acceptance of this technology would benefit from mandatory fair trade labels for the production and trading of commodities.⁸

Notes and References

1 Project "Modernising waste management".

2 Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018,



Acceptance of renewable energy, Berne, chapter 1, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-1.pdf>. Project “Acceptance of renewable energy” and project “Risk governance for geothermal and hydro energy”.

3 Project “Virtual competition for energy-efficient mobility”.

4 Project “Trade-offs in switching to renewable electricity”.

5 Project “Modernising waste management”.

6 Project “Risk governance for geothermal and hydro energy”.

7 Project “Hydropower sustainability”.

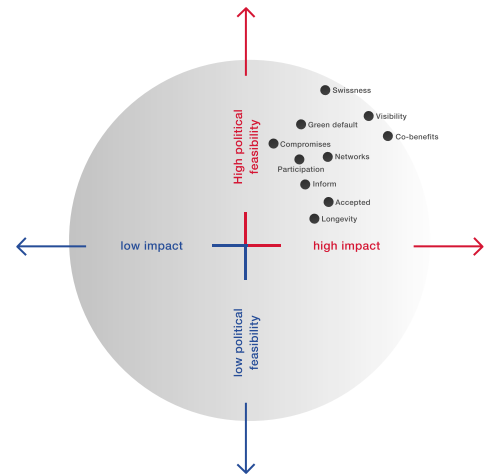
8 Project “Sustainability of methanation”.

4. Ten sources of impetus for the future

From the more than 100 NRP Energy projects, ten recommendations on the subject of acceptance can be derived in summary. An echo group of eight specialists (see “**Publication details**”) from the worlds of administration and practice have reflected on these recommendations at a workshop with a view to their impact and (political) feasibility (see “**Multi-stage synthesis process**”).

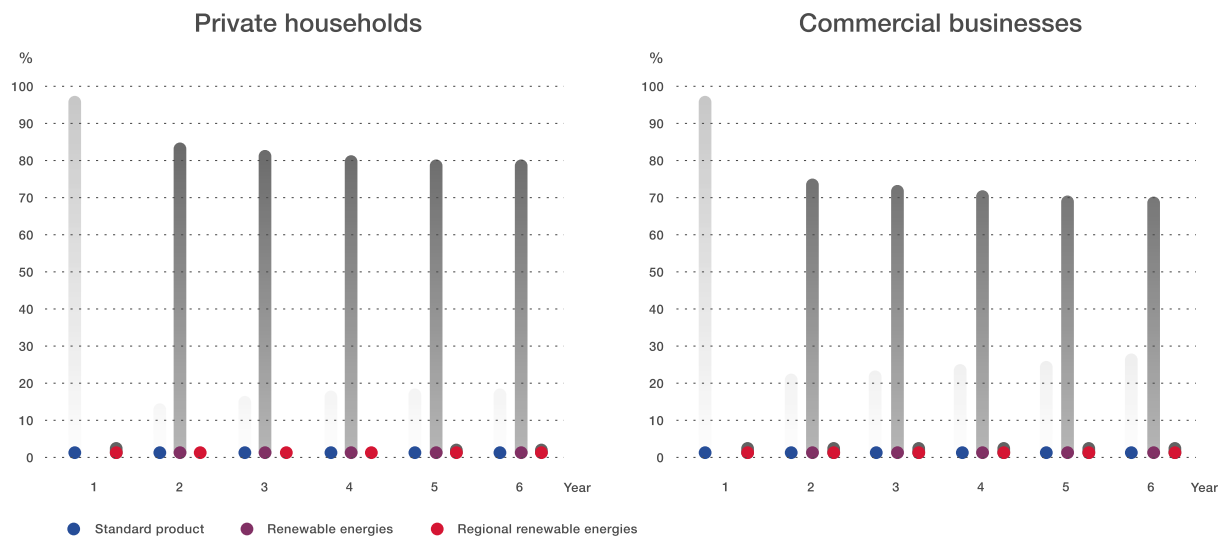
This gave rise to the matrix presented below. All of the recommendations were judged to be effective and feasible. It can be seen, however, that the potential effectiveness and feasibility of the following three key recommendations was judged especially positively.

1. Swissness: use local links as an effective argument (see “**Use local links as an effective argument!**”)
2. Visibility: create visibility for positive examples (see “**Create visibility for positive examples!**”)
3. Co-benefits: target co-benefits with respect to quality of life and health (see “**Target co-benefits with respect to quality of life and health!**”)



Public administration # Energy suppliers # Businesses # Politics (federal government, canton, municipality)

4.1. Implement environmentally friendly standard products on a systematic basis!



Long-term nature of the switch to standard products comprising renewable energies

Source: Liebe 2018.¹ The changeover took place in year 2.

The vast majority of electricity purchasers take part in the switch to standard products generated from renewable energies and remain loyal.

During the past decade, ever more Swiss energy suppliers have decided to switch their standard product to an electricity mix comprising a greater share of renewable energies. Customers who are not in agreement with the standard product comprising renewable energies must therefore actively order a different product.² This principle can also be implemented in other areas. For example, canteens could put their vegetarian meals at the top of the menu or mobility apps could list an environmentally friendly option first.

Such green default products are rarely objected to among the population.³ They serve to steer behaviour without being patronising or ruling out certain courses of action. An analysis of the data of more than 10,000 households and 1,000 companies with respect to power supply also shows that this measure effectively promotes the distribution of renewable energies. Some 80 % of households and 70 % of companies investigated also stuck with the more expensive standard electricity product comprising renewable energies five years after the changeover. Remarkable is the fact that companies also stayed loyal to the green standard product. It was expected that they would be more price-sensitive than private households.

Generally speaking, green standard products can be implemented in practically all areas



relevant to the transformation of the energy system both on a large scale and at a low cost. Levels of success can also be boosted if green default products are linked with “Swissness” and green products from Switzerland are stipulated as standard.

Notes and References

1 Liebe, U 2018, *Green Energy Defaults Have Massive and Persistent Effects in the Household and Business Sector*, Zurich.

2 Association for Environmentally Friendly Energy (VUE) 2018, *A Survey of Swiss Utilities*, conducted on behalf of the Swiss Federal Office of Energy (SFOE), Zurich. SCCER CREST 2018, Reduktion der Energienachfrage von Haushalten – erfolgversprechende Schritte auf einem langen Weg, *White Paper 4 – January/2018*, recommendation 3, p. 9, https://www.sccer-crest.ch/fileadmin/user_upload/White_Paper_SHEDS_final_mit_supported_by....pdf.

3 Project “Soft incentives and energy consumption”.

Investors (outside creditors) # Energy suppliers # Politics (federal government, canton, municipality)

4.2. Use local links as an effective argument!



If Swiss investors and, where possible, regional firms or public companies are behind a project, the level of acceptance is markedly higher.

The Swiss population has a preference for “Swissness” and this also holds true in the area of energy policy. This is shown by a representative survey of 1,020 Swiss citizens conducted by the University of St.Gallen.¹ Consumers clearly express the wish for Swiss hydropower plants to remain under Swiss ownership. Some 92 % of respondents support Swiss public utilities and 62 % welcome Swiss pension funds as new investors. With respect to the construction of infrastructure for the production of renewable energy, citizens prefer domestic project sponsors.² Furthermore, using the example of building-integrated photovoltaic components, it has been demonstrated that Swiss citizens are more open to less well-known technologies if these are produced in Switzerland.³

The marked preference of the Swiss population for “Swissness” must be used for the utilisation of Energy Strategy 2050: the involvement of Swiss energy suppliers in planning, construction and operations can make power produced abroad from renewable energy more politically acceptable.⁴ Regional and local projects that are promoted by Swiss investors are met with a relatively high level of acceptance. This is especially true in cases in which public companies or cooperatives with civic participation take on a leading role.⁵ If a project is not only nationally based, but rather has regional or even local roots, acceptance levels rise yet further.



Notes and References

1 Gamma, K, Stauch, A & Wüstenhagen, R 2017, *7th Consumer Barometer of Renewable Energy*, Good Energies Chair for Management of Renewable Energies, University of St.Gallen, St. Gallen,

<https://www.raiffeisen.ch/content/dam/www/rch/pdf/publikationen/Studien/de/7-SG-Kundenbarometer.PDF>.

2 Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, *Acceptance of renewable energy*, Berne, chapter 5, p. 109, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-5.pdf>. Project "Acceptance of renewable energy".

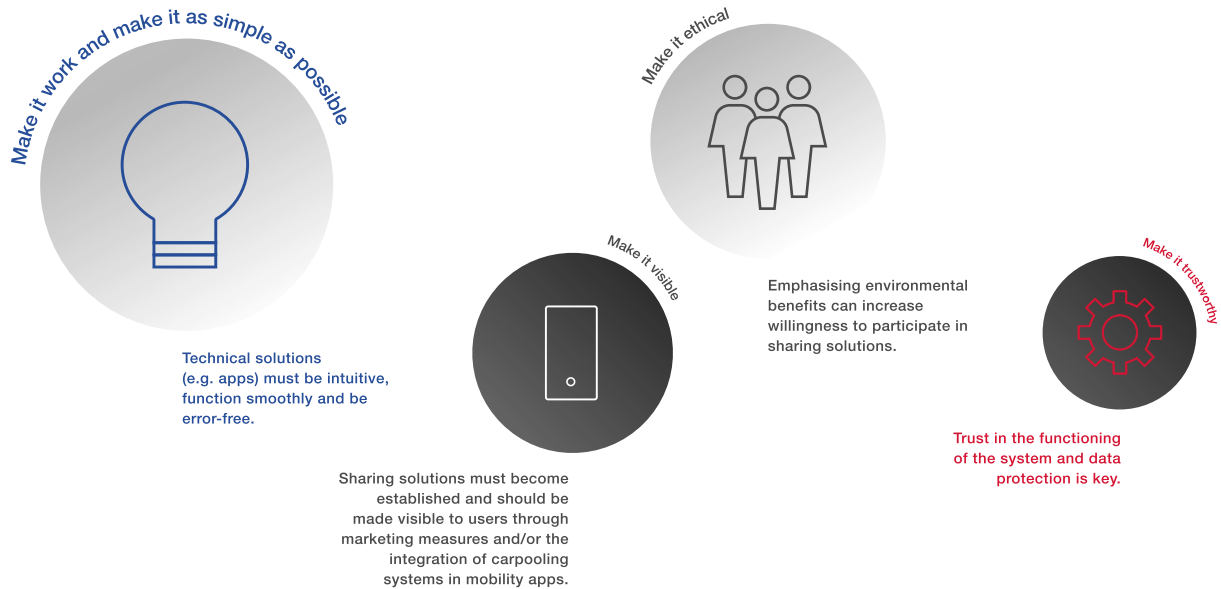
3 Project "Overcoming opposition to PV".

4 Project "Trade-offs in switching to renewable electricity".

5 Project "Collective financing of renewable energy".

Public administration # Energy suppliers # Businesses # Politics (federal government, canton, municipality)

4.3. Creative visibility for positive examples!



Four maxims for establishing a sharing culture¹

Positive experiences – where possible in close proximity to people’s living environment – increase both the acceptance of technologies and the willingness to change behaviour.

The acceptance of energy-efficient approaches and products grows if people can gain experience with them themselves. The more often a certain behaviour is performed in a certain context and the more positive the experiences with this behaviour are, the stronger the association made between the situation and the action in question.² It has been shown, for example, that in cantons with many small hydropower plants the level of socio-political acceptance for this technology is also higher.³ People are also less sceptical about high-voltage power lines if they live in close proximity to such systems.⁴ And for investors, the feasibility and functioning of new technologies are decisive.⁵

Nevertheless, the step from innovation among pioneers to the broad establishment of changes is not easy. Various projects have shown that it pays off to move forward in small steps. For example, it is worthwhile to test the introduction of carpooling initially at individual companies.⁶ The modernisation of waste management also benefits from a policy entailing small steps.⁷ As an alternative to the standard nationwide incentives, it is even recommended that the federal government adopts a targeted approach to creating regional hotspots for photovoltaics that are so attractive that they later trigger a snowball effect.⁸ Local organisations and municipal authorities generally offer more direct access to people and thus provide the ideal platform in order to create visibility for new behavioural forms and technologies.



Notes and References

- 1 Project “Sharing economy: hype or promise?”.
- 2 Aarts, H, Verplanken, B & van Knippenberg, A 1998, Predicting behavior from actions in the past: repeated decision making or a matter of habit? *Journal of Applied Social Psychology*, 28, pp. 1355–1374.
- 3 Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, Acceptance of renewable energy, Berne, chapter 6, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-6.pdf>. Project “Acceptance of renewable energy”.
- 4 Project “Hybrid overhead power lines for Switzerland”.
- 5 Project “Collective financing of renewable energy”.
- 6 Project “Sharing economy: hype or promise?”.
- 7 Project “Modernising waste management”.
- 8 Curtius, HC, Hille, SL, Berger, C, Joachim, U, Hahnel, J & Wüstenhagen, R 2018, Shotgun or snowball approach? Accelerating the diffusion of rooftop solar photovoltaics through peer effects and social norms, *Energy Policy* 118, pp. 596–602.

Public administration # Energy suppliers # Politics (federal government, canton, municipality)

4.4. Provide information specifically and credibly!



The earlier and more deliberately that affected groups of individuals are informed, the greater the impact. Credibility is likewise decisive.

The population's level of knowledge with respect to topics such as energy and climate change is limited. Some 20 % of the representative sample selected for the 2018 Swiss Environmental Survey do not believe, for example, that global warming is actually taking place.¹ In a survey of households in Western Switzerland, it was revealed that none of those questioned understand the concept of a washing machine's 'eco' button.² On the basis of survey results, it can also be assumed that incentive taxes gain less acceptance not least because the population lacks knowledge of and confidence in the functioning of this measure.³

In order to improve the level of information the population has, specific measures are required. These must, however, take account of some basic conditions:

- Information measures must be implemented in good time so that discussions about the advantages and disadvantages can take place outside emotionally and ideologically charged political campaigns.
- Such information measures must be created specifically for the target group. Depending on how willing a group of people already is to change their behaviour is, they need to be addressed differently.
- Information measures must come from trustworthy sources. For example, the population has a high level of trust in science⁴ as well as in the federal government and cantons.⁵ However, associations and organisations that are recognised as “peer groups” can also be



utilised as trustworthy sources of information.⁶ One example here is a follow-up project from the NRP Energy in which municipal authorities, specialist organisations (Forum Energie Zürich, Minergie, OekoWatt) as well as banks and power plants hold events in order to motivate older homeowners to consider their future living situation and implement the energy-saving potential of their property.⁷

Notes and References

- 1 Liebe, U 2018, *Green Energy Defaults Have Massive and Persistent Effects in the Household and Business Sector*, Zurich. Burger, Paul et al. 2018, *Energieverbrauch der Haushalte in der Schweiz*, Basel, S. 5, https://www.sccer-crest.ch/fileadmin/user_upload/Energiekonsumverhalten_in_der_Schweiz_07032018_final.pdf.
- 2 Project “Understanding household energy consumption”.
- 3 Project “Acceptance of renewable energy”.
- 4 http://www.wissenschaftsbarometer.ch/wp-content/uploads/2016/09/Wissenschaftsbarometer_12-13.jpg.
- 5 Project “Collective financing of renewable energy”.
- 6 Project “Overcoming opposition to PV”. Wüstenhagen, R, Wolsink, M & Bürer, MJ 2007, Social acceptance of renewable energy innovation: An introduction to the concept, *Energy Policy* 35(5), pp. 2683–2691.
- 7 <http://www.ruetter-soceco.ch/wordpress/project/enwia-energieeffizientes-wohnen-im-alter/>.

Public administration # Associations and NGOs # Businesses # Politics (federal government, canton, municipality)

4.5. Target co-benefits with respect to quality of life and health!



Health, quality of life, convenience, security and availability are much more significant than energy consumption when it comes to the opinion-forming process.

Energy consumption is not at the forefront of the population's mind. Only half of the population know how high their electricity bill is (see **"Energy tariffs can encourage saving"**). And even among those who know what they are spending on energy, this expenditure has only minor relevance with respect to their behaviour. The day-to-day lives of people are much more shaped by issues such as health, quality of life, convenience, security and the availability of time.¹

Communication on the transformation of the energy system must therefore also use these themes as starting points: "Consuming less is also synonymous with health, well-being and comfort as well as the better handling of our time."² People who switch to using an e-bike, for example, have fewer worries when it comes to finding a parking space, while those who make use of carpooling can relax on the way to work and individuals who have fewer warm washing cycles save time.³

Here, it can be said that people who find themselves in periods of reorientation when they have to get used to new forms of behaviour in any case are especially open to change. This may be when a couple move in together, a child is born, an individual reaches retirement age or a move to a new flat is on the horizon.⁴ Upon the birth of a first child, for example, the norms of parenthood are tested and only defined with time. Targeted communication measures can show during this phase that, for example, it is not necessary always to wash children's clothing at 90 degrees or even sterilise it for hygiene reasons.



Notes and References

1 Project “[Understanding household energy consumption](#)”.

2 Sahakian, M, Bertho, B 2018, L'électricité au quotidien: le rôle des normes sociales pour la transition énergétique suisse, Université Genève, Genève, https://www.unige.ch/sciences-societe/socio/files/9415/3502/7352/Brochure_PNR71_DEF.pdf.

3 Moser, C, Blumer, Y & Seidl, R 2017, *Local interventions and campaigns for the promotion of energy-sufficient behaviour: findings from the research project "Promoting energy-sufficient behaviour in cities" of the National Research Programme NRP 71*, Winterthur, <https://pd.zhaw.ch/publikation/upload/212864.pdf>.

4 Project “[Understanding household energy consumption](#)”.

Investment # Public administration # Associations and NGOs # Energy suppliers

4.6. Use the powers of persuasion of social networks and role models!



Promoters who are part of an individual's personal environment or who are recognised as role models help to break down resistance to changes.

People often base their behaviour on that of the social networks to which they belong and on the views of opinion leaders or popular figureheads. Networks are, however, also important when it comes to the willingness of companies to introduce innovative technologies.¹

This empirical knowledge must be used for the transformation of the energy system. The commitment of one or more promoters with local roots (e.g. the mayor) can greatly facilitate the progression of an infrastructure project and be decisive for generating trust among the population in the authorities and stakeholders.

Social networks that should be given particular weight for the implementation of the energy strategy include locally financed cooperatives. On the one hand, co-ownership is a relevant factor for the acceptance of infrastructures. On the other, the local (municipal) benefits of an investment and the energy's ties to its place of production are two relevant aspects for the successful implementation of investments in renewable energies and energy efficiency.² Energy consumption communities can, for example, reduce the individual financing risk and at the same time make power production via photovoltaic plants 'tangible'.³ Here, co-ownership also contributes to improving awareness of energy consumption.⁴

The spreading of energy cooperatives does not take place automatically, however. Compensatory feed-in remuneration (KEV) plays a key role in their formation. To further promote them, it is expedient if municipal authorities directly support such energy



cooperatives, for example through interest-free loans, taking on 'expensive' certificates of origin or the rent-free provision of municipal roofs.⁵

Notes and References

- 1 Project “**Understanding household energy consumption**”. Wüstenhagen, R, Wolsink, M & Bürer, MJ 2007, Social acceptance of renewable energy innovation: An introduction to the concept, *Energy Policy* 35(5), pp. 2683–2691. Project “**Sustainable lifestyles and energy consumption**”.
- 2 Project “**Multi-energy hub systems and society**”. Wolsink, M 2012, The research agenda on social acceptance of distributed generation in smart grids: Renewable as common pool resources, *Renewable and Sustainable Energy Reviews* 16(1), pp. 822–835.
- 3 Project “**Overcoming opposition to PV**”.
- 4 Project “**Multi-energy hub systems and society**”.
- 5 Project “**Collective financing of renewable energy**”.

Public administration # Energy suppliers # Politics (federal government, canton, municipality)

4.7. Make participation comprehensive and professional!



Active participation automatically leads to identification. Concerns need to be taken seriously, however, as well as considered in a transparent and fair manner.

Political processes relating to projects in the area of renewable energy must be set up on participatory basis. The early involvement of the affected population not only serves to optimise the project itself, but also takes account of the requirement for participation enshrined in the Swiss psyche and thus prevents opposition on the basis of a lack of inclusion. However, information activities must not take the form of merely advertising events but must instead serve as platforms for the open and broad communication of information and the generation of knowledge as well as allow for the exchange of information and the opportunity for active participation.¹ For example, it has been shown that photovoltaic systems on avalanche barriers in mountain regions have also been accepted because the planning procedures took account of the various views of different interest groups with respect to the use of the landscape and because consideration was given to the needs of the agricultural sector.²

For participation to succeed, it is important that various factors are taken into account. Relevant factors include, for example, the manner in which information about the project is provided, what shape the participation and co-determination opportunities take as well as which stakeholders assume responsibility within the process. The roles of specialists (process managers, planners, etc.) and the stakeholders who are included (population, interest groups, etc.) must not be mixed up. The role of the included stakeholders is to state what their concerns are and what is important to them. The role of the specialists is to demonstrate how these concerns can be implemented.³



Notes and References

- 1 Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, Acceptance of renewable energy, Berne, chapter 5, p. 113, <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-5.pdf>. Project "Acceptance of renewable energy".
- 2 Project "Trade-offs in switching to renewable electricity".
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Investment # Energy suppliers # Politics (federal government, canton, municipality)

4.8. Build on the known and accepted!



Resistance can be reduced if it can be shown that a change will build on something that has already proven successful.

Views and behaviour are shaped by a resistance to change. People often tend to reject changes when initially presented with them.¹ In order to overcome the reservations associated with change, it therefore makes sense to develop solutions on the basis of things people are already familiar with.

- This applies to politics: politicians like to vote for solutions whose impact they already know from other contexts. This has been demonstrated by the example of public tenders for projects for the production of renewable power. A comparative study in five cantons made clear that only decision-makers from the canton of Lucerne broadly accept this instrument. This can be explained by the fact that in Lucerne projects for the production of renewable power have already been put out to tender directly by the canton. This measure was successful and was remembered positively. In the other cantons, this knowledge was lacking, leading to a lower level of acceptance for this particular instrument.² For this reason, experiences should be increasingly exchanged between the cantons, irrespective of whether they were positive or negative in nature. With a view to successful policy diffusion, cantons can learn from one another and adopt successful instruments.
- This also applies, however, to everyday life: those who want to affect behaviour are best advised to demonstrate alternatives that are linked to known and accepted solutions.³ The aim must be to help the new become the norm based on the known and accepted. What is



considered to be normal is reinforced via social networks. Normality can be changed by highlighting the benefit offered by slightly changed everyday practices.⁴

Notes and References

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2 Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, *Acceptance of renewable energy*, Berne, chapter 4, p. 80 <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-4.pdf>. Project “Acceptance of renewable energy”.

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Associations and NGOs # Investors (outside creditors) # Energy suppliers # Businesses

4.9. Plan and act for the long term!



It takes time for acceptance to grow and become established. Objectives must therefore also be set and pursued with the long term in mind.

The long-term nature of Energy Strategy 2050 is a success factor that also has to be taken into account during the specification of the next implementation steps. The opportunity for stable framework conditions over the long term is decisive when it comes to the economy's willingness to innovate. Clear and stable framework conditions are fundamental for investments in sustainable energy technologies in all cases.

However, the provision of long-term and stable information is also of great importance for the acceptance of the strategy among the population. Information efforts aimed at promoting the objectives of Energy Strategy 2050 should be made systematically and outside 'heated' campaign contexts. Here, innovative approaches for structuring such processes need to be developed which at the same time do not allow for accusations of manipulation.¹

Notes and References

1 Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, *Acceptance of renewable energy*, Berne, chapter 7, p. 137 <https://energypolicy.ch/wp-content/uploads/2018/07/NFP71-AEE-Kapitel-7.pdf>. Project "Acceptance of renewable energy".

Associations and NGOs # Politics (federal government, canton, municipality)

4.10. Compromise is called for – the politics of small steps!



The bigger and more comprehensive a reform is, the greater the risk of failure within the Swiss political system.

Switzerland's political system does not support large and comprehensive reforms. This does not have to be disadvantageous, however. Instead, compromises that have been made enjoy a high level of support and therefore provide the chance that the next step can also be taken. This finding places an obligation on the parties: a broadly supported compromise has a better chance of success since it typically exhibits the aforementioned features of the politics of small steps. A compromise will likely also be key, however, in order to gain acceptance from a majority of citizens despite significant aversion to the costs incurred for a project.¹

The “Exploring ways towards societal consensus” project attempted to identify the criteria for success with respect to the creation of a social consensus on energy-policy interventions and the required measures. The aim was to pinpoint political measures for the steering of energy consumption that are accepted by people in their role both as citizens and consumers.² Here, aspects relating to quality of life (e.g. freedom, social justice) proved to be unifying elements as they appear important both for the assessment of measures as well as for considerations about how measures could have an impact on the everyday lives of individuals.

Notes and References

1 Stadelmann-Steffen, I, Ingold, K, Rieder, S, Dermont, C, Kammermann, L & Strotz, C 2018, *Acceptance of renewable energy*, Berne, chapter 5, p. 113 <https://energypolicy.ch/wp->



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