Final Report, 1 February 2021

Behavioural Insights in Energy Policy

Behavioural science-informed potentials and interventions for increasing energy efficiency and the use of renewable energy in Switzerland's industry and services sectors

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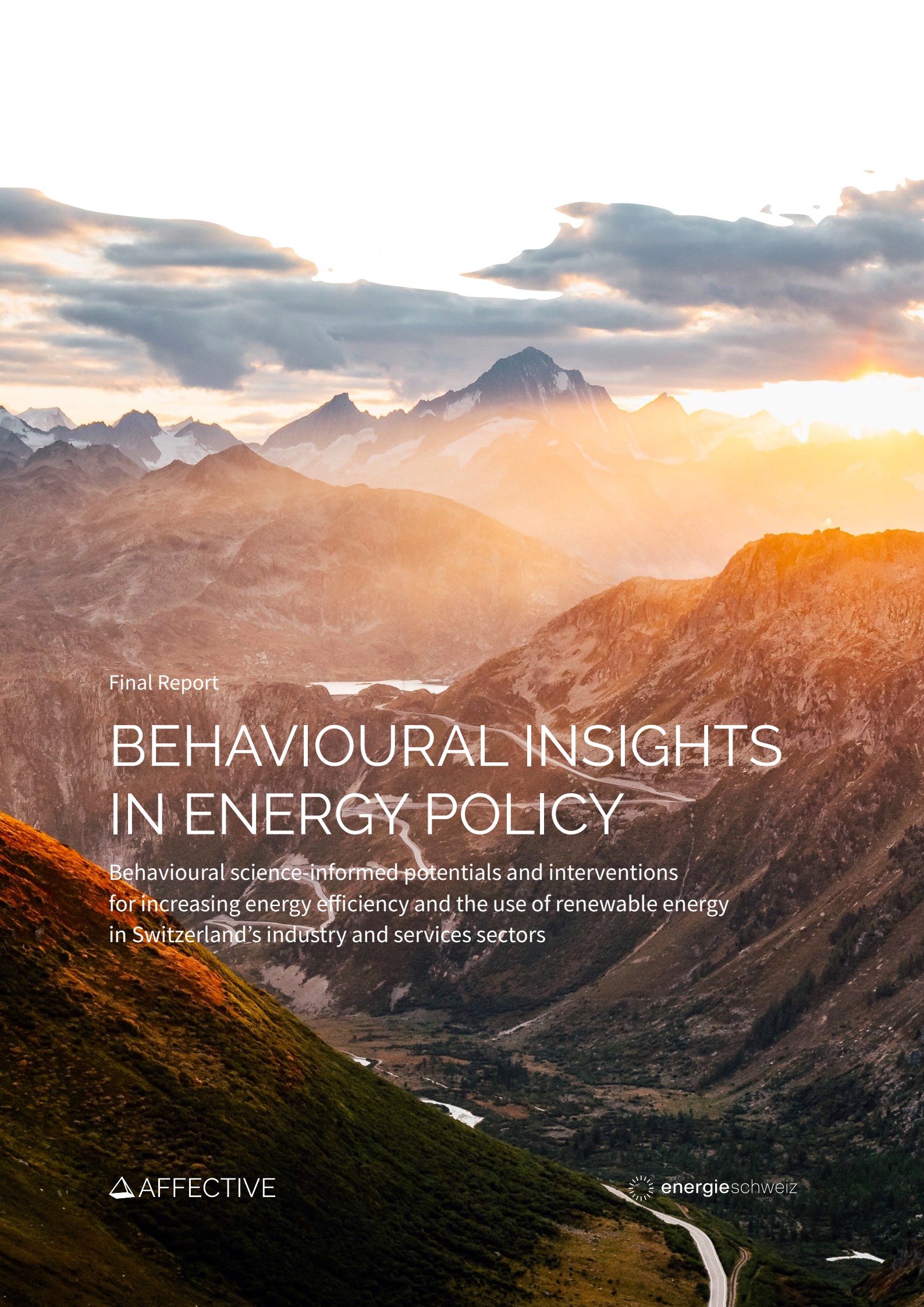
This study was commissioned by SwissEnergy.
Its content is the sole responsibility of the authors.



Final Report

BEHAVIOURAL INSIGHTS IN ENERGY POLICY

Behavioural science-informed potentials and interventions for increasing energy efficiency and the use of renewable energy in Switzerland's industry and services sectors

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1.

SUMMARY

„What you see is all there is“

Daniel Kahneman,
Nobel Laureate in Economics

In the framework of the Federal Energy Act, the Swiss Federal Office of Energy (SFOE) is fostering innovative ideas for increasing energy efficiency and the use of renewable energy. Behavioural science insights can make an auspicious and internationally recognised contribution towards this goal. In this context, Affective Advisory was commissioned to analyse the potential of behavioural science-informed approaches and to develop practice-related strategies for their application in the Swiss context. The objectives of the strategies are to supplement and optimise the existing measures, as well as to develop fresh ideas in the areas of sensitisation, information, consulting, initial and continuing education and training, and quality assurance in the scope of the SwissEnergy mandate.

This final report initially summarises selected fundamentals and principles of behavioural science that are of relevance for a targeted discussion of behavioural insights in Switzerland’s energy policy (page 4). This is followed by a discussion of the development, application, ethical framework conditions and a comparison between behavioural science-based and conventional policy instruments (page 10). In addition, the requirements and conditions are discussed for the successful development, validation and implementation of evidence-based policy formulation (page 16).

Based on a comprehensive analysis of academic and practical findings from the fields of behavioural science and energy policy, six different starting points for defining behavioural science-related measures were identified (page 21). These starting points were then validated and specified in a qualitative survey among representatives of selected companies in Switzerland. This step identified the motivators, barriers and behavioural patterns that Swiss companies perceive with respect to energy efficiency and the use of renewable energy (page 29). Based on the findings from the academic and qualitative studies, a catalogue was produced listing behavioural science-related interventions for increasing energy efficiency in Swiss companies. This catalogue comprises a description of the respective objectives, anticipated requirements and impacts, framework conditions and concrete implementation recommendations for 11 behavioural science-informed measures (page 39).

2.

BEHAVIOURAL INSIGHTS

2.1. Introduction to applied behavioural insights

Many of society's main current challenges – such as climate change and the associated pollution of the environment – are attributable to human behaviour. In view of this, a systematic understanding of how people take decisions and what motivates human behaviour has to play a central role in efforts to find solutions to these problems. The systematic study of human behaviour and of strategies aimed at measurably prompting behavioural changes is the focus of many scientific fields – including economics, psychology, sociology and neurosciences – which can collectively be described as behavioural sciences. Findings from behavioural science research are often referred to as behavioural insights. They are mostly based on empirical, data-related studies that examine how people take decisions and which factors systematically influence the behaviour of individuals, groups and organisations.

A central normative model of how decisions are taken results from rational choice theory, which explains that people endeavour to use their limited resources (for example, money and time) in order to obtain the maximum personal benefit (de Jong, 2012a). Here, situational circumstances should not influence choices, because it is assumed that personal preferences remain constant over time. Even if normative models sometimes vary considerably from our personal human experience, they are nonetheless an important reference point in the theoretical modelling of rational human behaviour. In the meantime, the fact that human decision-making does not follow a strictly rational pattern is now scientifically acknowledged, partly as a result of the increase in behavioural science research that has been witnessed in recent years. People display systematic errors in their perception and decision-making (Kahneman & Tversky, 1979; de Jong, 2012b). By gaining a comprehensive understanding of the conditions under which people deviate from this ideal model, it is possible for behavioural scientists to conceptualise measures that specifically counteract undesirable or harmful behaviour (from the perspective of the involved players).

2.2. Models of human decision-making behaviour

In order to concisely and comprehensibly analyse the findings from decades of research, we have limited the discussion to two central theories and concepts that are particularly important for understanding the subsequent analysis of the academic literature and the formulated measures.

Bounded rationality

As early as 1955, economist Herbert Simon recognised that people do not possess the mental capacities for making decisions consistent with the assumptions of rational choice theory. In practice, people merely behave with limited (or bounded) rationality. In Simon’s view, people do not evaluate all options until they identify the best one, but rather merely compare options until they have found one that best suits their needs (Simon, 1978). Instead of considering options in terms of costs and benefits, people often decide on the basis of heuristics (Simon, 1978), i.e. intuitive decision-making approaches (rule of thumb, or basic 'if X, then Y' algorithms). From an evolutionary point of view this is expedient, especially in our complex modern-day world, because given the range of options available today, people would otherwise be unable to take decisions (Haselton et al., 2015).

System 1 & System 2 (Dual System Theory)
The differentiation between two fictive 'systems' of human cognition described by Kahneman (2003) and others is fundamental for our understanding today of how people take decisions: System 1 is responsible for 'fast thinking' and System 2 for 'slow thinking'.

According to Kahneman (2011, p. 42), System 1 operates automatically and quickly, with little or no effort and no sense of voluntary control. It is responsible for our perception of our environment and for drawing attention to changes in it, or for our swift and effective reaction to them. This is where the impressions and feelings arise that are the main source for our convictions and decisions.

System 2 is associated with deliberate, mentally effortful processes. It encompasses conscious awareness and mental activities such as logical reasoning. System 1 is adaptive in evolutionary terms because it facilitates fast decision-making and automatic, partially subconscious action. However, it is also responsible for distortions of perception and false impressions that can lead to decision errors if they are not corrected through a conscious analysis via System 2. A selection of these relevant biases in the context of energy-efficient behaviour are explained below, together with a description of their potential impacts.

2.3. Heuristics and biases

Research on heuristics and biases represents a distinguishing feature versus the conventional model of the rationally acting human being (Homo economicus, or economic man). It permits a new perspective on the questions of how and why people act, which motivators and barriers play a role, and how measures aimed at changing behaviour can be identified and implemented, Here, for example, researchers van den Broek and Walker (2019) assume that merely in the context of energy-related assessments and decisions, up to 24 different heuristics can be applied. Heuristics (i.e. cognitive operations often used to arrive at fast and subconscious conclusions) are thus a significant factor in the assessment of one's own energy consumption and energy efficiency. But this also means that on the basis of heuristics a variety of distortions in the perception and assessment of energy efficiency can arise that are also referred to as 'biases'. Some of the behavioural science-based concepts and biases of relevance to Swiss companies are described in the box below.

Anchoring:
This refers to the fact that partially irrelevant initial information is applied – often subconsciously – as the reference point ('mental anchor') for subsequent decisions and can influence them (Tversky & Kahneman, 1974).

Information concerning the potential for energy efficiency (for example, communication regarding potential cost savings) can set an anchor for future decisions and significantly influence willingness to focus on energy-efficiency measures. Here it is important to pay attention to which information is communicated at which juncture.

Availability bias:
This refers to the fact that the importance or probability of a development is often assessed on the basis of how quickly and easily suitable relevant examples occur to people (Tversky & Kahneman, 1973).

During discussions on general operational optimisation in companies, the importance of energy efficiency may be underestimated if the participants are not aware of, or cannot come up with, any suitable measures. Here, it is recommended to facilitate simple and memorable comparisons in the context of energy efficiency.

Bandwagon effect:
This refers to an effect that motivates people to carry out an action if it has already been carried out by several others (Corneo & Jeanne, 1997).

Companies tend to be more willing to invest in energy-efficiency measures if other companies they are familiar with do so too. If possible, energy efficiency should therefore be communicated in the form of a positive growing trend so that companies can be motivated to 'jump on the bandwagon'.

Choice overload:
This refers to the fact that people possess limited cognitive capabilities to process information and, where there are an overwhelming number of options, there is a risk that none of them will be chosen (Schwartz, 2004).

The large number of different sources of information about energy efficiency (federal government, cantons, energy consultants, energy providers, etc.) can overwhelm decision-makers and cause their company to decide not to invest in energy efficiency at all. In order to prevent interested parties from becoming overwhelmed, the information that is provided should only include a few readily comprehensible options.

Cognitive dissonance:
This term describes a state of emotional conflict that arises when we act contrary to our own personal convictions. Internal conflicts can be resolved by correcting either our behaviour or our attitude (Festinger, 1957).

If someone is convinced of the importance of energy efficiency but is forced to carry out operational tasks in conflict with their convictions, this can reduce their willingness to also adopt energy-efficient behaviour. It is therefore recommended to focus on a consistent and comprehensive consideration of energy efficiency throughout the company.

Confirmation bias:
This describes the tendency to overvalue information that fits in with personal convictions or to interpret information in favour of one's own opinion or in line with one's own arguments (Jonas et al., 2001).

Companies that operate within an energy-efficient sector potentially consider their actions to be confirmed if energy-efficiency measures in their sector are barely or not at all addressed. Respected mediators such as the federal government or industry associations are suitable entities for communicating alternative views and encouraging preferred behaviour.

Loss aversion:
This describes the perception of emotionally (negatively) rating actual or anticipated losses higher than (positive) equivalent gains (Kahneman & Tversky, 1979). This means that even minor losses can have strong emotional impacts.

The way in which energy-efficiency measures are communicated influences their degree of acceptance in a company. The conscious communication of potential losses, or the risk of financial losses or the elimination of benefits can motivate people to adopt more energy-efficient behaviour.

Mental accounting:
This refers to the tendency for people to often create a notional mental budget for certain purposes and investments, and thus to allocate and weigh up costs (Hahnel et al., 2020).

Many activities are not (or not sufficiently) associated with energy efficiency. Here it is recommended that remuneration in the framework of target agreements should be clearly placed in the context of energy efficiency in order to foster an awareness of, and incentives for, investments.

Overconfidence bias:
This describes the tendency to rate one's own performance and/or own knowledge very highly in comparison with other people's, even if this is in fact not the case (Montibeller & von Winterfeldt, 2015)

It is often the case that considerations of, and investments in, energy efficiency are more highly rated in one's own business than they are in practice. An unduly high self-assessment can give rise to the false notion that only marginal efficiency gains are achievable. It is recommended to consciously challenge this conviction and encourage a fact-based discussion of potentials in companies.

Present bias:
This describes the tendency to give preference to minor immediate benefits over larger benefits that are realisable at a later time (Andreoni & Sprenger, 2012). The closely associated phenomenon of 'temporal discounting' also describes the tendency to attach less importance to future events with increasing temporal distance (Frederick et al., 2002).

Companies often give preference to measures with discernible short-term results. In certain circumstances, comprehensive energy-efficiency measures with longer-term benefits can be regarded as less attractive. It is therefore important to already draw attention today to the attractiveness and benefits of rewarding long-term measures.

Status quo bias:
This describes the preference for the current status versus changes, especially in complex and uncertain situations (Samuelson & Zeckhauser, 1988).

Because people tend to adhere to the status quo and often perceive changes as more complex than they really are, it is frequently the case that even attractive energy-efficiency measures can be rejected. In view of this, energy-efficiency measures should be designed so that they require the lowest possible additional expenditure and a minimum departure from existing practice.

Sunk costs fallacy:
This term refers to people's tendency to adhere to a given plan due to already irretrievable invested funds, even though further investments are no longer attractive from the present-day perspective. This may concern money, time or energy (Arkes & Blumer, 1985).

If production systems, machines or other equipment have been purchased in the recent past, there is a tendency to hold on to these capital goods even if they are less economical and (energy-)efficient than alternative products now available on the market. Here it is recommended to draw attention to the long-term benefits of energy-efficient alternatives.

Box 1: Relevant behavioural science-based concepts and biases.

3.

BEHAVIOURAL INSIGHTS IN POLICY-MAKING

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3.1. Applied behavioural insights in the policy-making process

Policy instruments (public policies) can be defined by (state) entities as mechanisms for implementing strategies to overcome social challenges (Rinfret et al., 2018). The planning of regulations, strategies and measures is based on assumptions as to how people will behave in specific situations. In the past, it was often the case that the influence of contextual factors was underestimated or even ignored during this process. This gave rise to the development of unrealistic plans and over-optimistic assumptions concerning the effectiveness of defined measures (Planning Fallacy; Lovallo & Kahneman, 2003). By integrating behavioural insights and empirical methods into the policy-making process, it is possible to effect a shift away from subjective assumptions and towards empirically tested and hence evidence-based findings.

The concept of behavioural science-informed policy-making was trialled for the first time by the UK government ten years ago when it created a new unit called the Behavioural Insights Team (BIT), which was entrusted with the mandate of exclusively applying behavioural insights for the optimisation of policy measures and the improvement of public services. Thanks to cost-effective interventions such as the redesigning of tax assessments, which in addition to the provision of the standard information drew attention to the positive behaviour of the majority of other citizens, the number of punctual tax payments was increased by an impressive 19% (Hallsworth et al., 2017). During the 23-day pilot phase, this move alone led to an increase in tax revenue of GBP 2.7 million. This and similar successful trials encouraged the rapid integration of behavioural insights into government programmes and private sector strategies throughout the world. While to begin with the spread was mostly confined to English-speaking countries, in the past five years various other countries have created behavioural insights teams or 'nudge units'. In the OECD alone, 202 institutions now incorporate behavioural insights in their policy-making process (OECD, 2020). It should be noted here that this is probably a conservative estimate of the influence of behavioural insights, because the figure does not include non-OECD member states, nor does it reflect numerous private sector initiatives.

3.2. Nudging and 'libertarian paternalism'

Nudging is the most widely known form of the use of behavioural insights as an innovative policy-making instrument or as a means of optimising policy instruments. This is attributable to the fact that a scientific understanding of heuristics and biases is used in order to help the involved players make better decisions (Thaler & Sunstein, 2008). The term 'better decisions' is understood to refer to the range of options that people themselves would choose if they were to possess all the necessary information, think in the long term and exercise sufficient self-control in order to also implement their self-selected goals (Thaler & Sunstein, 2003, 2008). Thus nudging is clearly differentiated from 'sludging', which leads decision-makers to act contrary to their own interests, or motivates counter-productive behaviour (Thaler, 2018). Examples can be cited here in which additional burdens are placed on the involved players: (1) If additional options for which charges apply are selected by default for the client, and (2) if subscriptions can only be cancelled by phone.

In the context of public-sector institutions, a nudge represents a form of libertarian paternalism. One of the arguments put forward here is that a nudge should only be used if it is in line with – and contributes towards – public interest or the interest of the target group concerned. It should also be used in a controlled and transparent manner. Decision-makers should always have all existing as well as

additional options at their disposal (i.e. no withdrawal of options). But people can be nudged towards an optimal choice through the conscious structure of the physical, social or individual choice architecture (Thaler & Sunstein, 2008). Here, for example, the display of fruits and vegetables at the entrance to a cafeteria can prompt customers to consume more of them (Broers et al., 2017). But this approach can also be applied to socially significant decisions, such as the statutory decision as to whether citizens are required to actively register in advance as organ donors (= opt in) or are automatically registered as organ donors if they do not deregister (= opt out).

3.3. Ethical framework conditions

The targeted influencing of behaviours has always been a central feature of public and private sector strategies and steering mechanisms. Both regulatory and private-sector players inevitably define the choice architecture through social and statutory framework conditions, financial incentives or targeted communication, and thus either consciously or unconsciously influence decision-makers. The advantage of the application of modern-day behavioural insights-informed concepts lies in the integration of a more comprehensive understanding of decision-making processes and an evidence-based and empirical approach with the support of scientific methods. A systematic and transparent discussion on the objectives and influencing mechanisms of policy instruments and their implications, which should form an integral part of every policy programme, can be additionally strengthened through the use of behavioural insights (Bowen & Zwi, 2005). The explicit criteria for choosing a given measure as a policy instrument are examined in section 4.1.

The growing number of nudge units established by governments and NGOs has also prompted an increasing global discussion on the ethical principles of changes to the choice architecture (e.g. Rebonato, 2012; Bubb & Pildes, 2014). A variety of studies, guidelines and models discuss the principles for a transparent, detailed and in particular case-specific assessment of the ethical and moral dimensions (Lades & Delaney, 2020). The FORGOOD Framework is a suitable model for meeting this requirement and for examining the ethical framework conditions for practice-oriented nudging at the state level (Lades & Delaney, 2020). It encompasses a total of seven dimensions to be taken into account in the development and modification of the choice architecture, in particular by the public administration. FORGOOD stands for Fairness, Openness, Respect, Goals, Opinions, Options and Delegation. The table below summarises the core concepts and key issues of the individual dimensions and their importance for application in Switzerland.

DIMENSION	CORE CONCEPT	KEY ISSUE
Fairness	Measures do not cause people to act contrary to their preferences. There are no negative redistributive effects.	Does the measure have undesired redistributive effects?
Openness	Measures are communicated openly and transparently, and are readily recognisable.	Is the effectiveness of the measure comprehensible or incomprehensible?
Respect	Measures do not restrict people's autonomy and freedom of choice, and allow for rejection.	Does the measure respect people's dignity, freedom of choice and privacy?
Goals	Measures support individual and socially desirable goals, and lead to a measurable improvement of the initial situation.	Does the measure serve good and legitimate goals?
Opinions	The approaches to, and acceptance of, the objectives by the target group are taken into account in the development of the measure.	Do people accept the means and the ends of the measure?
Options	For the choice of measures, the relative effectiveness, efficiency and appropriateness of the various options must be weighed up.	Do better measures for attaining the goal exist, and are they warranted?
Delegation	For the design of behavioural science informed measures, potential conflicts of interest have to be taken into account, together with the question as to whether the policy-makers have not exceeded the powers delegated to them.	Do the players have the powers, skills and capacities to implement behavioural science measures and evaluate their effects?

Table 1: Ethical framework conditions and deliberations. Adapted from Lades and Delaney (2020).

3.4. Conventional approaches versus behavioural insights

Although the field of behavioural insights is primarily associated with nudges, the latter by no means represent the sole application of behavioural science-informed concepts for improving policy instruments. Conventional instruments such as information campaigns, financial support programmes or draft legislation can also be informed and optimised by behavioural insights (Thorun et al., 2017). Table 2 depicts the spectrum of conventional approaches.

The legislation introduced in the UK in 2015 governing the increase in the price of plastic bags can be cited as a good example. This measure stipulates that plastic bags that had previously been provided free of charge now have to be sold for at least 5p. It is estimated that in the first six months after the introduction of this charge, around seven billion fewer plastic bags were used – a reduction of almost 92% (Thomas et al., 2019). From the behavioural science perspective, two main reasons may be cited

for the effect of this financial steering mechanism. People perceive losses disproportionately higher than equivalent gains (loss aversion) and always evaluate decisions in relation to existing circumstances (reference dependency). A financially almost negligible amount of just 5p can, under the right circumstances, bring about a comprehensive change in behaviour (departure from status quo).

INFORMATION	COOPERATION	PROCESSES	ECONOMY	REGULATION
Energy information	Standards	Energy process consultation	Taxes and duties (e.g. CO2 levy)	Requirements/ prohibitions (e.g. energy criteria for new buildings)
Labels (e.g. Energy Star)	Voluntary commitments	EMAS (Eco-management and audit scheme)	Emission rights for trading	Limit and threshold levels (e.g. for emissions)
Education, sensitisation		Energy-efficient process design	Financial incentives, support programmes	Approval procedures
Minor influence				Major influence

Table 2: Influencing of choice architecture through conventional approaches. Adapted from Thorn et al. (2017).

3.5. Models for applying behavioural insights in policy and strategy

For the successful application of behavioural science insights in policy and strategy, the use of a tried and tested model is recommended which incorporates and optimally supports the most important phases and activities in the development of behavioural science-informed policy instruments. During the past decade, various tool kits and process models in the field of behavioural science have been published that are suitable for use in the area of energy policy. Examples include the MINDSPACE Framework (Dolan et al., 2010); the Practitioner's Guide to Nudging (Ly et al., 2013); the DECIDE Framework (Wendel, 2020); the BASIC Framework (OECD, 2019a); and the D.R.I.V.E. Framework, which was developed and tested in the Swiss context (Emmerling, 2018; 2019).

The D.R.I.V.E. Framework, which also forms the basis for the development of this report and the corresponding measures, distinguishes between five consecutive development phases, from the initial discussion of problems through to the ultimate behavioural science-based solution.

Figure 1: The D.R.I.V.E.® Framework for behavioural insights in strategy and policy.

D.EFINE
During the initial phase, the principles for behavioural science-informed policy instruments are defined and a precise understanding is formulated of the specific challenges in terms of policy and strategy. A behavioural science-based definition of the target group and preferred behavioural objectives is formulated (in this case, behaviour contributing towards increased energy efficiency). As the initial phase, D.EFINE forms the basis for the four subsequent project phases.

R.ESEARCH
During the second phase, both the academic and the practical insights concerning the current behaviours of the target group are analysed, and the existing motivators and barriers are studied in terms of the targeted behaviour. In addition, a greater understanding of the behavioural context is drawn up, and both the drivers for current behaviours, as well as the criteria for future interventions, are developed. In this second phase, the prerequisites are created for the subsequent identification of starting points.

I.DENTIFY
During the third phase, on the basis of the defined target behaviour and the academic and practical research on the relevant framework conditions, potential behavioural science-based measures are identified, selected, tested and adapted for application in the relevant target group and context (in this case, measures aimed at increasing energy efficiency in Swiss small and medium-sized companies). I.DENTIFY is based on the previous two project phases (D.EFINE and R.ESEARCH) and formulates specific measures to be validated in the next phase.

V.ALIDATE
In the fourth phase, the anticipated effects of the behavioural science measures identified or developed are examined with the aid of robust (pilot) experiments. Evidence is produced as to whether and to what extent the theoretical interventions can be made in the context of the target group, and which practice-relevant effects can be realised in line with the predefined target behaviour. Through this empirical approach it is possible to address deviations and their causes at an early stage and adjust measures appropriately. Thus V.ALIDATE plays a key role on the path to the general application and scaling of the developed measures in the next phase.

E.XECUTE
In the fifth phase, the measures that have been developed and successfully validated are generally implemented and their effects on the defined objective (for example, increased energy efficiency and use of renewable energy in Swiss small and medium-sized companies) are observed. If necessary, additional adaptations can be made on the basis of the previously validated effects. Alongside the successful completion of a behavioural science-related development process, the E.XECUTE phase also forms the basis for the publication of measures and effects and thus for the provision of information for future projects.

4.

EVIDENCE-BASED POLICY MAKING

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4.1. Principles of evidence-based policy

Evidence-based policy represents an approach to policy formulation in which research findings are incorporated into decision-making processes (Bowen & Zwi, 2005). On the one hand, scientific findings are taken into account concerning people's decisions and behaviour. And on the other, proposed measures for bringing about targeted changes in behaviour are empirically studied. It is in particular the empirical examination of effects that facilitates the identification of the best possible steering instruments for the targeted motivation of behaviour. The question as to what is good policy can thus be answered in a more fact-based manner (Ruggeri et al., 2018).

In principle, potential measures for the targeted structure of the choice architecture should initially be tested in pilot projects. It is only after they have been successfully tested against a suitable control group that measures can be placed at the disposal of, or applied to, all relevant population groups. This step-by-step empirical approach ensures that measures are only widely applied if they are target-oriented and have been found to be effective, their effect justifies the associated expenditure of resources and there have been no observable negative impacts. Thanks to this process it is also possible to gain an insight into when, how and for whom measures are suitable, which in turn can be taken into account for the shaping of future programmes.

CRITERION	DEFINITION	EXAMPLES OF APPLICATION
Efficacy	The efficacy of a given measure is assessed on the basis of its ability to achieve the desired result.	A reduction of energy consumption thanks to a specific measure.
Effectiveness	The ratio between the effects attained and the defined goal.	Reduction of energy consumption in proportion to the target.
Efficiency	The ratio between the resources utilised and the effects attained.	The quantity of kilowatt hours saved per Swiss franc invested.
Proportionality	Measures must represent a suitable and necessary solution and be in reasonable proportion to public interest.	Extent of change of choice architecture versus anticipated energy savings.
Evaluation of implementation	Assessment whether the measure has been implemented as planned.	Whether all companies have received the applicable feedback.
Sustainability	Estimated duration of the observed effect and whether it is expected to persist after implementation has been completed.	Whether it is to be anticipated that an information campaign continues to have an effect after several weeks.

Table 3: Policy evaluation. Adapted from Ruggeri et al. (2018).

4.2. Structure and evaluation of policy instruments

In principle, the evaluation criteria and methodology should already be taken into account during the development and selection of potential policy instruments. In this way, the range of information can be clarified that has to be collected in order to carry out a qualified assessment of the effect of a given measure, and put forward evidence-based recommendations for action. A selection of important criteria that have to be considered in each evaluation is presented in Table 3.
In the evidence-based policy-making process it is useful to distinguish between two stages/processes: ex ante (prior to implementation) and ex post (after implementation). The ex ante stage concerns the planning and design of measures, and the question whether, and for whom a given measure will have an effect. It encourages a targeted discussion of a measure's necessity, suitability and assessability prior to its implementation. In this way, based on existing study findings concerning a measure in similar situations, it is possible to prioritise options before it is implemented. The three key questions that have to be answered *ex ante* are as follows:

I. *What is the core problem and who does it affect?*
   For topics of relevance to behavioural insights, this question can be answered through a behavioural science-informed analysis of problems which identifies the nature of the challenge (for example, low level of energy efficiency in companies) and its extent (for example, companies could operate 15% more efficiently), and defines the target group for potential measures (for example, small and medium-sized companies).

II. *What does the problem call for and which criteria can be identified for measures?*
   On the basis of a precise study of behaviour and context, this question can determine which prerequisites are required for the described problem and how various measures can contribute towards a solution. It examines both the current behaviours of the target group and the contextual determinants. Based on a comparison of the target (question 1) and current (question 2) state, the potential and conceivable starting points can be described for various measures aimed at finding the desired solution to the challenge .

III. *Which measures contribute towards the solution of the core problem, taking account of the framework conditions and criteria?*
   This question can be answered on the basis of an academic and practical evaluation of potential measures for the respective choice architecture. In order to be able to choose between different measures, it is recommended to make assumptions regarding their modes of action and impacts comprehensible and comparable. This can be achieved through the use of impact models, for example, which indicate assumptions, process and impact logic, and anticipated effects of measures, and facilitate the exchange between stakeholders (Balthasar & Fassler, 2017). In addition, it is recommended to include the target group as comprehensively as possible in addition to the stakeholders, and where necessary to adapt the evaluation of measures to the respective situation (OECD, 2019b).

After implementation of one or more measures, the *ex post* stage deals with the question whether the measures lead to changes in a specific case, whether any anticipated or unintended effects arise, and whether the defined objectives can be achieved (cf. V.ALIDATE step in the D.R.I.V.E.® model). For the design and evaluation of measures it is helpful to interpret these as components of complex social systems (Hudson, 2010). It is a characteristic of complex systems that their components always interact with one another, and the system is therefore more complex than the sum of its individual components and cannot be understood through an isolated observation of them. In the context of energy policy, an

overall observation of behaviour and its determinants is particularly important because interactions can occur. For example, energy-efficiency gains achieved can reduce the financial incentives for efficient behaviour in the future, and thus potentially give rise to increased wastage (rebound effect; Herring, 2000) or to the perception of processes as complex, serving as the justification for subsequent squandering behaviour (moral licensing; Tiefenbeck et al., 2013). Something that appears to be successful at first glance can produce another picture upon closer and more detailed examination. Differentiated evaluations on the basis of experiments (cf. section 4.3) are therefore necessary in order to gain a better understanding of the causal modes of action of measures, and permit an informed decision as to whether and how these should be applied on a broad scale (cf. E.XECUTE step of the D.R.I.V.E.® model).

4.3. Design and implementation of experiments

Every empirical examination of assumptions of a logical statement – for example, regarding the effectiveness of energy efficiency measures – begins with the formulation of a verifiable hypothesis. In order to test hypotheses empirically, their conditions have to be clearly formulated. For this purpose it is recommended to apply the standard form of logical conclusion ('whenever ... then ... '). Furthermore, it is necessary to specify which findings of an empirical study can be evaluated as evidence for and against the validity of the tested hypotheses. In addition, the population to be studied should also be defined. Here it is recommended to define precise inclusion and exclusion criteria for random sample participants. In order to be able to derive valid findings from an experiment for a given target group, the selected sample must be as representative as possible for the underlying population.

To verify a formulated hypothesis, systematic changes of a range of (independent) variables and their effects on the (dependent) result have to be studied in an experiment. The data thus collected are then (statistically) evaluated in order to draw conclusions regarding the effectiveness of the interventions and ultimately for or against the formulated hypothesis. In the field of social sciences, the ideal case in which an isolated causal effect of an intervention on an outcome can be verified (comparison of a person's behaviour with a measure versus the behaviour of the same person in exactly the same context but without the measure) is only possible to a certain extent. Instead, in reality each intervention results in an irrevocable influence on the involved person and system, and thus prevents a comparison of how the person would have behaved if they had not been influenced by the intervention. Consequently, for an evaluation of potential correlations between cause and effect, the observable effect of an intervention on the behaviour of a group has to be compared with that of one or more representative (and as far as possible, identical) comparison groups.

The choice of a suitable evaluation method depends on the issue at hand, the measure, the context, the sample, the experimental design and the collected data (Gerber & Green, 2012; Robson & McCartan, 2017). In principle, an evaluation should only be carried out if the desired gain in collected data justifies the resource costs. Alongside monetary considerations, both ethical and legal weightings are decisive (cf. for example Schubiger & Drissen [2019] for a detailed discussion). If for the evaluation of a measure it is necessary to intervene in the private sphere of people or organisations, this should only occur with their prior consent. Similarly, it is important to ascertain whether the evaluation of pilot measures (for example, a test with unilateral subsidies) requires an intervention in a company's autonomy or competitive capacity.

Randomised studies are the most widely used experimental method for ensuring that groups are as comparable as possible. In randomised controlled trials, the participants are randomly allocated to one or more intervention or control groups. In this way, with a sufficiently large random sample, the characteristics of the participants that possibly influence the effect of the intervention can be evenly distributed over both groups. The focus concerning the members of the intervention groups is, as the name implies, on intervention. As a rule, no influence is exerted on the control group. It is thus possible to approximately estimate the degree of the average influence of an intervention on a selected population group. In order to assess the effect of several measures, a number of intervention groups can be compared with a control group so that the most effective measure can be identified. In this way it is possible to determine the impact of a given measure compared with the status quo or other measures.

METHOD	DESCRIPTION
Before/after comparison	Identification of the changes that have occurred since the initiation of the influence of a measure. Here the status before introduction of the measure is compared with the status at the time of measurement.
Simple difference	Determination of the difference between addressees and non-addressees of measures at the time of measurement.
Difference-in-differences	Comparison of the changes between the intervention and control group at the time of measurement since the measure came into effect.

Table 4: Non-experimental comparison methods

Quasi experiments (Mark & Reichardt, 2004) are suitable for situations in which participants cannot be allocated on a randomised basis, but the effect of a measure is nonetheless to be evaluated. In medical studies, for example, for ethical reasons it is not acceptable to deny patients the best possible treatment solely in order to draw conclusions concerning the relative impact of various solutions. In addition, every examination of measures with potential negative effects must be carried out with the consent of the participants so that they have the option of terminating their participation in the study at any time. As a rule it is necessary to ensure that participants do not experience any negative effects as the result of an intervention. In these and other cases in which randomisation is not possible, an evaluation of measures can be secured through various methods. Table 4 presents an overview of some non-experimental evaluation methods. For a discussion on other (quasi-)experimental methods, cf. Thomas & Chindarkar, 2019.

5.

ACADEMIC RESEARCH:
STARTING POINTS FOR INTERVENTIONS

5.1. Introduction to behavioural insights in the fields of energy and environmental protection

By way of preparation for compiling a behavioural insights-informed catalogue of measures for increasing energy efficiency and the use of renewable energy, a comprehensive analysis was carried out of the findings from the academic literature in the field of behavioural science-informed energy policy. A total of 87 publications, scientific studies, reports and position papers were consulted. Special attention was paid to relevant findings and examples of measures in Switzerland or countries with comparable circumstances. The majority of findings originate from sources in Western and Northern Europe and North America. Most of the identified studies on the psychological aspects of energy consumption and energy efficiency focus on the individual or household context (ENABLE.EU, 2017; Andor & Fels, 2018). Studies in the corporate context are generally fewer and more recent, with the majority focusing on the past ten years (Staddon et al., 2016). However, in view of the fact that, especially in small companies, energy behaviour and investments in energy efficiency are primarily influenced by a small number of individuals in the areas of business and production management, many insights from the individual and household context are also of relevance in the context of small and medium-sized companies.

The corporate context offers unique opportunities and challenges for behavioural science-informed measures. On the one hand, interventions that prompt individuals to adopt a more energy-efficient behaviour to only a minor extent can quickly give rise to significant energy savings at the collective workforce level. And, on the other hand, integration into sizeable communities such as companies favours psychological mechanisms and circumstances that can have a negative impact on the individual motivation to act in an energy-efficient manner: (i) lack of feedback and (ii) diffusion of responsibility. *Lack of feedback* refers to the fact that employees receive no (or only very little) feedback regarding their personal energy consumption (or their share of the energy of consumption of the overall company). *Diffusion of responsibility* describes the phenomenon according to which each person's sense of responsibility diminishes in proportion to the size of the group (Wallach et al., 1964). In situations in which responsibility for energy efficiency is unclear or the persons who are responsible have no (or only very little) influence on energy behaviour, people tend to pass on responsibility to others. This means that employees often are unable to assess the impacts of their behaviour and thus lack the necessary motivation to change it. Both cases have a negative effect in terms of incentives to adopt energy-efficient behaviour.

In order to take account of these tendencies and thus to successfully counteract them, there are various behavioural science criteria which can be classified into six groups. The following overview of the established experimental methods corresponds to a typology of the 'behaviour lever' cited by the OECD (2017) and adapted to the Swiss and project context. Despite comprehensive research and international comparisons it is important to note that the criteria described below are not exhaustive and successful interventions often combine aspects from several categories.

5.2. Social norms

Human behaviour is strongly influenced by the actions of other people in their vicinity (descriptive norm) and by assumptions as to what is deemed socially acceptable (injunctive norm) (Cialdini, 2003). People tend to evaluate their behaviour relative to that of relevant comparators (Festinger, 1954). Generally speaking, the tendency exists to substitute difficult issues with less complex ones (Kahneman, 2011). These effects can also be observed in the context of energy efficiency and the use of renewable energy. Thus the question as to whether a person's behaviour is energy-efficient is often answered on the basis of a comparison between the person's own energy consumption and that of their friends and colleagues or comparable organisations. A few examples of social norms in the context of energy policy are discussed below.

Allcott (2011) studied the effectiveness of social norms on the energy consumption of US households. People who were told how their energy consumption compared with that of their neighbours reduced their consumption by an average of 2%. Households that had previously belonged to the upper 10% prior to the intervention reduced their consumption by 6.3%. In a similar experiment conducted by Schultz et al. (2007), contrary effects were ascertained for individuals whose consumption had previously been below the average level: here, households that discovered their consumption was below average subsequently increased it. It would in fact be possible to avoid this effect, however, if particularly energy-efficient households were to receive positive feedback regarding their consumption in the form of a smiley (i.e. a form of emotional approval). An expression of appreciation can make an enormous difference. With respect to interventions intended to reduce energy consumption through social norms/comparisons, it should be noted that the degree of cost-effectiveness depends on consumers' overall energy consumption. Whereas in the USA the reduction in relation to the programme costs proved to be highly cost-effective (Allcott, 2011), this was not the case in a replication in the German context (Andor et al., 2018). This was to some extent attributable to the fact that the average level of consumption in German households is lower than that in the USA.

In the Swiss context, a recent representative survey among more than 1,000 citizens that asked which aspects could make a significant contribution towards combating climate change showed that social norms are regarded as an important factor (Cousse et al., 2020). The three most frequently cited aspects were: technological innovation (78%); change in consumer behaviour (67%); and the behaviour of others (60%). The behaviour of individuals and major companies was cited as a central element. At the same time, however, only 20% of the respondents believe that people will voluntarily reduce their energy consumption in order to combat climate change. By informing people in a targeted manner that numerous other individuals and companies are endeavouring to act more energy-efficiently it would be possible to counteract this pessimistic view and motivate many others to improve their energy efficiency and do more to protect the climate.

5.3. Commitments & goal setting

In the context of energy behaviour, commitments can be described as verbal or written undertakings to reduce energy consumption or switch to the use of renewable energy (Abrahamse et al., 2005). Entering into a commitment means accepting a moral responsibility to behave in accordance with the undertaking, and strengthening the readiness to meet the corresponding obligations (van der Werff et al., 2019). A commitment may be entered into internally/privately or publicly, but public commitments

give rise to a stronger effect (Shippee & Gregory, 1982). As a rule, the greater the negative consequences of non-compliance with a commitment, the more effective the commitment becomes (Dolan et al., 2012). Goal setting combines a commitment with a specific, measurable, attainable, realistic and chronological target (S.M.A.R.T. goals, cf. Doran, 1981). These components facilitate the evaluation of target achievement and open up the opportunity for specific feedback (Andor et al., 2018). Examples: a 10% reduction of energy consumption within 12 months, or a changeover to 100% use of renewable energy by 2025.

In a survey of small companies in the USA with up to 25 employees, public commitment was revealed as a major driving force behind energy-efficiency measures. In the study conducted by Shippee & Gregory (1982), companies were able to participate in an energy-saving programme and receive energy consultation as well as individual energy-efficiency tips. As a condition for their involvement in the trial group, the companies were required to be listed in the local newspaper as participants in the programme (public commitment). The result showed that the companies in the trial group consumed 30% less gas than those in the control group (Shippee & Gregory, 1982).

In the framework of another project aimed at fostering energy efficiency in the USA, the participating households were given the opportunity of setting themselves non-binding reduction targets. Those households that set themselves realistic and achievable targets proved to be the most successful and recorded savings of around 11% (Harding & Hsiaw, 2014). In a similar context, commitments also proved to be an effective mechanism for fostering environment-friendly behaviour. Hotel guests were told that they could contribute towards the protection of the environment by reducing the number of daily towel changes. Some of the guests were offered a card to hang outside their door (public commitment) to demonstrate their support for the hotel's environmental protection campaign. The study showed that the number of towels used by the hotel guests who entered into this voluntary commitment fell by around 19.5%, enabling the hotel to significantly reduce its consumption of energy and water (Terrier & Marfaing, 2015).

5.4. Framing & labelling

The way in which information is communicated significantly influences the manner in which it is processed, which views and intended actions are developed, and whether these are subsequently put into practice (Shan et al., 2020). It is often the case that, in their quest for energy-efficient solutions, individuals and companies are frequently confronted with an excessive and confusing quantity of information, which often hampers their decision-making. Thus, the challenge here is to provide attractive and readily comprehensible information. In addition, it is important to ensure that players possess the necessary resources and are also able to put into practice their intentions formed on the basis of the provided information. Behavioural science-informed framing can help make the decision-making process more efficient and thus simplify identification of the preferred options for action and speed up their implementation.

In this context, Stadelmann & Schubert (2018) carried out a study together with a major Swiss online retailer to examine how energy labels influence the sale of household appliances. They found that sales of energy-efficient household appliances rose significantly when an energy label was displayed. Findings from another experiment which analysed the Irish real estate market revealed that energy labels also play a major role in decisions with high investment costs. Here, for properties with an A label (highest efficiency), 11% more was paid than for similar properties with a D label. The positive link

between energy labelling and prices was also identified in the rentals segment, though to a slightly lesser extent (Hyland et al., 2013). Generally speaking, the poorer the market conditions were, the greater the effectiveness of an energy label. This indicates that energy efficiency is also clearly regarded as a distinguishing feature.

In order to effectively implement energy labels (as an element of efficient framing), it is important to understand how they are regarded by consumers. In a survey to determine how energy labels are understood and interpreted by EU citizens, only 59% of the respondents indicated a correct understanding of these labels, even after their importance and use had been explained to them (London Economics, 2014). And in another survey, only 29% of the approximately 1,000 Norwegians participating in a survey understood how much fuel they could save if they were to buy an energy-efficient car (Foudi et al., 2018). As a potential hurdle to more energy-efficient investments, a lack of understanding was identified concerning the energy consumption of machines, and their life cycle costs as well as their period of depreciation. However, how the availability of such information affects the decision-making process of consumers has only been researched to a limited extent to date, and this could represent a promising experimental starting point for subsequent measures.

5.5. Defaults & physical changes

Many decision-makers display tendencies towards the status quo bias described above, i.e. a preference for the current state of affairs or for a preselection made on their behalf. Thus, a targeted change of default position or preselection can effectively influence the behaviour of a target group. From an ethical perspective it is important to permit a choice, i.e. a change of the current default position, at any time. In the literature, a distinction is often made between an opting-out and an opting-in procedure. Opting in refers to situations in which decision-makers have to actively sign on, while opting out describes situations in which decision-makers have to actively sign off. Well-known examples here include electricity tariff defaults with 100% renewable energy production.

A scientific study showed that private electricity consumers in Germany purchase electricity from renewable energy sources 19% more often if all energy providers in their region offer this in the form of a preselection (opt-out) (Kaiser et al., 2020). In another experiment, a group of electricity consumers were offered the opportunity to actively switch to a time-of-use tariff (opt-in). The comparison group was merely informed that their tariff automatically changes if consumers do not raise any objections (opt-out) In the opt-in condition, only 20% of consumers changed their tariff, whereas in the opt-out condition 90% accepted the automatic tariff change. Interestingly, after the changeover, even the automatically registered customers consumed less energy in peak demand periods, though more than those who actively opted for the new tariff.

The effects of defaults have also been identified in physical environments. For example, the OECD successfully and barely noticeably reduced its energy consumption in its Paris premises by gradually lowering the heating temperature. By reducing the standard setting by 1 °C – which could have been offset at any time through the individual adjustment of the temperature on the thermometer – it was possible to reduce the effective temperature by 0.38 °C on average (Brown et al., 2013).

5.6. Feedback & reminders

The problem described above regarding the lack of understanding of the effects of own energy behaviour can primarily be counteracted through targeted feedback or reminders. Generally speaking, feedback is the most effective method if it is adapted to the recipient, refers to specific forms of behaviour and is provided shortly after the relevant behaviour has been carried out (Abrahamse et al., 2007; Daamen et al., 2001). Reminders are suitable as an extended form of feedback that can be issued repetitively before and after an action. In the corporate context, opportunities arise for feedback to individuals as well as groups, business units and, in the case of smaller companies, directly to all employees.

Sheau-Ting et al. (2013) studied the effectiveness of feedback and reminders in the framework of various marketing strategies in order to motivate students to adopt more energy-conscious behaviour. For the participants, the use of reminders was regarded as the most important strategy because even basic actions can be quickly forgotten, especially in an environment that serves an entirely different purpose and in which energy efficiency is not prioritised. Caricco & Riemer (2011) tested the effects of group feedback, peer training (in which qualified employees inform their colleagues about energy efficiency) and a combination of the two, from the point of view of energy consumption by employees compared with a control group. The feedback was in the form of a monthly email containing information, plus graphs depicting the energy consumption of the university building in which the recipients worked. This intervention was carried out over a period of four months. A comparison was made of the energy consumption between the intervention period and the previous four months, as well as with the same period in the prior year. The group that received the combination of collective feedback and peer training reduced its energy consumption by 8% and the collective feedback group by 7%, whereas the consumption by the group that solely received peer training fell by only 2%.

With the dissemination of smart meters for gas, water and electricity consumption, which can receive and send digital data and are integrated into a communications network, the possibility exists today to provide feedback that is significantly more customised, up-to-date and provided in relevant and comprehensible metrics. These instruments also permit the use and integration of previously discussed methods, for example social comparisons, targeted framing and defaults. In addition, they facilitate the playful and competitive discussion of energy efficiency. The following section describes examples of such options.

5.7. Gamification

The term 'gamification' refers to the application of typical game elements and processes in the design of non-game-related products and services with the aim of changing behaviour. In this way, discussions concerning energy consumption can be given playful and player-relevant dimensions, the effects of which are thus rendered more comprehensible. This can be supported today through the use of information and communication technology, for example smart meters.
In a study that focused on gamification methods in Switzerland, the showers in several hotel rooms were equipped with various displays that either indicated the water temperature alone or also displayed a polar bear standing on a melting ice floe. The size of the ice floe diminished as the water consumption increased, thus intuitively and comprehensibly drawing attention to the guest's shower behaviour. Hotel guests whose shower displayed the polar bear consumed 11.4% less energy per

shower (Tiefenbeck et al., 2018). Another promising form of intervention that combines gamification elements with insights from behavioural sciences was tested in Switzerland by Koroleva et al. (2019). The team developed an app that collects energy consumption data directly from smart meters and visualises them in the form of interactive graphics. Here, for example, the energy consumption targets of users were visualised by depicting a battery that gradually appeared to drain in line with the targeted monthly energy consumption. These and other visualisations implement many of the approaches discussed and recommended above in the section dealing with feedback. They depict energy consumption in a clearly comprehensible manner, place it in relevant frames and provide direct feedback concerning consumption behaviour. Another element that used the lever of social norms was an energy-efficiency 'league table' which facilitated comparisons with other users. The influence of the app on energy consumption in Swiss households was measured during a period of seven months. The same period in the previous year was used as the basis for comparison. Households which used the app reduced their energy consumption by an average of 5.8%, whereas those households that did not use it reduced their consumption by only a negligible 0.2%.

The availability of modern software and hardware developed to yield playful and behavioural insights also represents a promising opportunity for enhancing energy efficiency in the corporate context. The topic of energy efficiency can be elevated quickly and effectively with the aid of gamification to form a collective issue in which not only company management, but also each employee, can exert a playful influence.

5.8. Other approaches and best practices

The successful translation of scientific findings into practice-related and implementable measures represents a critical process step in the development of behavioural science-informed policy instruments. Here the implementation context plays a decisive role because regulatory or market-specific differences, for example, can strongly influence the outcome of an intervention. In addition to the six dimensions discussed above (social norms, commitment, framing, defaults, feedback, gamification), other best practice options for applying behavioural insights in the fields of energy consumption and environmental protection were identified within the Swiss context and are briefly described below.

For example, within the framework of National Research Programme 71, the services of an energy supplier were restructured so that it was able to offer green power (i.e. electricity produced from renewable energy) to all customers as a standard product (default). The customers were still able to choose which type of electricity they wanted to buy, but were supplied with renewable electricity without an opt out. The recipients of this broad-based measure were more than 200,000 households, 7000 small and medium-sized companies and around 400 energy-intensive companies with an annual electricity consumption above 100,000kWh. At the time of the restructuring of the standard tariff, around 90% of the supplier's customers purchased electricity from conventional sources. Following the introduction of green power as the default product, this was retained by around 80% of the households and companies. There was also a significant long-term effect in that, four years later, less than 5% of the customers had cancelled their purchase of green power (Liebe, 2019). Similar results were reported concerning a related study in Germany in which new customers of an electricity supplier received green power as a standard product. Here, too, the purchase of renewable electricity increased by almost a factor of ten (Eberling & Lotz, 2015).

A joint initiative of WWF Switzerland, SwissEnergy and myNewEnergy is evaluating energy suppliers in accordance with the degree to which they make renewable electricity available to their customers. The results are depicted in the form of a colour-coded map of Switzerland posted on the stromlandschaft.mynewenergy.ch website. The map depicts those regions in which electricity suppliers have some catching up to do in order to keep the energy transition on track towards the declared net zero target for 2050.

The positive influence of electricity bills that have been supplemented with social and temporal comparisons as noted above in the section on social norms has already been documented (Allcott, 2011; Schultz et al., 2007; Vogel, 2019). However, the considerable potential associated with the supplementation of electricity bills has barely been exploited in Switzerland to date. For example, following its study of 91 domestic and 175 foreign electricity bills of private households, the 'Improve' research project found that 84% of Swiss bills do not offer any options for comparison (Vogel, 2019). There are highly attractive starting points here for the future design of interventions in both the household and corporate sphere. For the design of potential measures for the target group of Swiss companies, however, it should be noted that electricity bills are largely processed by accounting personnel, not by decision-makers. As already described above, correct framing is also of central importance in this regard.

Starting in 2021, ewz (electricity works of the city of Zurich) is substituting around 270,000 conventional electricity meters with smart meters over a timeframe of seven to ten years. With its planned large-scale introduction of innovative meters, this major project (with a budget of around CHF 200 million) will lay the foundation stone for the provision of real-time individual consumption-based feedback (Graf, 2020). The resulting adaptation of the standards in the field of information provision will also make a valuable contribution towards the successful implementation of associated criteria (feedback, social norms, commitment, framing, gamification). It will also lead to the creation of an important database that will facilitate more efficient evidence-based activities.

The current publication by Statista of a league table of climate-friendly companies in Switzerland for the two business publications, Handelszeitung and Bilanz, involves a combination of social norms, feedback, commitment and framing. The aim of its publication is to raise public awareness of the most climate-friendly companies tin Switzerland in 2021. It is based on a survey in which companies themselves cite their greenhouse gas emissions in relation to sales in the period from 2014 to 2019. It should be pointed out, however, that with this method a self-selection bias cannot be ruled out. It is therefore to be assumed that it is primarily addressed at companies that are in principle climate-conscious and are therefore willing to participate in a survey of this nature. The critical target group comprising companies that pay less attention to environmental issues is less likely to participate.

The cited examples show that various best practice criteria are also already being applied in Switzerland. The overview reveals, however, that in particular against the backdrop of the six categories discussed above, there is still a great deal of potential for the implementation of behavioural science approaches in Switzerland’s energy policy.

6.

QUALITATIVE RESEARCH: STARTING POINTS FOR INTERVENTIONS IN THE SWISS CONTEXT

6.1. Scope and structure of qualitative interviews in Switzerland

Comprehensive qualitative interviews were carried out in order to gain an accurate understanding of the importance attached to energy efficiency today by Swiss small and medium-sized, as well as large, companies, and of the factors that influence energy behaviour in companies. In addition, it was also possible to qualify and validate the insights obtained from the analysis of the scientific literature and the resulting hypotheses for the measures listed in chapter 7. Here the intention was not to carry out a comprehensive quantitative data collection campaign, because this had already been done, at least to a certain extent, in other reports and studies published on behalf of the SFOE (Egger et al., 2016; Hammer, 2014; Müller & Steinmann, 2016).

Due to the COVID-19 situation in 2020 the interviews were conducted via video conferencing. The participating company representatives (N=13) were recruited together with the respective SFOE project managers with a view to obtaining as representative a sample as possible. The interviews were conducted during the period from September to October 2020. For the interpretation of the findings, the fact should be borne in mind that effects associated with a self-selection bias (i.e. readiness on the part of interested companies / unwillingness of uninterested companies to participate) and with a social desirability bias (i.e. tendency on the part of participants to provide socially and morally desired answers instead of preference and opinions) cannot be ruled out (Grimm, 2010).

The structure of the utilised qualitative questionnaire was based on a comprehensive prior analysis of the scientific literature. This focused strongly on the incentives set through target agreements[1] (Müller & Steinmann, 2016; SwissEnergy, 2019) and their adoption and implementation in companies. Above all, an evaluation of earlier position papers and qualitative studies was carried out (LINK Institute, 2015; M.I.S. Trend, 2019. In addition, academic approaches described in further-reaching studies in this field were comprehensively analysed. In this section the main focus was on the motivators and barriers associated with energy efficiency, for example identifying the factors that encourage companies to invest in efficiency measures (cf. Solnørdal & Foss, 2018) and those that discourage them from doing so (cf. Cagno et al., 2013; Trianni et al., 2016). In addition, the question of which human behaviour factors exert a particular influence on a company's energy efficiency (Francoeur et al., 2019; Lo et al., 2012; Staddon et al., 2016; Yuriev et al., 2018) was examined. Table 5 depicts the structure of the questionnaire by topic.

[1] "Target agreements between the federal government and companies are an instrument for increasing energy efficiency in companies and simultaneously reducing CO2 emissions through commitments by companies to increase their energy efficiency. They take the form of either voluntary target agreements or commitments in order to gain exemption from the CO2 levy."

TOPIC	RECEIVED INFORMATION
Corporate context	Situation of company (e.g. sector affiliation, sector representativeness); Energy efficiency: Importance, room for manoeuvre, ambitions, assessment: Evaluation of support measures, especially from federal government
Responsibility	Person responsible for energy efficiency strategy, implementation of measures, input of ideas.
Motivators	Factors driving energy efficiency in companies, ranking of most frequently occurring motivators according to literature.
Barriers	Factors hampering energy efficiency in companies, ranking of most frequently occurring barriers according to literature.
Individual wishes (blue sky)	Desired form of support in general and from SFOE in particular; investment objects and strategies in the case of unlimited resources.
Influence of behaviour	Relevance of employee behaviour for energy efficiency, critical behaviours for implementing energy efficiency and potential criteria for changes, company's experience with experimental methods for changing behaviour
Validation issues	Validation of relevance of energy efficiency in the company, assessment of discrepancy between self-perception and effective behaviour

Table 5: Topics for qualitative interviews with company representatives

To begin with, general information was requested concerning the company and the context of its current business activities. In order to evaluate the answers in a differentiated manner, the representative's sphere of responsibility was recorded. This was necessary because information about responsibility for energy efficiency and its implementation is a prerequisite for the preparation of individual measures. In this analysis it is interesting to note that large companies in particular entrust dedicated personnel with the responsibility for energy efficiency, whereas in smaller companies it is generally the management that is responsible for decision-making through to implementation. This different allocation of responsibilities calls for different approaches and types of measures.

The interviewees were also asked about the most important motivators and barriers associated with increasing energy efficiency. Table 6 lists the four selected motivators and barriers relating to energy-efficient operation which represent a partial result of the analysis of the scientific literature. The selection of motivators and barriers is based on: findings from a qualitative survey of Swiss small and medium-sized companies (LINK Institute, 2015); a selection based on practical experiences of ewz (electricity works of the city of Zurich), the Energy Agency for Industry (EnAW) and Öko-Kompass consultants (Minder et al., 2015); an overview of literature concerning energy efficiency motivators and barriers of internationally producing companies (Trianni & Cagno, 2015); and certain relevant case studies (e.g. Trianni & Cagno, 2012). Importance was attached to the fact that the factors are relevant for small and medium-sized, as well as large, companies, even though the weightings are potentially different. In order to validate the selection, the participants were initially asked to state which motivators and barriers are the most relevant for them personally, before being requested to classify the cited factors according to their importance. In response, all interviewees cited one or more identified factors, which indicates a certain degree of validity of the selection.

MOTIVATORS	BARRIERS
Financial incentives	Lack of financial resources
Branding	Lack of information
Assumption of social responsibility	Lack of support from the workforce
Laws and regulations (requirements, prohibitions, criteria)	Lack of commitment due to complex bureaucratic processes

Table 6: Overview of selected motivators and barriers relating to the increase of energy efficiency in companies.

In the 'Own ideas' section, the interviewees were then asked to describe what they personally regard as the ideal situation with respect to energy efficiency and associated measures. This section yielded information concerning the desired forms of support and the expectations placed on the SFOE and other relevant stakeholders for the implementation of energy efficiency measures. It also yielded individual insights concerning the areas in which companies would seek to implement changes if they had unlimited resources at their disposal. The formulated objectives and specification of obstacles to their attainment are particularly important in order to gain a precise understanding of potential support measures.

Special attention was also paid to the influence of behaviour on energy efficiency, because it is necessary to identify and validate potentially already tested behavioural science methods for the promotion of energy efficiency in the Swiss corporate context. Here, questions were asked regarding the importance attached to employees, the relevance of human versus technical factors, plus identified critical behaviours and starting points. In addition, desired behavioural changes were described, together with experiences with measures aimed at changing behaviour.

Finally, questions relating to validation were asked in order to identify potential discrepancies between the declared relevance of energy efficiency and actual behaviour in the company. The compilation of the catalogue of measures is intended to help companies achieve their specific objectives and eliminate existing barriers so that they are able and willing to also implement the measures for their own benefit.

6.2. Findings from the qualitative interviews

Understanding and importance of energy efficiency
The term 'energy efficiency' is most commonly equated with low consumption and regarded as a lever for achieving major ecological and economic objectives. In the view of the questioned company representatives, energy efficiency measures must be financially viable or should at least not give rise to disadvantages. At the personal level, energy efficiency is considered to be a highly important issue, but at the corporate level it is only regarded as highly important by around half the respondents. Thus, there is a certain discrepancy between the personal views of the interviewees and implementation by the companies. For management personnel, energy efficiency is currently not at the top of the list of priorities.

Self-assessment of energy efficiency

Almost all the participants (86%) rated their company as close to or above the average for the sector in terms of energy efficiency. But at the same time, almost half of them (46%) stated that neither their company nor the sector as a whole were doing enough to increase energy efficiency. When the question was repeated at the end of the interview (validation), this figure rose to 69%. A company's excessively self-assured and positive self-assessment with respect to energy efficiency can have a negative effect on the acceptance of additional measures. A more specific demonstration of its effective performance in comparison with the sector as a whole can counteract this.

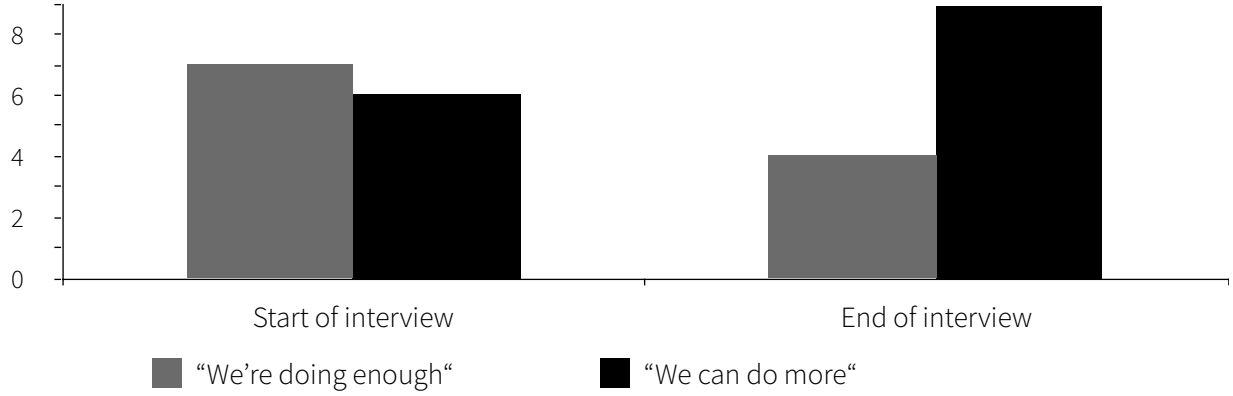


Figure 2: Self-assessment of corporate activity relating to energy efficiency before and after the interview.

Anticipated efficiency potential

The average energy-efficiency potential estimated by the participating companies was 12.4%, which is slightly higher than the figure communicated by SwissEnergy of 5 to 10% (SwissEnergy 'Energy Weeks' brochure). However, the estimates by the small sample fluctuated considerably (between 1.5% and 17.5%).

Responsibility for energy efficiency issues

In the majority of companies, it is management that is responsible for energy matters (59%), followed by technical directors and quality managers (18% respectively) and the procurement section (6%). As a rule, the same personnel are also responsible for implementation of energy efficiency objectives.

Energy efficiency motivators

Financial aspects were cited as the highest motivator for increasing energy efficiency. This was followed by a 'green' image and the company's social responsibility. Regulatory criteria were regarded as the lowest motivator.

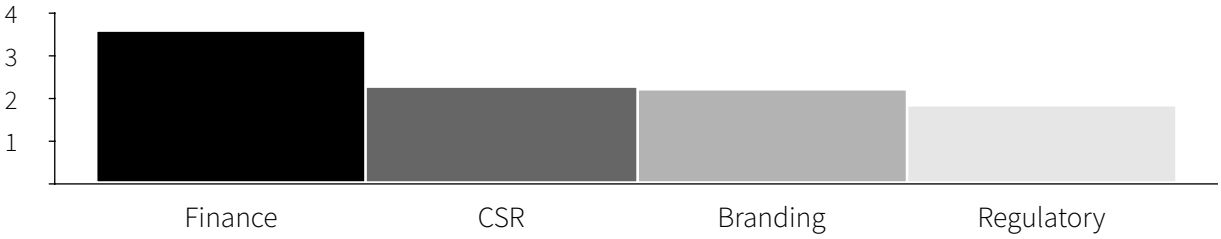


Figure 3: Ranking of motivators based on weighted average.

Energy efficiency barriers
Alongside financial aspects as the greatest barrier, a lack of information about energy efficiency and the need for a more detailed insight into own energy consumption were cited here – a promising starting point for behavioural science-based measures. The next dimensions were difficulties with bureaucratic processes and insufficient participation by personnel.

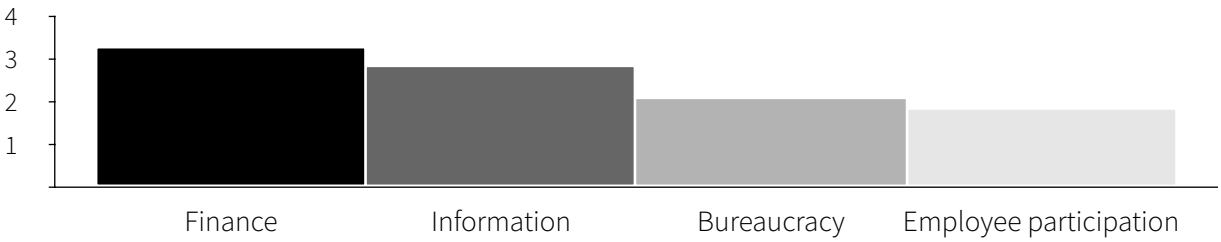


Figure 4: Ranking of barriers based weighted average.

New investments (blue sky)
For companies, the priorities regarding investment objects are new systems, new building technology and own autonomous electricity production, if unlimited resources are be available.

Influence of human behaviour
The influence of human behaviour on the implementation of energy efficiency is regarded as important to highly important. An understanding of the impacts of own actions, along with motivation and comfort, plus a lack of knowledge on the part of employees were cited as critical factors.

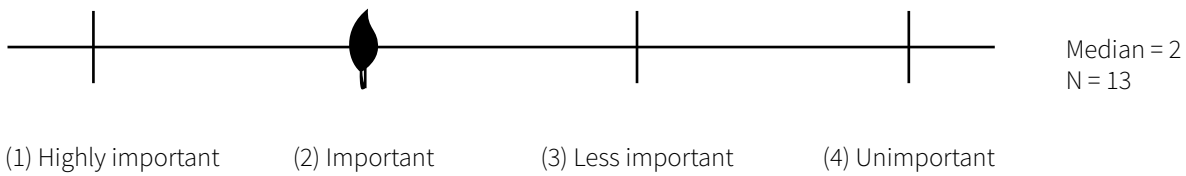


Figure 5: Assessment of the relevance of human behaviour.

According to the statements of the interviewees, the behaviour of employees is regarded as a significant factor for increasing energy efficiency Although it concerns the company as a whole, this is something that is generally only observed by management. A lack of awareness of the impacts of own energy behaviour in the company (62%), together with employees' comfort and lack of motivation to behave energy efficiently (62%) were cited as the central problems. Placing one's own energy behaviour in relation to its impacts is a difficult task, even for highly motivated personnel (Csutora, 2012; Karjalainen, 2011). And this is even more difficult in a large company in which the impacts are not individually attributable. Specifically, a discrepancy was ascertained between behaviour in the private sphere and in the corporate context, for example that employees leave machines running when they are no longer in use, or leave windows open in winter while the heating is on – things they would not do at home. With regard to the problems of awareness and motivation, it may be assumed that employees possess the relevant information and knowledge. A lack of knowledge with respect to energy-efficient action on the part of employees was cited by only 23% of the interviewees.

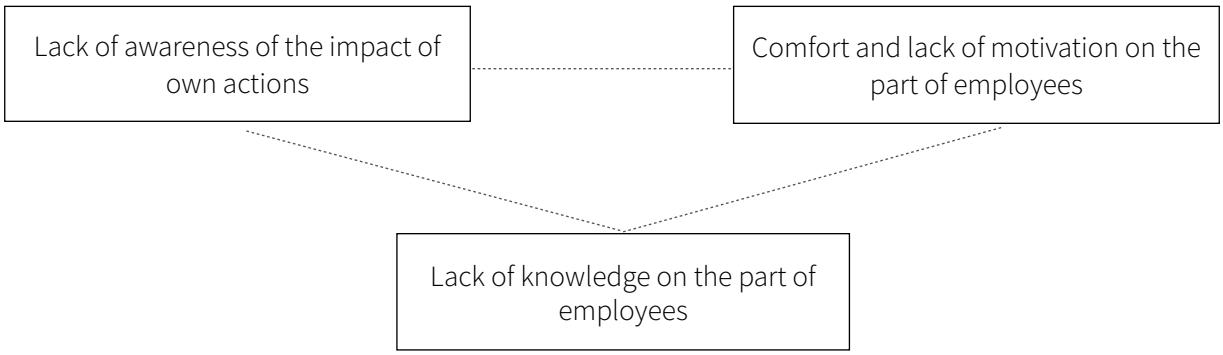


Figure 6: Most frequently cited assessment of critical behaviours or special priorities.

Expectations and desires
Companies would like playful aspects of energy efficiency to be made more perceptible, bureaucratic barriers to be broken down and simpler instruments and resources to be available for focusing on the issue of energy efficiency. Participants also expressed the desire for a more active exchange with similar companies, plus an energy-efficiency checklist facilitating the identification of efficiency potentials within their company. Companies generally would like access to data to be simplified and the data to be more comprehensible.

6.3. Synthesis of qualitative and academic findings

The most important findings from qualitative and academic research are summarised below and supplemented with recommendations concerning behavioural science-based behaviour. The overview is based on the six starting points for behavioural insights in policy programmes (cf. chapter 5) and the findings from the interviews conducted with company representatives. It shows that many of the findings from the scientific literature can be regarded as relevant for the Swiss context. It thus also forms the basis for the overview of selected behavioural science-informed measures for increasing energy efficiency and the use of renewable energy in Swiss companies.

Social norms

The targeted structure and communication of social norms for motivating more energy-efficient behaviour and their effects in terms of reducing energy consumption is dealt with comprehensively in the scientific literature. Social norms represent an important starting point for measures, especially in the context of comparisons between individuals and companies. This was reinforced through the qualitative study in the Swiss context. Here, for example, it was stated that large companies act as a role model for smaller ones. It should also be noted that this relationship and orientation was confirmed across different industries. Thus, the following points should be noted for the design of energy efficiency measures:

- In order to provide companies with a simple starting point for evaluating their own energy consumption, it should be made possible for them to make a comparison with relevant companies or rivals of a similar size.
- In order to transform motivation into practice, the question of which actions have to be taken in order to attain a higher level of energy efficiency needs to be clarified. Information campaigns intended to adjust incorrect behaviour should therefore include specific alternative options for action which ideally are already being pursued by others.
- In order to prevent inefficient behaviours, positive examples should be communicated. The observation of inefficient behaviour by others can reduce personal motivation for energy-efficient behaviour.

Commitments & goal setting

Voluntary commitments play a significant role in the context of increasing the motivation to adopt and maintain energy-efficient behaviour. Commitments can be ideally combined with energy-efficiency targets, and are generally linked with monetary incentives. In Switzerland, a conventional version of this concept is already being applied in the form of voluntary target agreements. However, the survey of Swiss company representatives demonstrated that there remains a great deal of additional potential with regard to commitments, which to some extent have been incorporated in the following measures. Thus the following points should be noted for the design of energy efficiency measures:

- In order to effectively achieve declared targets, these have to formulated specifically, measurably, attainably and realistically, and tied to a defined timeframe. Commitments such as 'By the end of the year we will reduce our energy consumption by X% versus the prior year' are more effective than statements such as 'We want to take active measures to become more energy-efficient'.
- To ensure that sufficient importance is attached to declared targets they should also be publicised. The voluntary publication of targets is generally more effective than a private declaration, since its attainment then influences the external as well as internal image.
- In order to intensify efforts to meet energy-efficiency targets, they should ideally be formulated in stages. Players who partially meet their targets are then more likely to be motivated to pursue them further.

Framing & labelling

The way in which information is presented significantly influences which views and intended actions are to be shaped and how these can subsequently be implemented. Behavioural science-informed framing can help make the decision-making context more efficient and thus facilitate simpler identification of the preferred options for action and also their implementation. For the implementation of framing concepts, the qualitative study yielded further-reaching and significant

insights for the Swiss context. Insights regarding role distribution and responsibility for energy efficiency, which in small and medium-sized companies is primarily borne by the management or technical director, provide essential pointers for target-oriented framing. Thus the following points should be noted for the design of energy efficiency measures:

- To ensure that information reaches the intended recipients, availability as well as discoverability, notability and comprehensibility are decisive factors. Despite the existing broad range of available information, the interviewed company representatives cited a lack of information about efficiency potentials as the second-highest energy-efficiency barrier.
- In order to enhance the attractiveness of energy-efficient acquisitions with high investment costs, attention should be drawn to the long-term benefits such as lower lifecycle costs and shorter depreciation periods, plus various other (multiple) benefits.
- In order to significantly influence the sale of products through the use of energy-efficiency labels, the design of the latter should be easily and intuitively comprehensible for consumers.

Defaults & physical changes

The targeted adaptation of defaults makes use of the status quo bias effect. This can make a significant contribution towards behavioural changes. From the interviews it could be deduced that individual default measures such as smart lighting management and the use of smart thermostats are already being used in smaller companies. There appears to be a fundamental acceptance of defaults in practice, which can be used for subsequent initiatives. Thus the following points should be noted for the design of energy efficiency measures:

- Decisions that are seldom taken and have long-term consequences are the most suitable for the targeted adaptation of defaults. Examples here include choice of electricity tariff and long-term investment decisions.
- In order to sustainably promote the transition to renewable energy, electricity suppliers should offer 'green power' as a preselected standard option and include an opting-out option.
- Physical aids such as timers and central switches can support energy-efficiency measures simply and intuitively, and counteract wasteful behaviour.

Feedback & reminders

From the scientific literature it is clear that targeted individual feedback can counteract a lack of understanding of the effectiveness of own energy behaviour. Moreover, targeted reminders support people’s exercising of a preferred energy-efficient behaviour. The results of the qualitative study indicated that in particular conventional reminders in the form of signs on doors are already in use, but that the potential of personalised and time and location-based feedback or reminder mechanisms has not (or only very seldom) been exploited to date. Thus the following points should be noted for the design of energy efficiency measures:

- To achieve the best possible effects, feedback should be adapted to the recipient as far as possible, refer to specific behaviour and be provided as soon as possible after a given behaviour has been carried out.

- To ensure that feedback can also be used efficiently in the group context, communication should be correspondingly tailored to the group and its members. The influence of group feedback on the behaviour of individual members largely depends on the extent to which the members identify with the group and whether they believe they can exert a significant influence on its collective behaviour.
- Technical instruments such as smart meters make it possible to provide detailed, timely and individual feedback, so these devices represent a promising starting point for future measures.

Gamification

For many people, the use of playful elements, including with the aid of information and communications technology, can depict abstract and invisible energy consumption in an attractive form and thus make it more comprehensible. This simplifies their perception of their own action and thus fosters a change of behaviour. In the survey, the participants cited playful approaches, for example in combination with feedback mechanisms, as attractive alternatives. Thus gamification offers attractive scope for trying out new approaches with companies:

- To make complex correlations and effects relating to energy efficiency simpler to understand, additional emotional and playful depictions and applications should be developed.
- Measures based on information and communications technology represent a promising platform for the further development and dissemination of the recommendations and interventions noted above.
- Playful competitions among employees from different companies can help raise energy efficiency to the level of a collective issue and foster innovative discourse.

To summarise, in combination with the qualitative insights from the survey of company representatives, the academic insights derived from the analysis of the scientific literature show that behavioural science-informed measures can play a significant role in the Swiss context. On the basis of six identified 'hotspots' and the cited recommendations, a broad range of specific pilot measures was developed that are suitable for application in the Swiss corporate context. Internationally tested approaches have already been adapted for the Swiss context, existing initiatives of the SFOE and SwissEnergy have been supplemented with newly gained behavioural science insights, and entirely new behaviour insights-related criteria have been developed for Switzerland’s energy policy. Some of the described insights can quickly incorporate several identified behavioural science criteria. While some of these are based on global best practices, for others the SFOE can assume an internationally pioneering role in the area of integration of behavioural insights and utilise as yet unexploited potentials in the fields of public policy and service design.

7.

INTERVENTIONS: BEHAVIOURAL INSIGHTS STRATEGIES FOR SWITZERLAND'S ENERGY POLICY

AFFECTIVE

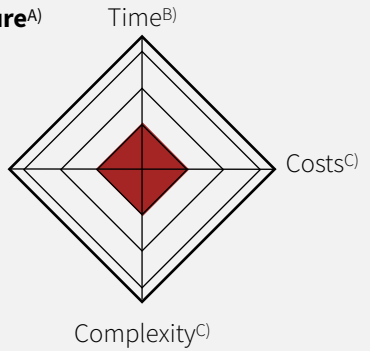
energieschweiz

METHODOLOGY & METRICS FOR EVALUATING THE INTERVENTIONS

Methodology

Based on the evaluation criteria discussed in section 5.2, 11 behavioural science-informed strategies for detailed discussion in the Swiss context were selected from an extensive longlist of measures. The objectives, descriptions, implementation scenarios and effects relating to these 11 measures are described in greater detail below. The SFOE and Affective Advisory also possess a detailed report containing validation scenarios and metrics. This report is available upon request.

Expenditure[A)]



Impact[A)]

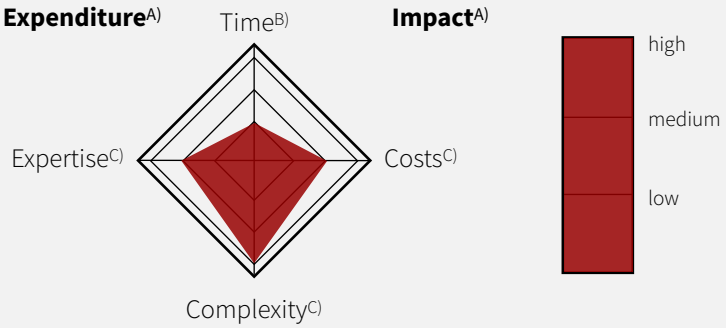
DIMENSION	TIME	COSTS	COMPLEXITY	EXPERTISE	IMPACT
SCALE	short < 6 m | medium 6-12 m | long > 12 m	low | medium | high	low | medium | high	low | medium | high	low | medium | high
CONTENT	Design Preparation Implementation Validation Rollout	Personnel costs External service costs Material costs Equipment costs Evaluation costs Other costs	Political buy-in Legal framework conditions Infrastructure framework conditions Subsidy or own implementation Availability of cooperation partners Logistical complexity Addressing of target groups	Internal expertise External expertise	Reduction in energy consumption Increase in demand for renewable energy Awareness of energy efficiency General behaviour in SMEs or large-scale consumers Generalisation of effects Scalability of effects Durability of effects

[A)] Estimation by project group
[B)] Key (from inside to outside): short - medium - long
[C)] Key (from inside to outside): short - medium - long

‘ELECTRICITY BILL 2.0’

Objective With the aid of social comparisons, which are depicted on electricity bills, to provide small and medium-sized companies with the opportunity to perceive their electricity consumption in relation to others and derive effective actions.

Target group	**Partners**
Mgmt & Finance SME	ESC, BI Advisor
Type	**Realisation**
Adaption	Sponsoring
Category	**Hotspot**
Feedback devices	Feedback, social norms, framing



DESCRIPTION

Revision of the electricity supply companies’ (ESC) bill in line with the depicted data. Depiction of the consumption of a small/medium-sized company and similar companies, timeframes, regions, sectors, etc., in order to permit a comparison. Here the depth of the comparison depends on the data situation of the respective electricity supply companies. Framing the current consumption to other companies or own consumption in a previous period is decisive. Small and medium-sized companies should be praised if their consumption is below average by comparison. But if their consumption is above average, concrete energy savings tips should be offered. A pilot project can be implemented in cooperation with a selected electricity supply company. Electricity supply companies have the additional incentive to increase their transparency and thus the degree of customer satisfaction and loyalty by providing informative and comprehensible reports. The aim is to provide small and medium-sized companies with feedback so that they can form a fact-based picture for themselves of their performance compared with relevant peers, and thus derive appropriate actions. This approach has proved successful throughout the world (cf. Opower in the UK).

Relevant BI concepts

Overconfidence Bias
Availability Bias
Loss Aversion
Mental Accounting

Critical success factors

Cooperation with energy supply companies
Development of benchmarks
Reaching the target group with decision-making power (management & finance)

IMPLEMENTATION / IMPACT

In cooperation with electricity supply companies, the consumption data of companies are processed in a new form of visualisation and placed in relation to the relevant comparative values. To praise efficient companies, the offer could be made to post this as a testimonial on the websites of the electricity supply company/SwissEnergy. For intensive consumers, sector/specific energy-saving tips are developed together with electricity supply companies (and with intermediaries if expedient) and offered directly on their electricity bill. Savings potentials based on estimates made with the use of the calculator on the SwissEnergy website could also be indicated. The question as to whether the provision of the new electricity bill could reduce the effective electricity consumption is being examined in an initial pilot phase.

Procedure:

I. Conclusion of a cooperation partnership with the electricity supply company
II. Specification of relevant comparative values and development of the new 'electricity bill 2.0'.
III. Calculation of average comparative values / savings potentials by sector (display of relevant social and timeframe comparison on the electricity bill)
IV. Test phase with delivery of new bill to group A versus old bill to group B
V. Evaluation of the measure in terms of changes to effective electricity consumption

[A)] Estimation by project group
[B)] Key (from inside to outside): short - medium - long
[C)] Key (from inside to outside): short - medium - long

ENERGY EFFICIENCY 'QUICK WINS'

Objective Emotionalise and simplify access to information about renewable energy and measures, thus encouraging increased discussion on energy efficiency.

Target group
Mgmt SME

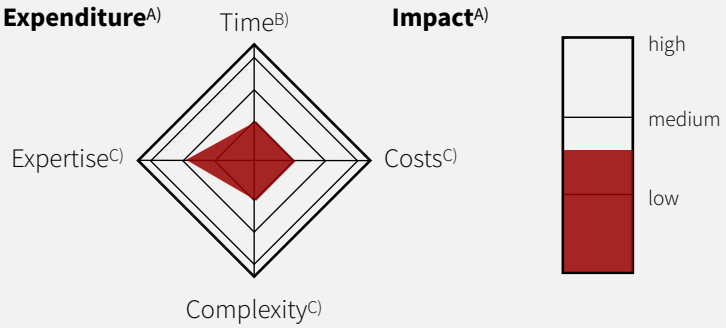
Partners
Intermediary, Marketing, BI Advisor

Type
Adaption

Realisation
Procurement

Category
Communication

Hotspot
Social norms, framing



DESCRIPTION

The objective is to develop sector-specific checklists with easily understandable and quickly implementable measures for achieving increased energy efficiency ('quick wins'.) Checklists should be compiled together with intermediaries and consultants so that their expertise can be used for achieving increased energy efficiency as quickly and easily as possible.

In addition to individual recommendations for action, the simple option of obtaining more comprehensive advice from experts should be included. Here the greater effectiveness of emotionalised stories should be applied instead of purely informational approaches. The corresponding materials should be developed together with intermediaries.

Relevant BI concepts Choice Overload · Availability Bias · Bandwagon Effect

Critical success factors
Know-How & Identification of Quick Wins
Buy-in of the intermediaries for the elaboration and dissemination

IMPLEMENTATION / IMPACT

Pilot trial of a communication campaign:
to begin with, the most important and simplest renewable energy solutions should be prepared together with a selection of energy consultants. Here, attention should be paid where necessary to any discrepancies in individual sectors. Subsequently, two series of posts to be drafted for SwissEnergy's LinkedIn/YouTube channels: one series with conventional communication (A) and the other with 'quick wins' (B).

Procedure:

I. Development of generally relevant 'quick wins' in cooperation with energy consultants.
II. Drafts of 2 LinkedIn series – a control series with conventional communication (A) and a test series with 'quick wins' (B).
III. Publication of the posts with trackable links via the SwissEnergy channel
Tracking links to distinguish between reactions to A or B
IV. Test of effectiveness of communication strategies A and B

[A)] Estimation by project group
[B)] Key (from inside to outside): short - medium - long
[C)] Key (from inside to outside): short - medium - long

‘ENERGY EFFICIENCY REFRAMING’

Objective Increasing the awareness of entrepreneurs for energy efficiency and the demand for energy consultation.

Target group

Intermediaries, Mgmt SME

Partners

Intermediaries, Marketing, BI Advisor

Type

Adaption

Realisation

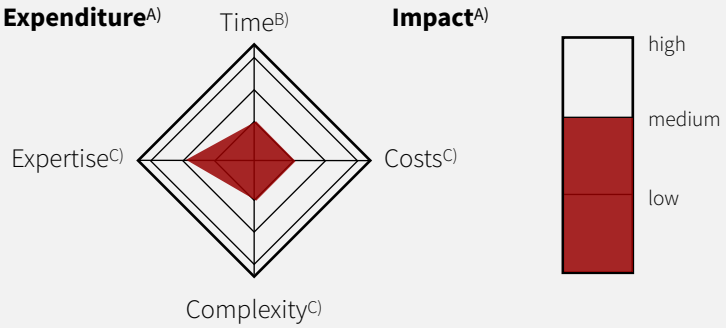
Procurement

Category

Communication

Hotspot

Social norms, framing



DESCRIPTION

Two variants are proposed:

VARIANT A: Most people find it difficult to accurately estimate and evaluate their energy consumption. New information campaigns should target the energy consumption of companies in relation to socially relevant activities and to set intuitively comprehensible values. In this way, the awareness of entrepreneurs for the level, and thus the impacts, of their consumption can be heightened.
Example: Through changes in their energy behaviour in the company, they can cut their energy costs by around 10%, which corresponds to almost 2.3 megawatt hours. This reduction would be equivalent to:
- … lighting a village in the Alps for X years.
- … operating an intensive care unit for a period of XX.
- … lighting up the Eiffel Tower for a period of XX.

VARIANT B: A campaign focusing on commercial success that can be achieved through energy consulting. This can be combined with existing information measures.
The objective here is to motivate entrepreneurs, via key performance indicator framing, which primarily emphasises the economic benefits of energy efficiency (e.g. reduction of lifecycle costs) to consider choosing energy efficiency measures in their investment deliberations in which energy efficiency is otherwise of secondary importance. Through the use of channels such as trade and industry associations as confidence-inspiring 'messengers', it is possible to place messages particularly effectively.

As a rule, shaming (cf. Hoogendoorn et al., 2020) should not be included in messages, and realistic options for improvement should be communicated. This can be implemented with testimonials, for example, which in addition can counteract overconfidence: "I thought we’d exhausted the entire potential, but I hadn’t thought of XX, which increased our efficiency (relevant key performance indicator) by YY."

IMPLEMENTATION / IMPACT

Here, different sector-specific framings are being developed. A framing that sets out to illustrate the relationship between energy behaviour consumption on the basis of clearly comprehensible examples. And another which sets out to underscore the effect of energy consumption and key performance data. The new framing of energy efficiency data can be rolled out via direct (SwissEnergy) and indirect (intermediaries, agencies, trade and industry associations) channels. In a pilot project, different frames can be tested in terms of their effectiveness in comparison with existing information materials so that the most effective framings can then be identified.

Procedure:

I. Definition of the various target groups (industry, region, etc.)
II. Development of framing variants A 'key performance indicator' and B 'alternative perception' with 3 or more examples per framing
III. Development of the random sample and evaluation metrics
IV. Presentation to focus groups of entrepreneurs in an initial pilot trial
V. Testing of effects on the defined target group

Relevant BI concepts Choice Overload | Availability Bias | Loss Aversion

Critical success factors Identification of the right framings per sector, region, etc.
Buy-in of the intermediaries as messengers

[A)] Estimation by project group
[B)] Key (from inside to outside): short - medium - long
[C)] Key (from inside to outside): short - medium - long

‘POSSIBILITY OF CONTRIBUTION TO CLIMATE PROTECTION’

Objective Utilising the existing business relations between small/medium-sized companies and service providers (e.g. installers) in order to draw the attention of the former via the latter to energy-efficient solutions.

Target group

Intermediaries, service providers

Partners

Intermediaries, Associations, BI Advisor

Type

Innovation

Realisation

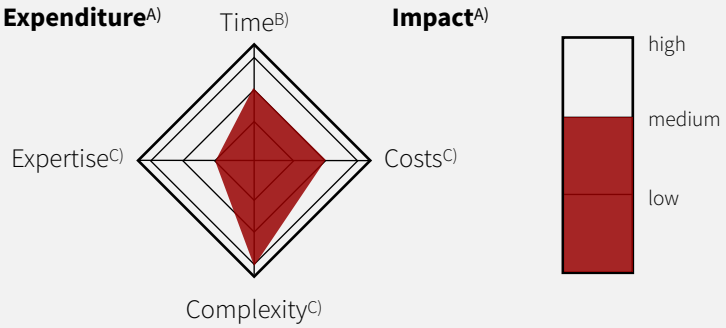
Procurement or Sponsoring

Category

Communication

Hotspot

Framing, defaults



DESCRIPTION

Many small and medium-sized companies have their energy efficiency potential evaluated by service providers with whom they in any case already work together, instead of with qualified energy consultants (e.g. heating installers). Through (financial) incentives and/or sensitisation campaigns, if they receive a request for support that involves a matter beyond the scope of their own expertise, service providers should be encouraged to draw the customer’s attention to the option of comprehensive energy consulting. As recompense for their successful mediation, service providers could receive a fixed fee or a percentage of the saved energy costs. At the same time, intermediaries can receive recognition of their contribution towards climate protection in that a certificate is issued to them after X mediated consultations. Alternative forms of incentive and communication strategies can subsequently be tested.

Relevant BI concepts

Present Bias | Availability Bias | Bandwagon Effect

Critical success factors

Access to and cooperation with service providers
Legal and financial framework conditions for incentive systems
Self-perception of service providers

IMPLEMENTATION / IMPACT

Structuring an attractive incentive system by developing it in cooperation with representatives of various service providers (e.g. installation companies). In addition, integration of trade and industry associations in the rollout process, in order to draw the attention of the service providers to the new incentive system. The effectiveness of this measure can initially be tested in a pilot project in order to determine whether more energy consultations are taking place as a consequence of the measure and companies are paying greater attention to energy efficiency.

Procedure:

I. Conception of the incentive systems
II. Communication of incentives to relevant service providers (e.g. in test cantons and/or specific sectors such as installation).
III. Within a given random sample, offering the new incentive system for a contribution towards climate protection to a selection of service providers.
IV. Evaluation of the (cost-)effectiveness of the measure by assessing how many small and medium-sized companies are mediated by service providers for energy consultation.

[A)] Estimation by project group
[B)] Key (from inside to outside): short - medium - long
[C)] Key (from inside to outside): short - medium - long

‘SWISS ENERGY CHAMPION 202X’

Objective Drawing public attention to previously invisible renewable energy successes by publicising them, and making renewable energy solutions attractive for other companies.

Target group

Mgmt. SME, Empl. SME

Partners

Publisher, Association, BI Advisor

Type

Innovation

Realisation

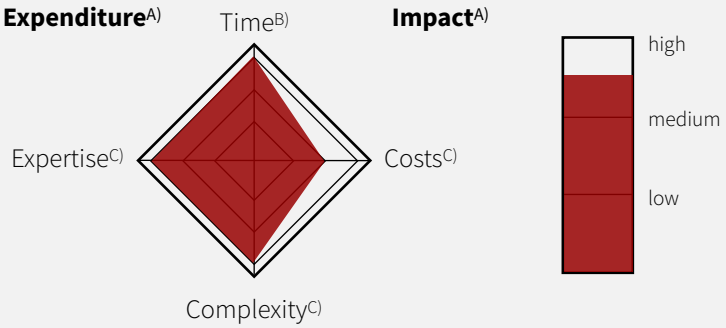
Sponsoring

Category

Labels

Hotspot

Framing, social norms



DESCRIPTION

Each year the SFOE selects a 'renewable energy champion' within a given sector (and other segments within a region). The winning company receives a specific label that it may publicly display for the period of one year. The company is thus publicised as a champion and role model. The label should be available in both physical and digital form. Cooperation with publishers and other institutions is conceivable (cf. Statista).
The objective is to motivate small and medium-sized companies to operate efficiently by issuing and publicising corresponding awards and thus recognising previously invisible energy efficiency successes and making them widely visible.
For these awards, energy efficiency is assessed on the basis of the measurement of input/output (challenge: basis for evaluation). The achievement of the company is summarised in a report that is publicly available (alternative: only available to participants).

Relevant BI concepts Overconfidence Bias Bandwagon Effect

Critical success factors Participation and evaluation of the companies (self-selection bias)
Basis of assessment (input/output and sector specifics)

IMPLEMENTATION / IMPACT

A cooperation partner is selected with whom the presentation of the award can be realised with the corresponding publicity effect. The evaluation metrics have to be jointly specified. To begin with, an accompanying explanatory and motivation campaign should be designed in order to encourage other companies to choose energy efficiency measures. Then a strategy has to be developed as to how the winner can be positioned as a role model and used after the presentation of the award.

Procedure:

I. Selection of suitable cooperation partner
II. Specification of metrics for evaluation of companies
III. Active communication of award in all relevant sectors, definition of participation potentials
IV. Specification of format for presentation of award
V. Selection of company(ies)
VI. Campaign for publicising winner as role model
VII. Tracking of interest among companies (e.g. applications, registrations)
VIII. Assessment of qualitative intervention evaluation

[A)] Estimation by project group
[B)] Key (from inside to outside): short - medium - long
[C)] Key (from inside to outside): short - medium - long

'PROFESSIONAL ENERGY AUDITS OF SMALL/MEDIUM-SIZED COMPANIES'

Objective Increasing public awareness of energy-efficiency efforts, especially in the context of voluntary professional energy consulting for small and medium-sized companies.

Target group

Intermediaries, Mgmt. SME

Type

Innovation

Category

Lables

Partners

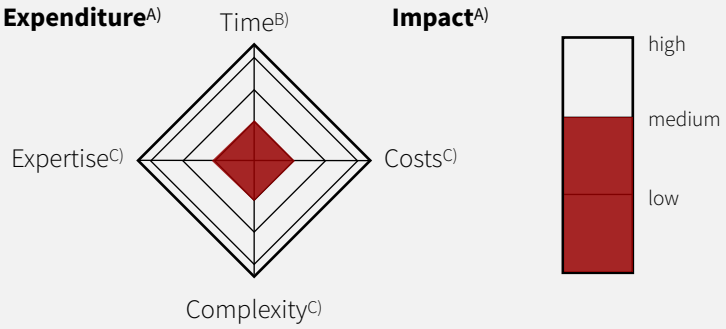
Intermediaries, BI Advisor

Realisation

Procurement

Hotspot

Framing, defaults, social norms



DESCRIPTION

Small and medium-sized companies are happy to invest in efficiency measures that are publicly visible (e.g. photovoltaic systems). But many important measures are not so visible, and this can make them less attractive for these companies. One such measure is energy-efficiency consultation mediated by a SwissEnergy unit (PEIK). In order to enhance the external effect and thus the attractiveness of this consultation service, companies receive a certificate upon conclusion of the consultation and may use it for a specified period of time for publicity purposes (like the 'ACT certificate' issued by the Swiss Cleantech Agency or - from a different sector - the TripAdvisor Certificate).
The objective is to use the certificate as a means of publicly recognising the company's previously invisible (or barely visible) contribution towards the protection of the environment, and motivate it to maintain its commitment. cf. 'Energy-efficiency charter' below.

Relevant BI concepts

Bandwagon Effect

Cognitive Dissonance

Critical success factors

Cooperation with all energy consultancies - uniformity
Creation and dissemination of the label
Recognition of the label

IMPLEMENTATION / IMPACT

The label is developed jointly with representatives of small and medium-sized companies and intermediaries (energy consultants) in order to facilitate a customer-focused design. Ideally, different versions of the label and its degree of acceptance can be tested using a random sample of the population in order to identify the most effective design. Then consultants at the above-mentioned SwissEnergy unit (PEIK) can be informed about the label so that they can motivate companies to apply for its award.
A pilot project could be implemented with the involvement of two cantons (or two sectors), with one as a test group and the other as a control group. In the test group, a label could be awarded after each consultation and could be used by the company for the period of one year. In the control group, the consultation would be continued without the award of a label.

Procedure:

I. Design and development of the label
II. Provision of information to the energy consultant about the availability of the label in the test group(s)
III. Campaign to actively promote the label
IV. Evaluation of its effect based on the defined metrics (before/after)

[A)] Estimation by project group
[B)] Key (from inside to outside): short - medium - long
[C)] Key (from inside to outside): short - medium - long

'ENERGY-EFFICIENCY CHARTER'

Objective Motivation of companies to commit to a charter for long-term energy-efficient behaviour

Target group
Mgmt. SME

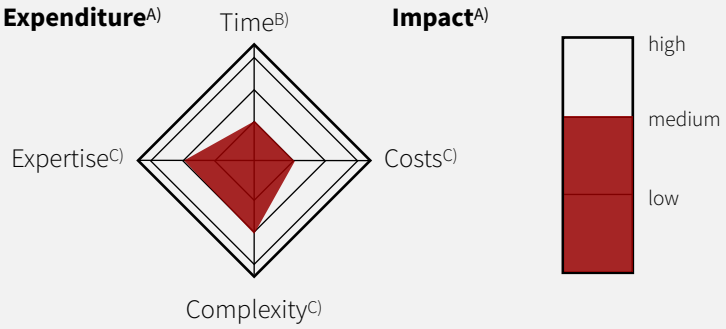
Partners
SFOE, Associations, BI Advisor

Type
Innovation

Realisation
Procurement/Sponsoring

Category
Commitment devices

Hotspot
Commitment, framing, social norms



DESCRIPTION

Invitation to companies and trade and industry associations to sign an energy-efficiency charter and thus undertake a public commitment to promote energy efficiency. The charter is a voluntary instrument that encourages the signatories to readily support later calls for energy efficiency measures. The objective is that signing the charter will pave the way for many other measures ('foot in the door' method). If entire industry associations were to announce their support for a given objective (messenger effect), their member companies would probably be more willing to implement relevant measures (encouraged by incentives such as regional rankings, labelling programmes, workshops, etc.). In the course of a trial period, an evaluation could be made as to whether the signatories demonstrate a higher willingness to carry out energy consultations than non-signatories.

Relevant BI concepts
Bandwagon Effect Present Bias Confirmation Bias
Cognitive Dissonance

Critical success factors
Support from industry associations and intermediaries Dissemination and acceptance of the Charter
Communication strategy of the Charter

IMPLEMENTATION / IMPACT

Conception and active promotion of a charter in cooperation with representatives of various trade and industry associations. Provision of information to small and medium-sized companies about the charter, motivation for them to sign it. Initially, a certain number of companies and sectors to be selected and recruited to play an 'ambassadorial' role.

Procedure:

I. Conception of charter, selection of medium via which it is to be publicised
II. Selection of 'ambassador' companies and industry associations, public communication of their role
III. Contacting companies and industry associations and offering the charter for signature (communication channels to be decided)
IV. Public communication of signatories so that they have the feeling of being officially recognised
V. Evaluation of the acceptance/rejection of the charter

[A)] Estimation by project group
[B)] Key (from inside to outside): short - medium - long
[C)] Key (from inside to outside): short - medium - long

'ENERGY SAVINGS ACCOUNT'

Objective Savings and remuneration to be earmarked for reinvestment in energy efficiency measures.

Target group
Mgmt. SME

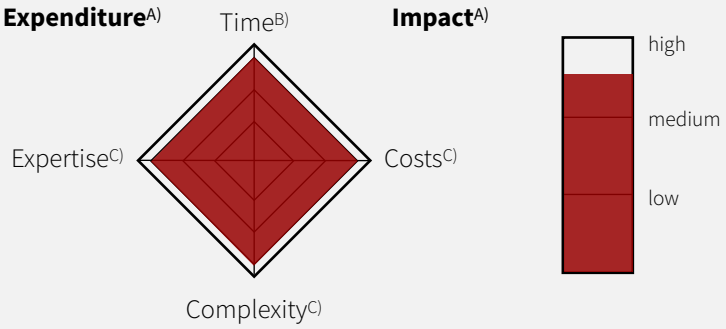
Partners
SFOE, Intermediaries, SME, BI Advisor

Type
Innovation

Realisation
Procurement

Category
Commitment devices

Hotspot
Commitment, framing



DESCRIPTION

Savings in electricity and heating costs achieved through energy efficiency measures, and remuneration of the federal CO2 levy, etc., are booked separately to an energy savings account (mental accounting), for which companies can voluntarily enter a commitment (commitment device). The savings accumulated on the account are available for additional investments in energy efficiency measures (principle of 'save more tomorrow'). The option of pooling financial resources as a form of joint saving (cross-financing) can also be made available. The objective is to tie savings and remuneration to future energy efficiency investments and thus utilise the realised effects as a lever for larger measures. In this way, even minimal measures can gain significantly in influence through the setting of incentives for follow-up measures.

Relevant BI concepts

Anchoring
Mental Accounting
Present Bias Loss Aversion
Sunk Cost Fallacy

Critical success factors

Buy-in and application through intermediaries
Legal and regulatory framework
Potentially also partners for account administration

IMPLEMENTATION / IMPACT

Together with representatives of small and medium-sized companies, a virtual account is developed on which remuneration paid to the companies is kept in a visible manner. Thus the account shows the amount that has been generated through energy efficiency measures and is available for future investments. In practice it could suffice if the SFOE or electricity supply companies were to transfer remuneration to a specific account in the name of the company. With the aid of a technical solution such as an app, the available amount for each company could be displayed. Before this can be implemented, the legal framework will have to be clarified.

Procedure:

I. Selection of a random sample from the target group for inclusion and questioning
II. Identification of the preferences of the companies in the random sample
III. Development of the 'savings account' solution and its technical components
IV. Preparation of a marketing concept for promoting the account solution
V. Introduction of the new account with a parallel campaign aimed to motivate the companies to enter into a voluntary commitment
VI. Accompanying evaluation of the measure

[A)] Estimation by project group
[B)] Key (from inside to outside): short - medium - long
[C)] Key (from inside to outside): short - medium - long

'CENTRAL SWITCH / ECO BUTTON'

Objective Reduction of the expenditure associated with the reduction of electricity consumption.

Target group
Mgmt. SME, Empl. SME

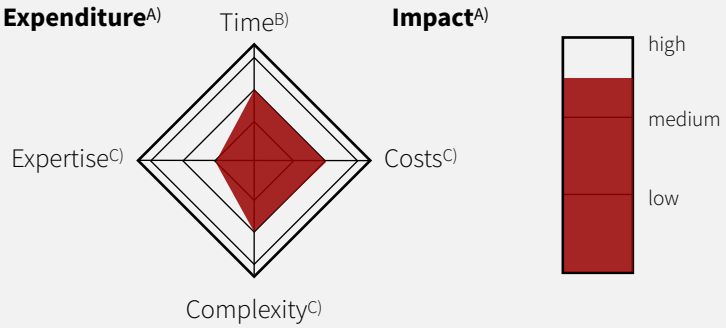
Partners
Prototype-Provider, BI Advisor

Type
Innovation

Realisation
Sponsoring

Category
Defaults

Hotspot
Defaults



DESCRIPTION

A new switch is installed in the company by means of which all connected appliances can be switched on and off (similar to the use of central switches in hotel rooms). Thus at the end of the day, the company can ensure that no unnecessary energy is consumed simply by operating a central switch (standby and permanent operation).
The associated installation cost is relatively low. The objective is to combine and simplify numerous actions and thus promote energy-efficient behaviour.

Relevant BI concepts
Choice Overload
Status Quo Bias

Critical success factors
Technical possibilities and framework conditions
Willingness to implement in SMEs
Sector-specific solutions

IMPLEMENTATION / IMPACT

Installation of a central switch in companies for turning off all connected appliances. This can prevent unnecessary electricity consumption. A pilot project could be implemented with the participation of selected companies.

Procedure:

I. Selection of test and control groups
II. Verification that energy consumption can be accurately measured and consumption data are available for the reference period
III. Installation of the central switch and technical solution
IV. Evaluation period
V. Evaluation of data with & without switch, and technical solution

[A)] Estimation by project group
[B)] Key (from inside to outside): short - medium - long
[C)] Key (from inside to outside): short - medium - long

'ELECTRICITY BILL WITH CONSULTATION LINK'

Objective Increasing the awareness for energy efficiency and the motivation to seek more energy consultations through a reference to the consultation service on the electricity bill.

Target group
ESC, Mgmt. & Empl. SME

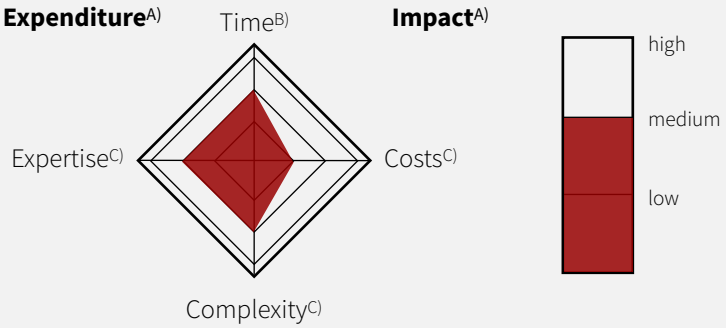
Partners
ESC, BI Advisor

Type
Adaption

Realisation
Sponsoring

Category
Defaults

Hotspot
Defaults, social norms, framing, feedback



DESCRIPTION

Addition of a reference to the option of energy consultation on the new standard electricity bill (possibly combined with 'Electricity Bill 2.0). In order to strongly underscore the benefits of an energy consultation by the specialised SwissEnergy unit (PEIK), the effective amount of the bill can be compared with the average savings potential achieved through energy consultation in the form of an 'alternative billing amount' (cf. calculator on the PEIK.ch website). Based on the savings potentials calculated by electricity supply companies (messenger effect), the objective is to draw the attention of more small and medium-sized companies to the consultation service provided by the SwissEnergy unit (salience effect) and ultimately encourage them to make use of the consultation services.

Relevant BI concepts
Anchoring Mental Accounting Availability Bias

Critical success factors
Cooperation with energy supply companies (ESC)
Development of benchmarks
Reaching the target group that has decision-making power (management & finance)

IMPLEMENTATION / IMPACT

In cooperation with a selected electricity supply company, supplementing the existing electricity bill for small and medium-sized companies with consultation details. In a pilot experiment, a new bill can be rolled out and evaluated for a selection of the customers of an electricity supply company. In this way it can be ascertained whether the promotion of savings potential (based on estimates by the currently used calculator) with corresponding information on the electricity bill would be an effective means for increasing the demand for energy consultations.

Procedure:

I. Conclusion of a cooperation partnership with the electricity supply company
II. Design of the new electricity bill together with representatives of the electricity supply company and energy consulting service (PEIK).
III. Calculation of the mean savings potential by type, industry, region, cluster, etc. (display of the reduced amount on the electricity bill)
IV. Test phase with delivery of new bill to group A versus old bill to group B
V. Evaluation of the effectiveness of A versus B

[A)] Estimation by project group
[B)] Key (from inside to outside): short - medium - long
[C)] Key (from inside to outside): short - medium - long

'ADAPTATION OF CONSULTATION SUBSIDY PROCESS'

Objective Adaptation of the subsidy process in order to reduce critical barriers and simplify access to promotion of energy-efficiency consultation.

Target group
SFOE, intermediaries, Mgmt. SME

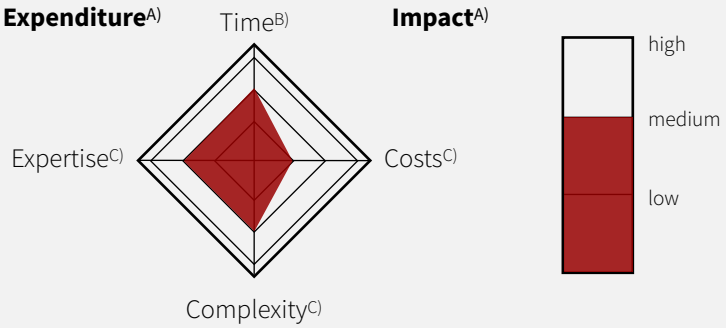
Partners
Intermediaries, BI Advisor

Type
Adaption

Realisation
Procurement

Category
Policies

Hotspot
Defaults, framing



DESCRIPTION

At present, 50% of the costs for consultation on the planning of measures (or a maximum of CHF 1,500) is refunded. The advance payment of several thousand Swiss francs for energy consultation can put off many interested small and medium-sized companies. This process could be improved if the energy consultants were to bill the federal government directly for its share of the costs, and thus ease the burden on small and medium-sized companies. In addition, the notification of the discount could be optimised from the perspective of behavioural economics and variants could be tested that in terms of cost could be the same, but in terms of effect could be significantly superior.
The objective is to eliminate obstacles to the demand for energy consultations so that small and medium-sized companies would only have to pay their share and not have to take separate steps to apply for remuneration.

Relevant BI concepts Present Bias, Mental Accounting, Status Quo Bias

Critical success factors
Buy-in of intermediaries and communication towards SMEs
Financial and legal framework conditions

IMPLEMENTATION / IMPACT

Development of a new procedure for the payment of subsidies in cooperation with representatives of the intermediaries and the SFOE. Provision via existing communication channels of detailed information to intermediaries about the new procedure. Before a nationwide rollout takes place, an assessment should be carried out in a pilot experiment in a test canton or test sector to determine whether a restructuring of energy consulting subsidies gives rise to increased demand for consultation services.

Procedure:

I. Structure of the new procedure for payment of subsidies
II. Provision of the necessary conditions for restructuring (energy consultants must be informed that from now on they are to bill the federal government for a share of the subsidy)
III. Assessment whether more energy consultations are carried out and more subsidies are granted as a result of the measures.

[A)] Estimation by project group
[B)] Key (from inside to outside): short - medium - long
[C)] Key (from inside to outside): short - medium - long

8.

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This study was commissioned by SwissEnergy.
Its content is the sole responsibility of the authors.

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