Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Department of the Environment, Transport, Energy and Communications DETEC

Swiss Federal Office of Energy SFOE
Energy Research and Cleantech

SWEET Call 1-2021: SWICE

Deliverable report

Deliverable n°	D6.1
Deliverable name	Report on Intervention and study design
Authors The authors bear the entire responsibility for the content of this report and for the conclusions drawn therefrom.	Timo, Ohnmacht, HSLU, **timo.ohnmacht@hslu.ch** Noah, Balthasar, HSLU, **noah.balthasar@hslu.ch** Jana Z'Rotz, HSLU, **jana.zrotz@hslu.ch** Iljana, Schubert, ZHAW, **Iljana.schubert@zhaw.ch** Raphael, Hoerler, ZHAW, **raphael.hoerler@zahw.ch** Tobias, Arnold, Interface, **tobias.arnold@interface-pol.ch** Matthias, Mahler, intep, **mahler@intep.com** Christian, Schmid, intep, **schmid@intep.com** Stefan Schneider, PLANAR, **s.schneider@planar.ch**
Delivery date	October 2023

Table of contents

sweet swiss energy research for the energy transition

Summary

In autumn 2022, a survey was conducted among Suurstoffi residents on the topics of living, working and mobility. This population-representative survey was used to examine existing mobility attitudes and other mobility-relevant characteristics on the site. The survey provides key data to describe the residents in terms of mobility, working life and household structure. The survey serves as a zero measurement ("*base line study*") for central key figures that are to be changed in the course of the project in the sense of sustainable consumption styles. These key figures can serve as a basis for comparison after the introduction of interventions. In particular, the first data on commuting in the Living Lab was collected by means of the participatory approach. This shows that an increase in telecommuting of 10% on the total working time of a person leads to a reduction of about 60kg CO2 per year. With the first comparative values collected, participatory experiments and changes can now be initiated to sustainably change the mobility behaviour of the residents in the Living Lab. The results of the survey were discussed in the form of a workshop with residents of the area. The focus group workshop showed that the residents of Suurstoffi are interested in various innovative mobility topics that can be implemented as intervention measures. In particular, the prioritisation showed that the bicycle infrastructure, but also specifically the mobility app as well as carpooling are possible interventions that could help to support the residents of Suurstoffi in choosing more sustainable means of transport. In a first attempt, a possible experimental research design for the introduction of a mobility app in the area was developed. However, various challenges and problems arise in the implementation of this intervention, which is why alternative implementation options need to be examined in further work.

1 Introduction

The survey of the residents of the Suurstoffi area is based on the research methodological approach of the living labs in a 4P approach (Public-Private-People-Participation). In an experimental approach, participation and user involvement as well as the joint development of knowledge are investigated in a real context (Rose et al, 2019; Compagnucci et al, 2021). Real labs as complex public-private partnerships (Ruijsink and Smith, 2016) offer an efficient, increasingly used approach for integrating partners from science, implementation and governance in a common methodology through collaboration (Engels et al, 2019). Experiences through experiments in real labs can contribute to systemic changes in real life worlds (Schäpke et al, 2018). With real laboratories, social systems and regional effects can be tested and important steps towards sustainable mobility can be taken. In addition, interventions to influence sustainable mobility behaviour are tested and researched in a user-centred way. The focus is on evaluation research, which examines whether and to what extent the interventions can contribute to energy reduction.

2 Deliverable content

2.1 Base-Line-Survey

A baseline study for the zero measurement was developed together with stakeholders. The survey content and the questionnaire were developed in a participatory process (workshop). Participants in the participatory process included representatives of the scientific community, the municipality, the consulting and transport companies as well as representatives of the local companies. As a result of this process, the following topics were included in the survey: Age, gender, household income, working life, housing situation (renting/owning), second home ownership, "mobility tools" (car availability, bicycle availability, public transport subscription) (Ohnmacht and Axhausen, 2005, p.17) in the household, attitudes towards mobility, evaluation of "Carefree mobility" (in cooperation with Postauto & Bern University of Applied Sciences), working life (place of work, home office, co-working, home office, mobility behaviour during commuting), destinations of leisure activities.

The survey is based on a quantitative cross-sectional study with a standardised questionnaire. It is a population-representative survey of Suurstoffi residents (main residence) aged 18 and over. The basic population (N) is 922 persons. The addresses of the Suurstoffi residents were provided by the municipality of Risch-Rotkreuz. All residents received a personal letter by post, and the letter included a questionnaire with a prepaid reply envelope. The online survey was possible in German or English in parallel and accessible by scanning a QR code. As an incentive, people received a voucher worth ten francs per person for the local bakery, which was handed out after entering their answer by post after the survey was completed. After two weeks of fieldwork, a reminder wave with a response check was sent out. Furthermore, field support was available with hotline and email support. The questionnaire was sent out on 6 October 2022. A reminder wave for the persons took place on 26 October 2022. The survey was completed on 29 November 2022. The survey results allow comparisons with a preliminary study from 2017 (Ohnmacht et al, 2017).

The survey shows that Suurstoffi is an area for high-income couples and families. This is shown by the fact that the average household size is 2.4 persons. The proportion of families has increased slightly in the last five years. The area is home to people who spend a large proportion of their leisure time outside the municipality of Risch-Rotkreuz. 84% of the people living in the area are employed, 47% of whom are not bound to fixed working hours. The Swiss labour force share in 2022 is 67.1% in the population aged 15 and over (BFS, 2023). The employed like to work from home: 65% of respondents have home office options. On average, 28% of respondents work from their home office per working day and only 1% work in a coworking space. The percentage of respondents who work in a home office is higher on Monday and especially Friday than during the other working days. This means that respondents arrive at the "regular" workplace especially between Tuesday and Thursday. In the home office, higher proportions of pick-up and drop-off and leisure trips are made than on the working days at the employer's premises. In general, it can be seen that more journeys are made during home office

days, which can be interpreted as an indication of rebound effects. 91% of the respondents have a driver's licence. The Swiss average value from the 2015 microcensus (BFS & ARE, 2017) is 82%. Almost half of the respondents usually get to their "regular" workplace by car and one third by public transport. Almost all respondents who arrive at their place of work by car have a parking space available at their place of work. This shows that there is a connection between the availability of a parking space and the choice of transport.

People living in the area tend to have a low emotional attachment to the car, despite a high level of car use. Furthermore, there are 23% carless households in the area. On average, however, all households own a car, which indicates that some households own more than one car. There are 29% car-captives living in the area, meaning that they use the car for most of their trips and see no reason to change their current car use. 47% of respondents can imagine changing their car use. The remaining 24% of respondents do not own a car or do not have access to one and therefore do not want to reduce their car use. Of particular interest for the interventions are the 47% of respondents who want to change their car use. Furthermore, people living in the area have multi-modal lifestyles, which means that the respondents choose the appropriate vehicle for the purpose. Thus, car availability is high at 77% with simultaneous GA availability of 12%. The Swiss average for car availability is 78%. The average for GA availability is 10% (BFS & ARE, 2017). Furthermore, attitudes towards public transport are very positive, with higher use than the Swiss average (BFS & ARE, 2017). Conversely, respondents have a rather negative attitude towards the bicycle as an ideal means of transport. For example, the combination of bicycle and public transport or the fact that they can get everywhere on short distances by bicycle is rather less important for the respondents. This attitude has strengthened since 2017. Nevertheless, it is evident that the respondents in the Suurstoffi area would like to see more bicycle parking spaces and cheaper parking spaces for visitors. A large number of residents in the area use rental mobility services. 24% of respondents used such services in the summer of 2022, although package offers such as "Carefree mobility" were not accepted on the site. Overall, 9% of respondents use car-sharing options, with the proportion remaining stable since 2017. The Suurstoffi area is home to people who are looking for proximity to public transport and the motorway with an attractive and low-tax residential location. These aspects were given by respondents as important reasons why they chose to live in Suurstoffi. The local social network is of secondary importance for people moving in.

In general, cycling is viewed very positively in the area, but it is not used excessively. It is a challenge to find reasons for this. There may not be enough parking spaces and the bicycle infrastructure needs to be promoted. The survey shows that some people provide their cars privately. The challenge is therefore how to expand the private circle in the neighbourhood. One possibility would be for residents to borrow each other's cars when they do not need them themselves. According to the survey, there is also the potential to establish a peer-to-peer app for the area. The communication situation of the site management is a hurdle. The site management is a pioneer in the area of sustainability. In the area of mobility, however, the picture is rather sobering. It became apparent that there was no demand for the "Carefree mobility" offer. This may also be due to the high car ownership in the area. According to the survey, there is a high willingness to use mobility services. However, these services must be simple and not require long-term commitments. It is highly unlikely that "Carefree mobility 2.0" will work, which is why a new, low-threshold service must be created. It has been shown that residents prefer to position themselves in the mobility landscape. This means that the residents of the Suurstoffi area like to open up all possibilities of personal mobility and use them individually. This circumstance is shown on the one hand by the high availability of transport tools and on the other hand by the rejection of the structured MaaS offer "Carefree mobility".

A meeting of the research team to present the survey results took place on 22 December 2022 at Switzerland Innovation Park Central (SIPC). The meeting served to present and validate the results of the survey for the research team and the practice partners and was led by the HSLU researchers. In the study results, it can be shown that the population of Suurstoffi is highly car-savvy. At the end of 2022, the offer for rental mobility (MaaS) on the site was also discontinued. Against this background,

the question must be asked as to how the MaaS intervention group should continue and whether a follow-up offer should be initiated.

The relevant questions on "Carefree mobility" and also the interim reports of Postbus give reason to think that it is not very promising to think further in the direction of MaaS as a complete service (Nassikas et al, 2022, p.22). Based on the survey results, however, there seems to be interest in e-bike rental, bicycle repair facilities/rooms/workshop and also parcel boxes in the area ("city logistics"). Furthermore, potential can be identified to include the intervention "car-pooling" as an intervention strategy. The line of argumentation is that car-pooling has met with little response (Nassikas et al., 2022). The population is a car-affine milieu, as the level of motorisation is high. However, if cars are plentiful, it is important to increase the occupancy rate of private cars, both among residents and employees. The results were also prepared for a qualitative workshop with the residents of the area. This is presented in the next section.

2.2 Qualitative workshop to prioritize interventions

The focus group workshop was held on 20 March 2023, from 5:00 p.m. to 7:30 p.m. (followed by an aperitif) at the Suurstoffi Innovation Park, Risch-Rotkreuz. Ten residents of the Suurstoffi area took part (six women and four men aged 19-57). It is important to note that among the focus group participants were six households that do not own a car and that the focus group was cycling-savvy. Participants were invited through different channels. First, 210 survey participants were contacted by e-mail who had shown interest in receiving further information or participating in research activities in the Suurstoffi residents' survey of autumn 2022. In addition, an invitation flyer was published via the Suurstoffi app and distributed in the building entrances. The participation rate is therefore just under 5 per cent, measured by the number of invitation e-mails sent out. All participants received a 30 CHF voucher from a local bakery after the workshop. The following four topics were discussed: Around the bike (bike infrastructure and bike offers), carpooling in the neighbourhood, coworking in the neighbourhood, mobility app use. Each topic was introduced using results from the survey or literature and the guiding questions were presented. There were two topic rounds of 35 minutes each in which two topics were dealt with simultaneously at different tables. The focus group participants were free to divide themselves between the two topic tables (cycling or carpooling; coworking or mobility app).

The focus group workshop showed that there is interest in various innovative mobility topics among Suurstoffi residents that can be implemented as intervention measures. In particular, the prioritization showed that cycling infrastructure, the mobility app and carpooling are possible interventions that could help to support Suurstoffi residents in choosing more sustainable means of transport. It is important to mention that among the participants of the focus group workshop there were six households that do not own a car and only two households that do not have a bicycle. Consequently, the focus group was very bike-savvy. For the design of interventions targeting car users, it is helpful to additionally assess the needs of this target group through appropriate channels. Following the workshop, the concept of a first intervention was developed. The procedure and a first proposal for the intervention mobility app are explained in the following chapter.

2.3 Exemplary Study Design: Mobility Application

The "Swiss Mobility Challenge" (SCC) intervention is (as of today) planned for the end of 2023/beginning of 2024. In autumn 2023, there will first be an initial survey and then an eight-day pre-intervention period. For the survey, a Workpackage 1 questionnaire (possibly already with the WP1 app) will be sent to all residents (via letterboxes), students (via the HSLU), employees (via companies) of the site (and possibly also to the employees of the Bösch site (accessibility still open) before the intervention. Once we have received the responses and the declaration of consent, we will know who we can send the cover letter to download the HSLU research app. Both the treatment and control groups will continuously record their mobility behaviour with the same HSLU research app (white label app). After that, six days are available for randomisation (random principle). Subsequently, the treatment and control groups will continue to record their mobility behaviour with the same HSLU research app continuously for 3 months, but the treatment group will be asked to install and use the SCC app. The SCC app will (presumably)

be integrated into the white label app. In addition to the feedback from the SCC app, subjects will still receive "mobility challenges" that we design (e.g. car-free weekend, car-free week). At the end of the intervention, we would like to send the WP1 questionnaire again. A full participation in the study will be remunerated with 100 Fr. The design is a first draft and therefore still subject to change. Furthermore, it is still unclear whether the costs of implementing this design are within the financial scope of the Working Package. If necessary, a more cost-effective variant should be examined as an alternative, possibly with a project-internal mobility tracking app.

3 Conclusion

The focus group workshop showed the first possibilities of how the measures could be designed and communicated. For example, more parking and repair facilities are needed to support cyclists. When it comes to the use of carpooling, the greatest opportunity was seen in commuting. Carpooling, as well as the shared use of a mobility app among residents, was seen as an opportunity to strengthen the sense of community in Suurstoffi and at the same time do something good for the environment. Support for the various intervention measures is needed from Zug Estates AG, but also from the municipality of Risch-Rotkreuz and the residents of the Suurstoffi area. In the prioritization of possible measures by the residents, cycling issues such as an improved cycling infrastructure were given high priority. This is possibly a consequence of the fact that more bike-savvy people took part in the discussion. The switch from car to bike has a strong influence on energy consumption. If residents are to succeed in switching from car to bicycle, an attractive offer of bicycle parking spaces is very important. From the project's point of view, however, priority is given to interventions that are intended to appeal more to car users and thus have an influence on energy consumption. A balance must be found in the choice and design of the interventions. In the exchange within the research team it was recognised that it would make sense to discuss which intervention should be directed when, where and to which target group. This makes sense because it must be ensured that the interventions do not influence each other. In the area there are residents, students, employees, different planned interventions and also a limited time schedule. A procedural concept and good coordination are therefore necessary. A first intervention is planned with the Swiss Mobility Challenge, which is to be carried out experimentally at the end of 2023/beginning of 2024.

4 References

BFS (2023) *Arbeitsmarktstatus, Erwerbstätige*, Bundesamt für Statistik. Neuchâtel, https://www.bfs.admin.ch/bfs/de/home/statistiken/arbeit-erwerb/erwerbstaetigkeit-arbeitszeit/erwerbsbevoelkerung/arbeitsmarktstatus.html#:~:text=In den letzten 20 Jahren,7%25 im Jahr 2002).

BFS & ARE (2017) *Verkehrsverhalten der Bevölkerung. Ergebnisse des Mikrozensus Mobilität und Verkehr 2015.*, Bundesamt für Statistik & Bundesamt für Raumentwicklung. Neuchâtel und Bern, https://www.bfs.admin.ch/bfs/de/home/statistiken/mobilitaet-verkehr/personenverkehr/verkehrsverhalten.html#-345756557.

Compagnucci, L., Spigarelli, F., Coelho, J., et al (2021) Living Labs and user engagement for innovation and sustainability, *Journal of Cleaner Production*, 289(125721), doi: 10.1016/j.jclepro.2020.125721.

Engels, F., Wentland, A. and Pfotenhauer, S.M. (2019) Testing future societies? Developing a framework for test beds and living labs as instruments of innovation governance, *Research Policy*, 48(9), 103826, doi: 10.1016/j.respol.2019.103826.

Nassikas, M., Graf, M. and Radovanovic, D. (2022) *Projekt Sorglos mobil - Schlussbericht*, Bundesamt für Verkehr (BAV). Ittigen.

Ohnmacht, T. and Axhausen, K.W. (2005) *Entwicklung des Forschungsdesign und der Erhebungsinstrumente für das Projekt Mobilitätsbiographien, Mobilitätswerkzeuge und soziale Netze*, ETH Zürich. Zürich.

Ohnmacht, T., Steiger, F., Sonderegger, R., et al (2017) Suurstoffi-Areal – Energiebilanz des Verkehrs und Ansätze für ein Mobilitätsmanagement., *ITW Working Paper Series, Mobilität 002/2017, Hochschule Luzern – Wirtschaft, Luzern*.

Rose, M., Wanner, M. and Hilger, A. (2019) Das Reallabor als Forschungsprozess und -infrastruktur für nachhaltige Entwicklung, *Wuppertal papers*, (1).

Ruijsink, S. and Smith, A. (2016) WP 4 | CASE STUDY Living Labs, *TRANSIT: EU SSH.2013.3.2-1 Grant agreement*, (613169), 1–91, http://www.transitsocialinnovation.eu/content/original/Book covers/Local PDFs/245 TRANSIT Case Report - Living Labs - Final.pdf.

Schäpke, N., Bergmann, M., Stelzer, F., et al (2018) Labs in the real world: Advancing transdisciplinary research and sustainability transformation: Mapping the field and emerging lines of inquiry, *GAIA - Ecological Perspectives for Science and Society*, 27(1), 8–11, doi: 10.14512/gaia.27.s1.4.