

SSH Energy Workshop

Narrative, normative, persuasive
How SSH energy research shapes imaginable transitions

17 and 18 June 2024

ETH Zurich, PBLabs, D-Floor, RZ Building Clausiusstrasse 59, 8006

*Program
Event information
Book of abstracts*

Organised by

ETH zürich

USYSTdLab
Department of Environmental Systems Science
Transdisciplinary Lab - Science-Society Interface

 **CSTS**
Cultural Studies
of Science
and Technology

 **Universität
Basel**

sweet swiss energy research
for the energy transition
CaSI



Program Overview

Monday 17 June

12.00 – 13.00 Registration and light lunch Foyer & Social corner

13.00 – 13.30 Welcome and program overview Community floor

Social corner – Open the Community Forum, Prototyping Table and Art Corner

13.30 – 15.00 Participation Sessions 1

Transitions corner – Bridging the Gap: Integrating Societal Dynamics into Energy Modelling and Scenarios

Social corner – Prototyping Energy Imaginaries

Imaginaries corner – Building Narratives from Complex Energy Model Outputs: A Participatory Modelling Exercise

15.00 – 15.30 Coffee Break Social corner

15.30 – 17.00 Knowledge Gathering 1

Imaginaries corner – Pecha Kucha

Art Corner – Posters

17.00 – 19.00 Ápero and visit art installations Art & Social corner

Tuesday 18 June

8.30 – 9.00 Registration Foyer

9.00 – 10.15 Round Table: Narratives ... in Energy Research Community floor

10.15 – 10.30 Coffee Break Social corner

10.30 – 12.00 Knowledge Gathering 2

Transitions corner – Scenarios

Imaginaries corner – Communities

12.00 – 13.00 Lunch Social corner

13.00 – 14.30 Participation Sessions 2

Imaginaries corner – How can humanities, social scientists, and technical scholars working on the energy transition stay in regular contact and profit from this?

Transitions Corner – Incorporating Social Sciences in Energy System Modelling: Practical Opportunities within SWEET-CoSi

14.30 – 15.00 Coffee Break Social corner

15.00 – 16.30 Knowledge Gathering 3 ...

Imaginaries corner – Participation

Transitions corner – Technology

16.30 – 17.00 Closing remarks Community floor

Event information

Getting there

There are several options to get to the RZ Building, click on the hyperlinks for more information of each option.

Option 1: From Zurich HB, take the tram 6, 7 or 10 and get off at Heldenegg Stop. Walk to RZ building via Heldensteig, which links to Zehnderweg and enter the RZ building on the D-Floor from Zehnderweg.

Option 2: take a 10 minute walk from Zurich HB to the RZ building and enter the RZ Building on the D-Floor from Zehnderweg.

Option 3: If you enter from Clausiusstrasse 59, enter on the E-Floor and take the stairs directly across from the entrance one floor down to D-Floor, where you will find the PBLabs.

Venue details

See the floor plan on the next page (page 7) for the venue details.

Meeting room/quiet space: there is a private meeting room available should you need to pop out of the proceedings to attend to emails, meetings, etc.

Organising committee

The 4th Swiss Social Sciences and Humanities Energy Research Workshop (SSH Energy) was organised by CoSi Consortium and the [Cultural Studies of Science and Technology Group](#) (CSTS) in the Transdisciplinarity Lab (TdLab), ETH Zurich.

- PD Dr. Bianca Vienni-Baptista (CSTS Group lead, TdLab, ETH Zurich)
- Dr. Stephanie Briers (CSTS, TdLab, ETH Zurich)
- Dr. Annika Sohre (University of Basel)
- MSc. Konstanty Ramotowski (CSTS, TdLab, ETH Zurich)
- Victoria Herbig (CSTS Group, TdLab, ETH Zurich)
- Linley Rachel (CSTS Group, TdLab, ETH Zurich)

Scientific committee

- Prof. Dr. Michael Stauffacher (TdLab, ETH Zurich)
- Prof. Dr. Isabelle Stadelmann (University of Bern)
- Prof. Dr. Christian Pohl (TdLab, ETH Zurich)
- Dr. Hugo Caviola (University of Bern)
- Dr. Yann Blumer (ZHAW School of Management and Law)
- Dr. Devon Wemyss (ZHAW School of Management and Law)
- Dr. Annika Sohre (University of Basel)
- Dr. Gracia Brückmann (University of Bern)
- Dr. Valentino Piana (HES-SO Valais-Wallis)
- PD Dr. Bianca Vienni-Baptista (CSTS Group, ETH Zurich)
- Dr. Stephanie Briers (CSTS Group, ETH Zurich)

Acknowledgements

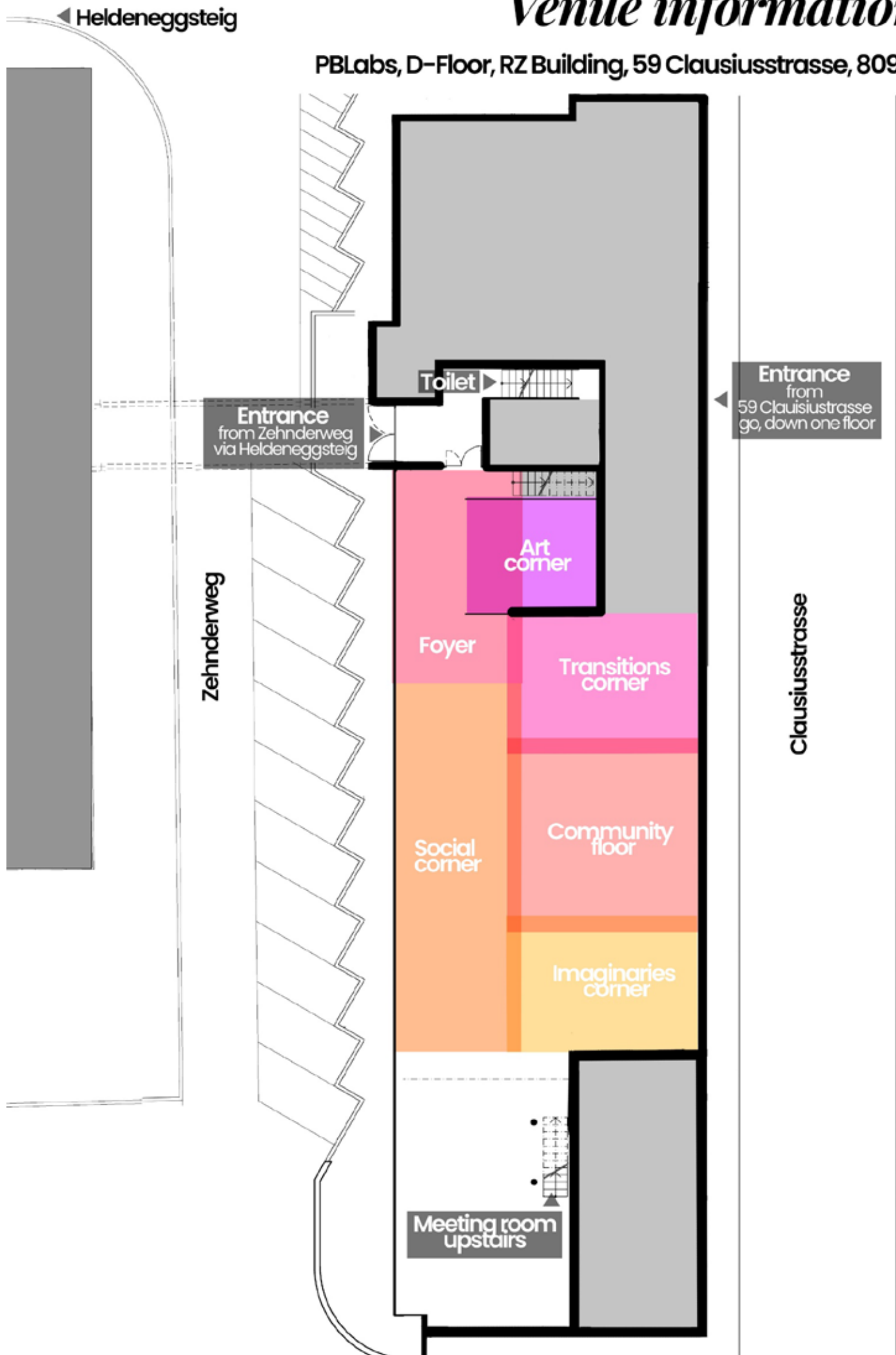
Thank you to the organising committee and scientific committee for helping shape the SSH Energy Workshop. Special thanks to the PBLabs for their great venue and services. Thank you ETH Logistics Centre, ETH IT Services, ETH Catering and the RZ Building management. Thank you SWEET CoSi and University of Basel for contributing to funding this event.

Contact

For queries contact Stephanie Briers at stephanie.briers@usys.ethz.ch, or in urgent cases on 076 455 7764.

Venue information

PBLabs, D-Floor, RZ Building, 59 Clausiusstrasse, 8092



◀ Heldeneggsteig

Zehnderweg

Clausiusstrasse

Entrance
from Zehnderweg
via Heldeneggsteig

Toilet

Entrance
from
59 Clausiusstrasse
go, down one floor

Art
corner

Foyer

Transitions
corner

Social
corner

Community
floor

Imaginaries
corner

Meeting room
upstairs

Detailed program

Monday 17 June

12:00 – 13:00

Registration and Light Lunch

Foyer and Social corner

Remember to register in advance for **Participation Sessions** at the Registration Desk

17 – 18 June

Art Installations

AR1 – Art corner

Operation Beton, 2017 – 2020 **(An)nina Boogen**

AR2 – Art corner

Imagining the Swiss electricity system of the future, 2024 **Vanja Djinlev & Shiila Infriccioli**

AR3 – Art corner

Sequester, 2023 **Marcel Rickli**

13:00 – 13:30

Welcome and Program Overview

Community floor

Welcome and opening words. Opening of the Prototyping Table, the Community Forum in the Social Corner, and Art Corner **Bianca Vienni-Baptista & Stephanie Briers**

13:30 – 15:00

Participation Sessions 1

Please register for participation sessions in advance at our Registration Desk

WS1 – Transitions corner

Bridging the Gap: Integrating Societal Dynamics into Energy Modelling and Scenarios **Yann Blumer & Devon Wemyss**

WS2 – Social corner

Prototyping Energy Imaginaries **Stephanie Briers & Konstanty Ramotowski**

WS3 – Imaginaries corner

Building Narratives from Complex Energy Model Outputs: A Participatory Modelling Exercise

Stefano Moret

15:00 – 15:30

Coffee Break

Social corner

Make sure to build your creativity at the **Energy Imaginaries Prototyping Table** and to add your thoughts to the **Community Forum**

15:30 – 17:00

Knowledge Gathering Sessions 1

This knowledge session consists of two parallel sessions, **Pecha Kucha Presentations** and **Poster Presentations**

Pecha Kucha Presentations

Moderated by Devon Wemyss (ZHAW)

PE1 – Imaginaries corner

How can we link public opinion and modelling of Swiss emission reductions abroad? **Gracia Brückmann**

PE2 – Imaginaries corner

Sentimental dams: an emotional analysis of Hydropower in Valais, Switzerland **Tristan Loloum**

PE3 – Imaginaries corner

How to Use Future Methodologies and Foresight in Energy Research **Fiona Zimmermann & Anastasia Ponomareva**

PE4 – Imaginaries corner

Regional energy system planning in Switzerland and the potential to consider the social aspect **Barton Chen**

PE5 – Imaginaries corner

On the (sensory) perception of renewable energy in alpine landscapes **(An)nina Boogen**

Poster Presentations

Moderated by Yann Blumer (ZHAW)

Grab a foam box to sit on or enjoy sitting on the carpeted floor.

PO1 – Art corner

Externality Assessment of Swiss Long-Term Net-Zero Energy Pathways Including Life Cycle Contributions **Adolfo Uribe**

PO2 – Art corner

PowerCheck **Matthias Frommelt**

PO3 – Art corner

Strategic Decision-Making in Pursuit of Profitability and Sustainability Goals **Ngoc-Quynh Dao**

PO4 – Art corner

Shared Socioeconomic Pathways for Switzerland **Lena Gubler & Pascal Tschumi**

PO5 – Art corner

The Swiss electricity system of the future: Between technical realities and future imaginaries **Vanja Djinlev & Shila Infriccioli**

17:00 – 19:00

Apero and Art installation viewing

Social corner and Art corner

Join us for drinks, snacks and mingling after Day 1 of the SSH Energy Workshop

Tuesday 18 June

08:30 – 09:00

Registration

Foyer

Remember to register in advance for the Participation Sessions at the Registration Desk

09:00 – 10:15

Round Table

RT1 – Community floor

Narratives in energy research: from heterogeneous understandings to language

concerns **Hugo Caviola, Adriana Marcucci, Paul Upham, Bianca Vienni-Baptista**

10:15 – 10:30

Coffee Break

Social corner

Make sure to build your creativity at the **Energy Imaginaries Prototyping Table** and to add your thoughts to the **Community Forum**

10:30 – 12:00

Knowledge Gathering Sessions 2

This knowledge session consists of two parallel paper presentation sessions, **Paper Presentations 1: Scenarios** and **Paper Presentations 2: Communities**

Paper Presentations 1: Scenarios

Moderated by **Konstanty Ramotowski (ETH)**

PA1 – Transitions corner

Effect of information provision and visualization on user's confidence, comprehension, and decision-making for long-range energy projections **Valeria Sorgato**

PA2 – Transitions corner

Towards successful SWEET CoSi Scenarios **Martin Densing**

PA3 – Transitions corner

Designing socially acceptable Swiss electricity supply scenarios for 2035 by linking population survey data and electricity supply modelling **Xin Wen**

PA4 – Transitions corner

A transdisciplinary policy response mechanism for socially relevant energy- and climate-economic modelling **Conall Heussaff**

Paper Presentations 2: Communities

Moderated by **Gracia Brückmann (ZHAW)**

PA5 – Imaginaries corner

Energy modelling of community resilience: A transdisciplinary journey in fostering bottom-up energy initiatives **Vanja Djinlev**

PA6 – Imaginaries corner

Framing Energy Sufficiency in Swiss ski resorts:
The case of Val de Bagnes, Verbier **Ivan Minguez**

PA7 – Imaginaries corner

Understanding motivation and engagement in
living labs: A Swiss case study **Annika Sohre**

PA8 – Imaginaries corner

Innovative methods for energy policy-making?
How the Living Lab Integrative Process enhances
stakeholder engagement strategies in SSH
energy research. Lessons learned from the
methodological review of 11 research projects in
SWEET Lantern **Fiona Zimmermann**

12:00 – 13:00

Lunch

Social corner

We will serve a standing lunch in the social
corner, grab a plate and find a seat anywhere
you like in the venue.

13:00 – 14:30

Participation Sessions 2

Please register for participation sessions in
advance at the Registration Desk

WS4 – Transitions corner

How can humanities, social scientists, and
technical scholars working on the energy
transition stay in regular contact and profit from
this? **Gracia Bruckmann & Valentino Piana**

WS5 – Imaginaries corner

Incorporating Social Sciences in Energy System
Modelling: Practical Opportunities within SWEET-
CoSi **Martin Densing & Hannes Weigt**

14:30 – 15:00

Coffee Break

Social corner

Make sure to build your creativity at the **Energy
Imaginaries Prototyping Table** and to add your
thoughts to the **Community Forum**

15:00 – 16:30

Knowledge Gathering Sessions 3

This knowledge session consists of two parallel
paper presentation sessions,
Paper Presentations 3: Participation and **Paper
Presentations 4: Technology**

Paper Presentations 3: Participation

Moderated by Annika Sohre (UniBas)

PA9 – Imaginaries corner

How to become an energy citizen the Swiss way:
Preferences for engagement in RECs, motivation
and barriers to energy citizenship **Iljana Schubert**

PA10 – Imaginaries corner

From Stakeholder Engagement to Inclusivity:
Advancing Participatory Modelling for Net-Zero
Sustainable Development **Victoria Herbig**

PA11 – Imaginaries corner

Fostering energy transition through participatory
visioning of integrated regional development: a
systematic experimental evaluation **Matthias
Buchecker & Vrhovac Bozana**

PA12 – Imaginaries corner

Renewable Energy Siting in Switzerland: Public
Opinion 2018 to 2022 as a Basis for Spatial
Optimization Models Integrating Energy-
Production, Ecosystem Services, and Social
Acceptance **Marcel Hunziker & Boris Salak**

Paper Presentations 4: Technology

Moderated by Hannes Weigt (UniBas)

PA13 – Transitions corner

Does perceived economic viability of rooftop PV
match with its actual viability? Findings from a
Swiss population survey **Mert Duygan & Maria
Anna Hecher**

PA14 – Transitions corner

Unleashing Flexibility for a Sustainable Energy
Transition: A Niche Readiness Level Model for
Direct Current Technologies **Reinhard Madlener**

PA15 – Transitions corner

EVAadopt: De-biasing electric vehicle adoption
with personalized nudging **Ursa Bernardic**

PA16 – Transitions corner

Zukunft Alpenstrom. Energy cultural landscapes
in climate-positive alpine communities:
Pontresina Case Study **Veronika Studer-Kovacs**

16:30 – 17:00**Closing Remarks****Community floor**

Join us in wrapping up the 4th SSH Energy
Workshop and selecting outstanding topics for
SSH-2025. **Bianca Vienni-Baptista, Stephanie Briers
& invited observers**

SSH Energy Workshop

Narrative, normative, persuasive
How SSH energy research shapes imaginable transitions

17 and 18 June 2024

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*Book of
Abstracts*

Round Table

RT1 – Community floor

Narratives in energy research: from heterogeneous understandings to language concerns **Hugo Caviola (UNIBE)**, **Adriana Marcucci (ETHZ)**, **Paul Upham (RUG)**, **Bianca Vienni-Baptista (ETHZ)**

During the Second SSH Workshop, held in Murten, the SSH community identified several topics of their interest, among which language and the use of narratives in energy research were highlighted. In recent years, 'narrative' has become something of a buzzword, a rather broad cover term in the cultural and social sciences. This panel discussion will address the many understandings of the term "narrative" in sustainable transitions and energy research, together with the role they have for the SSH community. What are the most salient uses of the term "narrative" in our community and how do we deal with diverging understandings? How differing understandings are dealt with in interdisciplinary and transdisciplinary endeavours? Panellists will share experiences of this challenge and how it can best be tackled. Finally, we will address the question of how language concerns could be integrated more systematically in the energy modelling and research processes.

Art Installations

AR1 – Art corner

Operation Beton, 2017 – 2020 **(An)nina Boogen (ZHAW)**

Between 2017 and 2020, Annina visited around 26 hydro dams in eight Swiss cantons. In addition to the gas cooker and the Bialetti, she brought her research equipment in her backpack: a camera, a thermometer, a hygrometer, a cyanometer, an audio recorder and several microphones. And of course, as a field researcher, a protocol. At the provisional end of this project stands a non-scientific synthesis report: It is an assemblage of supposedly 'objective' systematically collected research data, 'objective' and 'subjective' findings as well as moments of experience and stories from the research trips. But it is also an assemblage of different forms of writing and texts, images and sounds created during the research process, which come together in the form of a vinyl record.

This art installation will be presented in Knowledge Gathering Session 1: PE5 "On the (sensory) perception of renewable energy in alpine landscapes".

AR2 – Art corner

Imagining the Swiss electricity system of the future, 2024 **Vanja Djinlev (ETHZ) & Shiila Infriccioli (ETHZ)**

The installation visually unravels the insights of the study into a dynamic representation of six key elements: buildings, energy grid, Internet of Things, hydropower, solar panels and energy storage. As the animation zooms into the Swiss topography, it highlights these technologies and features direct quotes from stakeholders, illustrating their conceptual blueprints. By juxtaposing these ideal visions with the existing socio-technical and techno-institutional landscape, the installation reveals the broader challenges of the energy transition, emphasizing barriers that transcend mere technicalities. The work serves as both a starting point and a catalyst for dialogue on the future of sustainable energy in Switzerland.

This art installation will be presented in Knowledge Gathering Session 1: PO5 "The Swiss electricity system of the future: Between technical realities and future imaginaries".

AR3 – Art corner

Sequester, 2023 **Marcel Rickli (ZhdK)**

'Sequester' is a photo-bioreactor that utilizes microalgae (*Chlorella vulgaris*) to convert CO₂ into biomass. This biomass can be further processed into food, fertilizer, biofuel, or bioplastic. Due to its fast-growing capabilities, algae are significantly more effective at absorbing carbon dioxide than trees, potentially playing an important role in combating climate change. Nevertheless, the energy efficiency of the apparatus remains a mystery.

Participation Sessions

WS1 – Transitions corner

Bridging the Gap: Integrating Societal Dynamics into Energy Modelling and Scenarios **Yann Blumer (ZHAW) & Devon Wemyss (ZHAW)**, **Martin Densing (PSI)**, **Hannes Weigt (UNIBAS)**

Model-based scenarios are essential tools for strategic decision-making amidst the significant and uncertain changes needed to achieve a sustainable energy system. However, a common criticism is that these

techno-economic energy models often fail to adequately incorporate societal processes. This gap can lead to transition pathways that lack socio-political plausibility or cause us to overlook promising options that, while potentially less cost-efficient, offer significant societal benefits. This workshop offers a collaborative space for reflecting on the interface between social sciences and humanities (SSH) energy researchers and the modelling and scenario-building community.

This is the first of two workshops on the interface of SSH energy research and model-based energy scenarios, providing inputs for the second one, entitled *Incorporating Social Sciences in Energy System Modelling: Practical Opportunities within SWEET-CoSi*.

WS2 – Social corner

Prototyping Energy Imaginaries Stephanie Briers (ETHZ) & Konstanty Ramotowski (ETHZ)

Energy imaginaries are intersubjectively held visions of the energy future. They help to organize, explain, and justify the desirable energy future and social reality enabled through technical and scientific progress.

Although the imaginaries reflect the understanding of the future by a collective, they also have an impact on the present, as they define not only what the collective pursues, but also how it pursues it. Therefore, as a field of social practice, imaginaries have a strong normative component, defining how the future good society should look like, and by which means the good energy system and energy research should be organized.

In this workshop, we will prototype our energy imaginaries, making concrete how our energy future could look, placing the social sciences and humanities perspective centrally when imagining the technical and scientific progress in the energy transition towards a “good” energy system.

WS3 – Imaginaries corner

Building Narratives from Complex Energy Model Outputs: A Participatory Modelling Exercise Stefano Moret (ETHZ), Florian Joseph Baader (ETHZ), André Bardow (ETHZ)

Energy system models can help to identify and quantify energy transition pathways. In this workshop, we explore if/how we can use these models to systematically derive narratives and storylines commonly used in the SSH domain to support decision-making. Specifically, we present a machine learning method to translate large sets of energy transition scenarios, which are often challenging for policymakers to interpret and act upon, into a small set of actionable and interpretable options.

After introducing our method, we will focus on a case study where the method streamlines hundreds of options

to reach net-zero into four transition pathways on the decision-makers’ table. Participants will learn about energy models and their applications; then, as a participatory modelling exercise, they will create narratives for these four pathways, which will be discussed to evaluate the effectiveness of our method in guiding decision-makers to prioritize the key factors that will shape the energy transition.

WS4 – Transitions corner

How can humanities, social scientists, and technical scholars working on the energy transition stay in regular contact and profit from this? Gracia Bruckmann (UNIBE) & Valentino Piana (HES-SO)

The climate crisis and other urgent challenges require us to join forces. However, we are still so far away from each other’s research, and only work together, if we happen to have joint academic projects. What can we do to overcome that? Should we write short memos for the relevant other disciplines?

How can our joint ideas become important voices in the Swiss and the global energy transition? Previous research showed scientific consent messaging (such as the statement, that „97% of climate scientists agree on human-caused climate change, or “88% of IPCC authors argue we are in a climate crisis”) is a powerful tool. We as energy researchers across disciplines have not yet joined their voices. Thinking about our last workshop in Sion, we wonder, how can we become one voice?

WS5 – Imaginaries corner

Incorporating Social Sciences in Energy System Modelling: Practical Opportunities within SWEET-CoSi Martin Densing (PSI) & Hannes Weigt (UNIBAS), Yann Blumer (ZHAW), Devon Wemyss (ZHAW)

The SWEET CoSi (Co-Evolution and Coordinated Simulation of the Swiss Energy System and Swiss Society) project aims to enhance model- and simulation-based assessments by incorporating social sciences and humanities (SSH) research, thereby capturing the co-evolution of energy systems and society. There is considerable flexibility in how SSH perspectives, expertise, and insights can be integrated into these models. At the same time, SSH researchers may be uncertain about where, when, and how they can contribute to the scenario and model development process. This workshop will provide an overview of CoSi and facilitate concrete discussions on how to effectively incorporate SSH at different stages of the CoSi process, which is planned to go until 2032.

This is the second of two workshops on the interface of SSH energy research and model-based energy scenarios, building on the insights of the first one, entitled Bridging the Gap: Integrating Societal Dynamics into Energy Modelling and Scenarios.

Knowledge Gathering Sessions

Pecha Pucha Presentations

PE1 – Imaginaries corner

How can we link public opinion and modelling of Swiss emission reductions abroad? Gracia Brückmann (UNIBE)

Currently, in Bangkok GHG emission-free e-busses are transporting passengers, and Switzerland, not Thailand, counts it as its emission reductions – the first completely fulfilled bilateral agreement of this kind. The Swiss government calculates the costs of these emission reductions abroad at 35 CHF per ton of CO₂-equivalent and from 2025 to 2030, the country plans to save around 8.6 million tons of CO₂-equivalents abroad. Besides Thai e-busses, other projects include solar power in Vanuatu and rice cultivation with methane reduction in Ghana, and improved wood-fired stoves for Peru, the latter is currently a pilot project. Public opinion is mostly neutral about this – yet, as the issue is not very salient. However, this might change when more emission reductions abroad are utilized. Will these policies keep “flying under the radar”? Will the public demand decarbonization at home? How are modelers thinking about these “boundary conditions” for energy models in a decarbonizing society?

PE2 – Imaginaries corner

Sentimental dams: an emotional analysis of Hydropower in Valais, Switzerland Tristan Loloum (HES-SO) & Ana Patricia Quintana Ramirez (Universidad Nacional de Colombia)

Hydropower, a key renewable energy source, has been instrumental in economic development and water resource management. Its implementation in the Alps during the 20th century led to profound socio-economic transformations, including industrial expansion, peasant decline, migration trends, mountain resort development, and the opening of secluded valleys. It also left indelible marks on Alpine ecosystems and landscapes.

While the energy sector is predominantly guided by techno-economic expertise, the role of emotions in energy planning is gaining recognition. Energy projects for sustainable transition can evoke strong public emotions and resistance. Understanding these emotional

responses is vital for addressing them and is particularly relevant in analysing the socio-economic effects of hydroelectric dams. These emotions mirror personal and community feelings towards the changes induced by such projects, ranging from enthusiasm about economic opportunities to distress over environmental and cultural disruptions.

This study explored the sentiments associated with hydroelectric dams in Valais, a Swiss canton known for its extensive hydroelectric facilities. We conducted semi-structured interviews with 15 local stakeholders about their relationships with areas affected by hydroelectricity across three timeframes: past, present, and future. The interviews were video-recorded, transcribed, and analysed to identify the primary emotions associated with hydroelectric power during each period.

Despite individual differences, the results revealed a significant affinity among Valaisans for hydroelectric infrastructure, a respect for historical achievements, and apprehension about the future. This highlights the complex emotional landscape surrounding hydroelectric projects and underscores the need for a more nuanced understanding of their socio-economic impacts.

PE3 – Imaginaries corner

How to Use Future Methodologies and Foresight in Energy Research Fiona Zimmermann (HES-SO) & Anastasia Ponomareva (HES-SO)

Take a short dive into ‘How to Use Future Methodologies and Foresight in Energy Research’. We will explore how foresight and future studies can be used in innovation and co-creation, with specific examples from Living Labs provided through recent training provided by the European Network of Living Labs (ENoLL). Foresight involves systematically exploring future developments and scenarios to inform strategic decision-making, while future studies encompass a broader interdisciplinary field examining the future from various perspectives. Learn about how these important methodologies and concepts can be integrated into energy transitions research and help to co-create a sustainable future.

PE4 – Imaginaries corner

Regional energy system planning in Switzerland and the potential to consider the social aspect Barton Chen (Empa), Natasa Vulic (Empa), Matthias Sulzer (Empa), Georgios Mavromatidis (Empa)

Energy system modelling tools (e.g. ehubX developed in the Urban Energy Systems Lab in Empa) have been used in several regional energy system planning projects such

as DigiFrauenfeld, decarbonising Swiss Federal Buildings. Those tools are often based on mathematical programming that minimises or maximises objective functions that could be quantified such as total costs or total emissions. In the above-mentioned projects, the focus is often on the techno-economic parameters and the social-economic parameters are not considered.

This talk is focus on two parts. First part is to share how energy system modelling tools are currently used in regional energy system planning projects in Switzerland. The second part is to discuss why the social aspect is not considered and how it can be incorporated in the future.

PE5 – Imaginaries corner

On the (sensory) perception of renewable energy in alpine landscapes (An)nina Boogen (ZHAW)

Infrastructure buildings for energy production and distribution are situated in landscapes whose images they change. However, landscapes are not only geographical spaces, they are also culturally coded representations of desires and imaginations. The transformation of alpine cultural landscapes is evidence of the needs of our society, which often are in conflict with the preservation of traditional cultural landscapes as demanded by nature and heritage conservationists. This conflict has come into focus again, with the energy strategy 2050, the net-zero targets but even more drastically with the Solarexpress.

How do these energy infrastructures relate to landscapes? How do we perceive them? And how do we relate to cultural landscapes of tomorrow? When discussing such energy cultural landscapes, «the aesthetics need to move beyond the visual» for new ways of perceiving, imagining, and speaking that make it possible to open up discourse spaces for alpine energy futures.

The artwork AR1: *Operation Beton, 2017 – 2020*, will be presented in this Pecha Kutcha.

Poster Presentations

PO1 – Art corner

Externality Assessment of Swiss Long-Term Net-Zero Energy Pathways Including Life Cycle Contributions Adolfo Uribe (PSI) & Thomas Heck (PSI)

Our research explores the societal implications of greenhouse gas mitigation scenarios within Switzerland's energy system, aiming for net-zero emissions by 2050. We assess both local and global externalities (outside Switzerland) linked to long-term net-zero pathways. It is

essential to include this information in discussions about energy systems.

Using the Impact Pathway Approach, we analyse emissions, environmental changes, and their physical impacts, expressing these impacts in monetary terms. We integrate a Life Cycle Assessment (LCA) to comprehensively develop a framework for assessing emissions from the entire chain.

Our research, part of the ongoing SCENE project and Work Package 7, provides valuable insights into the economic and social effects of Switzerland's net-zero target. This understanding is crucial for policymakers and stakeholders in energy and environmental sustainability.

Our work aligns with the theme 'Societal factors integrated into energy modelling: what do models already integrate, and how? What is missing?'

PO2 – Art corner

PowerCheck Matthias Frommelt (OST), Boris Meier (OST), Pascal Diethelm (OST)

PowerCheck is a model of the Swiss energy system that analyses the production costs of a renewable Swiss energy system. The aim is to design a climate-neutral and supply-secure energy system based on technically proven and politically accepted technologies.

The model uses historical production, consumption and weather data from 2014–2022 with a resolution of 15 minutes. It further assumes the electrification of transport and building heating, which impacts the power balance. For compensation, various seasonal storage technologies can be introduced. PowerCheck minimizes the energy production costs, by finding the optimal size of production and storage capacities.

Preliminary results show that minimal costs are reached with a combination of short and long-term storage. The optimizer chooses both heat pumps and district heating. A large part of the seasonal energy storage is covered by chemical storage.

PO3 – Art corner

Strategic Decision-Making in Pursuit of Profitability and Sustainability Goals Ngoc-Quynh Dao (UNINE) & Emmanuelle Reuter (UNINE)

As firms seek to transition to low-carbon solutions, leaders often face goal conflict between profitability and sustainability in their strategic decisions. This paper explores how market conditions influence goal conflict between profitability and sustainability, and the role of individuals' paradox mindset for coping with such goal conflict in strategic decision-making. Managers often perceive these goals as difficult to reconcile, potentially resulting in trade-offs and/or uncertainty avoidance. In

particular, goal conflicts have the potential to increase negative motivational processes and decision biases in strategic decision-making. These goal conflicts may be exacerbated even further as market conditions worsen the tensions between competing goals. We employ an experimental research design that randomizes market conditions—including industry growth rate, the intensity of competitiveness, and market opportunities—to study the causal relationships between market conditions and paradoxical decisions, mediated by a paradox mindset. We hypothesize that individuals with a heightened paradox mindset are better at navigating goal conflicts and can more effectively integrate both goals, even as market conditions exacerbate the tension between them. Our study contributes to the understanding of the role of the paradox mindset in coping with goal conflicts and in shaping goal preferences under less favourable market conditions for achieving profitability. This study further enriches research on the energy transition by uncovering the impact of market conditions and the critical role of strategic leaders' paradox mindset for handling goal conflict in strategic decision-making.

PO4 – Art corner

Shared Socioeconomic Pathways for Switzerland **Lena Gubler (WSL) & Pascal Tschumi (WSL)**

Our poster presents the Shared Socioeconomic Pathways for Switzerland, five scenario storylines describing consistent socioeconomic futures in the year 2100. The storylines were developed in a comprehensive participatory process involving interviews with 60 experts and five stakeholder workshops. Key socioeconomic drivers were identified, and their characteristics and interactions were assessed. The energy sector is one of the main factors in the storylines. Depending on the storyline, its structure ranges from a highly technologized and internationally integrated renewable electricity network to one based on sufficiency, and one fully dependent on fossil fuels. Based on the storylines, greenhouse gases and land use changes will be modelled considering possible climate policy mixes. The model outputs and storylines can be used as a decision-making basis for long-term strategic planning, as input for climate risk analyses or adaptation strategies.

PO5 – Art corner

The Swiss electricity system of the future: Between technical realities and future imaginaries **Vanja Djinlev (ETHZ) & Shiila Infriccioli (ETHZ)**

This study explores the potential evolution of Switzerland's electricity system towards the ideal state through a

thought experiment. We disregard existing constraints and aim to envision a system built entirely from scratch, leveraging current knowledge and technologies in the energy realm. Through semi-structured interviews, we asked stakeholders across the electricity system in Switzerland about how they would do it, and what would that system look like, if they were able to rebuild the whole electricity system from scratch. By comparing the theoretical ideal system envisioned by the interviewees with the realities and limitations of the current socio-technical and techno-institutional landscape, we reveal the potential barriers of the energy transition that go beyond technical concerns.

The artwork AR2: *Imagining the Swiss electricity system of the future, 2024*, will be presented in this Poster Presentation.

Paper Presentations 1: Scenarios

PA1 – Transitions corner

Effect of information provision and visualization on user's confidence, comprehension, and decision-making for long-range energy projections **Valeria Sorgato (UNIGE) & Evelina Trutnevte (UNIGE)**

Long-range energy projections are crucial for policy and investment decisions but often come in forms that either provide too little information about uncertainties through deterministic models or present complexities such as probabilistic or uncertainty ranges that can overwhelm users. There is a need for empirical research to explore how the amount and visualization of information impact the users' interpretation and subsequent actions drawn from energy projections. We measured the effects of information amount and visualization on the users' decision-making process and perception of projections. The study focused on solar electricity projections in Switzerland and the USA, comparing deterministic projections with broad uncertainty ranges and probabilistic projections. The participants included 266 Swiss master students, as novice experts, and 867 lay readers from Switzerland and the USA. We also considered demographics, familiarity with national electricity production, solar panel perception, numeracy, and graph literacy. We found that deterministic projections enhance comprehension among both Swiss citizens and students. However, probabilistic projections, despite being more challenging to interpret, significantly boost confidence in decision-making among students. When confronted with previous failed projections, outcomes showed that displaying uncertainties without probabilities increased confidence in students when outcomes fell inside projected ranges. Notably, a higher preference for solar panels increased confidence in

decisions, policy support, and confidence in projections, with USA lay readers showing greater confidence than novice experts. This study highlights the importance of tailoring communication in energy projections, showing how information quantity and perception of renewable energy influence comprehension, confidence, and support across different audiences.

PA2 – Transitions corner

Towards successful SWEET CoSi Scenarios

Martin Densing (PSI)

We discuss the challenges to build energy system scenarios in CoSi that capture the co-evolution of the energy system and the society. The CoSi scenarios should be compatible with heterogeneous model ensembles, also with new models over next years, and take several linking options into account. In addition, the CoSi scenarios should address the needs of different stakeholders. We sketch preliminary options for a scenario framework which is feasible in terms of usability, of extensibility, and of implementation with limited resources.

PA3 – Transitions corner

Designing socially acceptable Swiss electricity supply scenarios for 2035 by linking population survey data and electricity supply modelling **Xin Wen (UNIGE), Julia Gonzalez Contreras (UNIGE), Isabelle Stadelmann-Steffen (UNIBE), Evelina Trutnevte (UNIGE)**

Model-based scenarios are important tools to support policymaking and investment decisions, especially in the context of the ongoing energy transition and climate change mitigation. While existing energy system models heavily rely on techno-economic optimization, they often neglect the essential influence of many social phenomena, which drive the transition. Studies have shown that the model-based scenarios rarely reflect the social acceptance of energy technologies, especially high support for renewable technologies. Having said that, methods to integrate social factors in techno-economic models are still at a nascent stage. The aim of this study is to model Swiss electricity supply scenarios for 2035 that consider the social acceptance of electricity technologies. This study mainly investigates three methods to integrate social acceptance data from a population survey (N=6'203) into the electricity system model EXPANSE with a spatial resolution of 2'136 municipalities. The three methods are based on modifying the potential constraints, technology costs, and objective function based on survey data. We also test different methods for generating scenarios regarding spatial aggregation of the survey data, ways to quantify

the impact of acceptance, and ways of translating survey data into model parameters. The findings highlight high sensitivity of modelled scenarios on social acceptance of a couple of key technologies (such as solar PV, onshore wind, nuclear power, and interconnection in Switzerland) and on the chosen social acceptance integration method.

PA4 – Transitions corner

A transdisciplinary policy response mechanism for socially relevant energy- and climate-economic modelling **Conall Heussaff (Bruegel)¹, Natasha Frilingou², Adrian Lauer¹, Ugne Keliauskaite¹, Georg Zachmann¹, Panagiotis Fragkos³, Eleftheria Zisarou³, Dirk-Jan van de Ven⁴, Russell Horowitz⁴, Xaquín García-Murosa⁴, Rasmus M. Johannsen⁵, Jakob Z. Thellufsen⁵, Georg Holtz⁶, Shivika Mittal⁷, Alaa Al Khourdajie⁸, Sara Giarola⁸, Jaime Nieto⁹, Mohamed Lifi⁹, Clàudia Rodés Bachs⁴, Konstantinos Koasidis², Vassilis Stavrakas¹⁰, Charalampos Platias¹¹, Alexandros Nikas^{*2}**

Recent efforts for stakeholder-driven integrated assessment modelling have remained scarce and limited to high-level consultations. In this research, we introduce a policy response mechanism, as practical how-to guidance for well-structured participatory modelling. In a nine-step approach, different stakeholder groups interact with modelling teams to form themes, co-create questions, co-develop modelling studies, co-design scenarios, provide feedback, and co-produce policy briefs. We validate this mechanism drawing on pertinent policy priorities to provide a stakeholder-driven modelling research agenda across eight regions (China, EU, India, USA, Ethiopia, Kenya, Sri Lanka, Ukraine), which was subsequently refined in collaboration with policy, industry, and societal actors. We present the step-by-step approach of the mechanism, the themes emerging from its operationalisation in the EU, and an overview of the resulting model inter-comparisons. In particular, we identified four policy themes (industry, electrification, green investments, and behavioural change); for instance, on the future of European industry, questions on the energy, climate, labour, and cost implications of reshoring critical industries and resilience to shocks of industrial decarbonisation trajectories emerged from our exchanges with policymakers. Building on questions across the themes, seven studies were put together—e.g., based on questions on future system configurations that are more susceptible to disruption from geopolitical events and on the impacts of a decoupling/multipolar world on clean energy technology supply chains, a study on the geopolitics of energy was put together. Studies were finally grouped into three themes for stakeholders to

engage and discuss in workshops, to refine, select models with appropriate capabilities, and co-design scenarios.

Paper Presentations 2: Communities

PA5 – Imaginaries corner

Energy modelling of community resilience: A transdisciplinary journey in fostering bottom-up energy initiatives **Vanja Djinlev (ETHZ)**

Navigating the evolving landscape of energy systems demands a multifaceted approach that combines engineering and modelling expertise with a holistic understanding of societal, economic, and environmental considerations. Transdisciplinary researchers play a crucial role in bridging these disciplines and involving citizens along the way to foster innovation and drive sustainable energy transitions. This paper delves into the unique intersection where a researcher from the energy engineering field transcends traditional engineering boundaries and ventures into the realm of social sciences to foster energy communities – a form of a bottom-up energy initiative. By adopting a transdisciplinary approach, engineers are not only contributing to the technical advancements of energy systems but are also actively engaging in community development and knowledge co-production, as tenets of energy communities. The role of engineers in this context is redefined – from modelers and providers of technical solutions to facilitators and catalysts of community-driven change.

However, cultivating these bottom-up initiatives is not without its challenges. The paper investigates the various forms of uncertainty that pose significant barriers to the development of bottom-up energy initiatives. These include regulatory ambiguities, market fluctuations, evolving technological landscapes, financial constraints, and community willingness and acceptance. Central to this paper is a case study from North Macedonia and the first energy community in the country, which provides insights into the practical aspects of building and sustaining energy communities in a transitioning energy landscape. The case study serves as a microcosm of the broader global challenges in transitioning to more resilient, community-driven, and sustainable energy systems.

PA6 – Imaginaries corner

Framing Energy Sufficiency in Swiss ski resorts: The case of Val de Bagnes, Verbier **Ivan Minguez (HES-SO) & Tristan Loloum (HES-SO)**

Nestled amidst the Swiss Alps, Verbier-Val de Bagnes faces a dual challenge: the imperative of energy

transition and sustainable tourism growth. Our interdisciplinary research delves into the intricacies of energy sufficiency within this context. Our study revolves around the research questions: “How can energy sufficiency be integrated into social representations of the tourism destination? How is energy sufficiency ‘framed’ by stakeholders?”

Methodologically, we employ qualitative interviews with local key-stakeholders of the destination to provide their interpretations of sufficiency. We also conduct participatory observations and analysis both grey literature and scientific literature. Our main sources draw from the concept of sufficiency, as explored by Villalba B. (2018) in “Sobriété énergétique : contraintes matérielles, équité sociale et perspectives institutionnelles.” Additionally, we delve into the concepts of Framing and the Process of Framing, guided by Cherqui and Bombenger (2019) in their study on energy transition dynamics in western Switzerland.

Narratives on sufficiency reveal significant variation within decision-makers’ point of views. These interpretations are influenced by their roles as well as the destination’s characteristics, growth trajectory and exclusivity. Disagreements exist over practices and the status of clients and residents, adding complexity to sufficiency discussions.

Developed in the context of the SWEET Lantern (WP9.2) project, this collaborative research contributes to framing sufficiency for low-carbon tourism planning. By bridging cognitive frameworks and social perceptions around the concept, we aim to illuminate pathways for sociotechnical changes within the energy transition context.

PA7 – Imaginaries corner

Understanding motivation and engagement in living labs: A Swiss case study **Sohre Annika (UNIBAS)**

Living labs, e.g. in PEDs or energy community settings, are key to achieving the sustainability transition. Through their transdisciplinary process they engage and integrate the needs of different local stakeholders to develop efficiency or sufficiency solutions for the local context. While most research on sustainability transition processes emphasizes the crucial role of collaborations between citizens and other stakeholders, there is a lack of integrated or transdisciplinary knowledge on the motivations of different stakeholders/residents in living lab processes and how these might impact longer-term engagement. Of particular interest are shared visions and goals, the ‘commitment’ of members, structural factors such as resources and organizational capacities (e.g. funding and leadership), as well as local connectivity.

Understanding these factors is crucial for the scaling up of living labs and for the replication of successful living lab processes into other settings. Moreover, it is crucial to systematically capture and compare future narratives and motivations of residents and other stakeholders within living lab settings regarding the energy future to derive meaningful future pathways within modelling efforts.

In this research, we investigate factors of motivation and engagement in transdisciplinary co-creation processes in living lab contexts. Specifically, we utilize a mixed method approach, analysing interview and focus group data of transdisciplinary co-creation and engagement processes in Switzerland. This paper aims to address the identified scientific research gaps by investigating factors of motivation and engagement in co-creation processes in the living lab context and beyond.

PA8 – Imaginaries corner

Innovative methods for energy policy-making? How the Living Lab Integrative Process enhances stakeholder engagement strategies in SSH energy research. Lessons learned from the methodological review of 11 research projects in SWEET Lantern **Fiona Zimmermann (HES-SO), Anton Sentic (ZHAW), Debora Frei (ZHAW)**

One of the core characteristics of Living Labs is the active involvement of users and other key stakeholders throughout a (sustainable) innovation process (Hossain et al., 2019). Due to an often high level of transdisciplinarity and sectoral diversity, use of appropriate methods and tools is crucial in enabling and optimising the impact of these innovations, leading to appropriate policy recommendations and the acceleration of the ongoing energy transition.

In such an environment, energy innovation can be leveraged by applying the Living Lab Integrative Process (LLIP) (Mastelic, 2019) using a range of participatory, analytical, and open innovation methods and tools to co-create interventions and facilitate knowledge exchange and reflexive learning in a safe environment shielded from incumbent system pressures (Smith and Raven, 2012).

This longitudinal study examines methods and tools proposed and applied in the research design of 11 interventions in the SWEET Lantern Project. A modified version of the Delphi method was initially applied to a sample of Researchers and Practitioners from various research fields within and beyond SWEET Lantern. The review was updated in year two of Lantern with a focus on how stakeholders are engaged, what narratives are

used, how their feedback is integrated into the research design and how barriers are addressed.

Differences in the methodological approaches of Researchers and Practitioners are identified and several important lessons learned in relation to stakeholders' strategies and expectations.

This research contributes to how SSH research can apply participative methodologies to drive sustainable policy outcomes. It also reveals how new innovative approaches, methods and tools can be applied in the Swiss and European research and practice community.

Paper Presentations 3: Participation

PA9 – Imaginaries corner

How to become an energy citizen the Swiss way: Preferences for engagement in RECs, motivation and barriers to energy citizenship **Iljana Schubert (UNIBAS)**

The energy transition will include decentralised and integrated energy systems, such as renewable energy communities (RECs). This will require a reconceptualization of participating actors, including citizens, within the energy system. Citizens will no longer just be consumers but will, in part at least, become energy citizens, who co-produce and change their energy demand patterns through increased engagement (and automation). This research investigates Swiss participant's preferences for engagement (type, frequency and flexibility of electricity consumption) in RECs and explores factors that influence motivations and barriers (and other decision-making factors) to perform energy citizenship activities (Willingness to join RECs, invest in renewable energy equipment, to monitor or automate electricity consumption with opt out). Findings are based on an online survey with a discrete choice experiment of 1000 quota-sampled Swiss participants from Romandy and German-speaking parts of Switzerland. They highlight decision-making factors relevant for modelling engagement/activation towards energy citizenship. In addition, we present key findings for preferences for engagement activities in RECs, relevant for developing different business models, or model engagement pathways. Findings are compared to results in other European countries, highlighting that preferences, motivations and barriers are similar across countries, with small variations.

PA10 – Imaginaries corner**From Stakeholder Engagement to Inclusivity: Advancing Participatory Modelling for Net-Zero Sustainable Development** **Victoria Herbig (ETHZ)** Stephanie Briers (ETHZ), Bianca Vienni-Baptista (ETHZ)

Integrated Assessment Models (IAMs) are crucial for climate policy-making but often emphasize technical accuracy over inclusivity and transparency. The Horizon Europe project "Delivering the next generation of Open Integrated Assessment Models for net-zero, sustainable development" (DIAMOND) addresses these issues by redefining participatory modelling through a transdisciplinary approach that emphasizes inclusivity.

This study aims to enhance models used to inform policy decisions by integrating diverse stakeholders' perspectives, improving model relevance and efficacy. Using a mixed-methods approach, this research outlines practices for inclusive stakeholder engagement within participatory modelling. Key elements identified include stakeholder representation ("Who is at the table?"), engaging diverse stakeholders ("How are stakeholders included?"), and collective decision-making ("How is their knowledge integrated?"). These elements ensure that IAMs reflect a broad spectrum of perspectives and foster a democratized, co-productive process of knowledge creation. The study underscores the importance of moving beyond traditional consultation towards genuine inclusivity, ensuring that marginalized communities in particular are actively involved and their voices valued.

While this research is grounded in the context of IAMs, the insights and methodologies developed are broadly applicable to other modelling contexts, including energy modelling. The findings provide significant theoretical insights and practical strategies for advancing participatory modelling, offering a template for inclusive stakeholder engagement that can inform more acceptable and equitable climate policies. By embedding inclusivity within IAM frameworks, this research advocates for a cultural and structural shift towards participatory, transparent, and accountable climate policy-making, essential for achieving sustainable and net-zero futures.

PA11 – Imaginaries corner**Fostering energy transition through participatory visioning of integrated regional development: a systematic experimental evaluation** **Matthias Buchecker (WSL) & Vrhovac Bozana (WSL)**

In spite of people's general support for energy transition, the implementation of renewable energy projects is widely blocked by local resistance. Recent literature sees a promising way out in integrating energy transition in participatory strategic spatial development planning on a regional level. Our transdisciplinary project aims at evaluating the potential of participatory visioning of future regional development for finding shared solutions on renewable energy production in the region. To achieve this goal, a comparative study was conducted that focuses on the evaluation of governance experiments in two Swiss and two Slovenian case studies using a quasi-experimental design. In the study region of Knonauer Amt, in order to measure the baseline, a standardized PPGIS-based survey was developed and sent to a random sample of regional residents as well as to the participants of the participatory visioning. In May 2023, a participatory visioning workshop following the approach of geodesign was conducted in collaboration with the regional marketing association, in which 45 representatives of regional interest groups were involved. The findings of the participatory workshop on regional development were published in media articles and in a virtual exhibition. Some weeks after the workshop, a second, nearly identical survey was sent to the respondents of the first survey as well as to the participants of the workshop. The repeated measurement allowed for a systematic evaluation of the effectiveness of the participatory visioning workshop in the sense of agreeing to shared solutions for regional energy transition. The findings will be presented and discussed.

PA12 – Imaginaries corner**Renewable Energy Siting in Switzerland: Public Opinion 2018 to 2022 as a Basis for Spatial Optimization Models Integrating Energy-Production, Ecosystem Services, and Social Acceptance** **Marcel Hunziker (WSL) & Boris Salak (WSL)**

In 2018, a representative survey was conducted throughout Switzerland as part of the NRP70-project "ENERGYSCAPE". The aim was to find out about the preferences of the general public regarding the siting of renewables in different Swiss landscapes. Late 2022, the survey was repeated to investigate whether the changed situation 2022 (Ukraine war, summer drought, increasing energy prices, political debate on solar parks) had effects on the preferences towards energy landscapes.

The results of the first survey 2018 showed that the public was more likely to accept renewables in some landscapes rather than in others: energy infrastructure is particularly rejected in unspoiled mountain areas, but that it also meets with rejection in the Prealps and the Jura.

People are more likely to accept those infrastructure in the settlement-dominated, and the agriculturally characterised Central Plateau and in mountain areas characterised by settlements and tourism.

The survey of 2022 showed that, compared to 2018, the Swiss population remains strongly opposed to renewables in almost untouched mountain areas. By contrast, Alpine landscapes characterised by tourism are newly considered as suitable as urban landscapes on the Central Plateau. This reveals potential for generating winter electricity from Alpine solar parks – if they are sited in places where they are best accepted.

The preference data were finally included into a spatial optimisation model that integrates the energy-production potential, ecosystem services and social acceptance. This model provides a comprehensive basis for evidence-based multi-criterial prioritisations and supports informed decision making in renewable-energy siting.

Paper Presentations 4: Technology

PA13 – Transitions corner

Does perceived economic viability of rooftop PV match with its actual viability?

Findings from a Swiss population survey **Mert Duygan (EPFL, UNIBE) & Maria Anna Hecher (EPFL), Jules Ghozland (EPFL), Claudia R. Binder (EPFL)**

According to the diffusion of innovations theory, the perceived attributes of a technology or innovation are decisive for its adoption. In case of rooftop PV, which generally has a positive image in terms of environmental benefits and technical reliability, economic factors tend to be the most critical attributes. While the costs of PV have significantly reduced over the last years and reached grid parity in many locations, its perceived economic viability by potential users might be different than its actual viability. Given that perceptions can play a key role in the decision-making process; in order to increase the uptake of rooftop PV, it is crucial to identify the factors determining its perceived viability. We will present our findings from a Swiss population survey investigating a potential discrepancy between the perceived and actual economic viability of rooftop PV, and identifying what factors could be causing this discrepancy.

PA14 – Transitions corner

Unleashing Flexibility for a Sustainable Energy Transition: A Niche Readiness Level Model for Direct Current Technologies
Reinhard Madlener (RWTH Aachen University)

Due to the rapidly increasing share of renewable energies, especially solar and wind power, the transformation of energy infrastructures requires a reorganization of the traditional top-down grid design towards flexibility. This might be accomplished with configurations based on direct current (DC) technologies. Thereby, technical and socio-economic challenges are substantially intertwined and cannot be addressed separately. Particularly at the level of individual private households and communities, a complex interplay of regulations, spatial design, technology perceptions, user practices and economic considerations steers the actual adoption and diffusion of novel technologies. Therefore, to focus simply on levels of technological readiness is clearly insufficient and needs to be aligned with the question of the actual socio-economic readiness of innovations. To fill this gap, we present a novel Niche Readiness Level (NRL) Model for assessing the readiness of socio-economic niches that embraces many different socio-economic aspects. Specifically, we consider five mechanisms to be relevant: Framing, Exploration, Standardisation, Acceptance, and Imitation (Schöpfer et al., 2023, 2024). Assessing the niche readiness of DC applications can provide critical insights on how to accelerate the mainstreaming of socio-economic innovations in the energy sector. For creating opportunities and experimental space for non-standard technological options, it is important to identify the most relevant societal needs of different groups, including grid operators, investors, insurance companies, regulators, manufacturers, architects, policy makers, and others. The proposed NRL model provides an approach to systematically describe the interactions of these groups through a novel conceptual lens based on a mechanistic and interdisciplinary ontology.

PA15 – Transitions corner

EVAdopt: De-biasing electric vehicle adoption with personalized nudging **Ursa Bernardic (ETHZ), Davide Cerruti (ETHZ), Massimo Filippini (ETHZ), Jonas Savelsberg (ETHZ), Giuseppe Ugazio (UNIGE)**

Replacing combustion engine vehicles with battery electric vehicles (BEV) is essential to achieving climate objectives and advancing sustainable transportation, aligning with the United Nations Development Goals and the Paris Agreement. In this project, we identify three perception biases linked to EV adoption and address them with personalized non-monetary information treatments to increase the adoption of BEVs among owners of internal combustion engine vehicles. In a randomized controlled trial with 3181 car owners, we measure the extent of perception biases about range anxiety, charging anxiety, and total cost of ownership

(TCO). We find that individuals have strong misperceptions related to these three aspects. In a randomized control trial setting, we then introduce three personalized information interventions to correct each of these biases, based on actual driving and parking behaviour. Our results show that these treatments, and especially the TCO information treatment, are effective in increasing purchase preferences toward BEVs.

PA16 – Transitions corner

Zukunft Alpenstrom. Energy cultural landscapes in climate-positive alpine communities: Pontresina Case Study Veronika Studer-Kovacs (UNILU)

The debate over expanding renewable energy in the Alpine region, particularly around the establishment of alpine photovoltaic (PV) fields in open spaces, reveals conflicts extending beyond typical energy infrastructure issues. These primarily involve clashes between urgent renewable energy needs and nature and landscape conservation concerns.

A notable example is the planned large-scale PV plant by Pontresina on the southern slope of Piz Albris, which is located within the protected BLN area of the Upper Engadine Lake Landscape and Bernina Group, and within the UNESCO World Heritage-listed Bernina Pass. The controversy in Pontresina illustrates how aesthetic and narrative reflexes as well as identity concepts impede energy transition and create tensions between alpine-urban and local-national stakeholders. Moreover, the project underscores the conflict between traditional, locally focused conservation efforts and a broader, Earth-system based approach to protection. The former relies on historically established perceptions of Alpine landscapes, while the latter asserts that local considerations cannot be separated from planetary contexts and questions the aesthetic and narrative practices underlying traditional conservation.

The presentation will highlight the intersection of landscape institutionalizations – UNESCO and BLN – in Pontresina, examining their historical justifications and exploring how they could and should be updated. This includes integrating the installation of an alpine PV field in open spaces into the overall framework of the two conservation concepts, particularly in relation to fostering a dynamic energy cultural landscape in Bernina and contributing significantly to climate mitigation for the long-term preservation of glaciers.