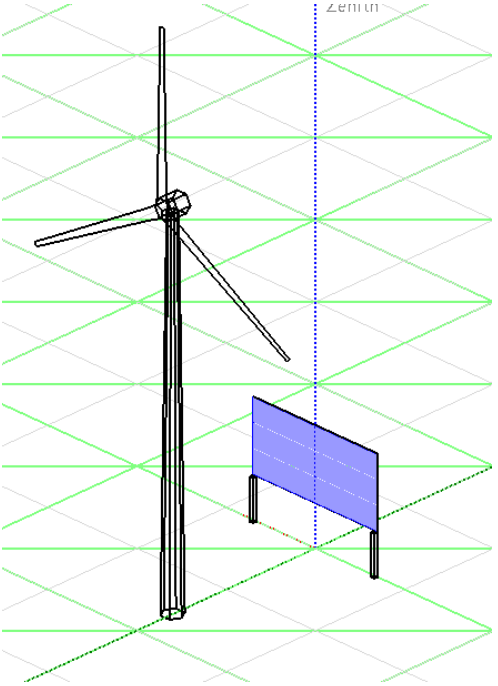
EDGE: Decentralized Renewables for Switzerland

Swiss Federal Offices Day, 07.10.2024, EPFL, Michael Lehning

sweet swiss energy research for the energy transition
EDGE

EDGE is a consortium sponsored by the Swiss Federal Office of Energy's SWEET programme and coordinated jointly by UNIGE and EPFL

SWEET EDGE objectives



- **VISION: fast-track the growth of locally-sourced decentralized renewable energy in Switzerland**
- develop new national-level scenarios and implementation pathways with high shares of decentralized renewable energy by 2050, including options for nearly or fully renewable Switzerland
- ensure that by 2050, when ambitious shares of renewable energy are reached, the Swiss energy system is designed and operated in a technically and economically optimal and secure way, and that it is well positioned in the European markets
- identify tailor-made **solutions** for the Swiss cities, midlands, and the Alps for largely electrified and multi-carrier energy systems
- combine research with innovation in three Pilot and Demonstration project clusters (P&Ds)

Rephrasing in 4 Research Questions

1. How do regional socio-economic-technical factors influence installations?

2. What are key challenges in the energy transition?

3. What can we learn from directly working with P&Ds?

4. What solutions can we propose?

Soul of EDGE

Back to the soul of EDGE: De-block the energy turn-around

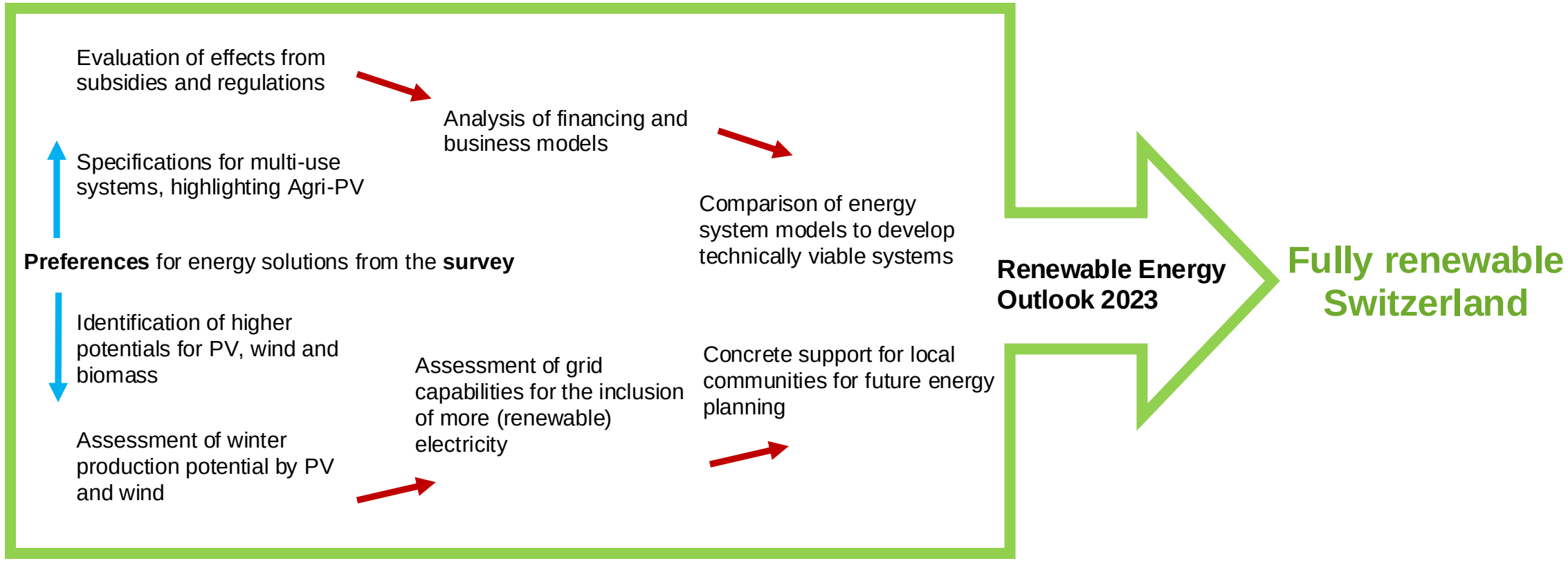
- Starting from the survey: what are the ”acceptable” renewable energy options
- ➔ Solar- and Wind Express
- Strong opposition➔EDGE shows pathways
  - Update potential estimates
  - Show financing situation
  - Update grid requirements and future demand
  - Show local solutions (recommender tool)
  - Present national scenarios

➔ Add additional criteria to siting recommendations and realize smaller unit of wind and solar parks


Photo credit: thatdamguide.com

Selected Activities

The EDGE consortium integrates individual activities towards first overarching results, helping to increase the pace of the Swiss energy transition.



The EDGE Renewable Energy Outlook for Switzerland (REO) received high attention

NZZ

ehrgeizige Ziele erreichen

In zwei Monaten kommt das neue Stromversorgungsgesetz an die Urne. Die Gegner halten den darin geplanten Ausbau der erneuerbaren Energien für illusorisch. Nun zeigt eine Studie: Das Ziel ist ambitioniert, aber machbar.

Jürg Meier
08.04.2024, 05.30 Uhr · 5 min

Hören · Merken · Drucken · Teilen

Développer les énergies vertes minimisant leurs impacts, c'est

PASCALINE MINET
@pascalineminet

RESSOURCES La loi sur l'approvisionnement en électricité, soumise à votation le 9 juin, prévoit d'augmenter rapidement la production issue de sources renouvelables en Suisse. Des simulations montrent qu'il existe diverses solutions pour y parvenir

Faut-il déployer massivement les énergies renouvelables en Suisse? C'est la question à laquelle le peuple devra

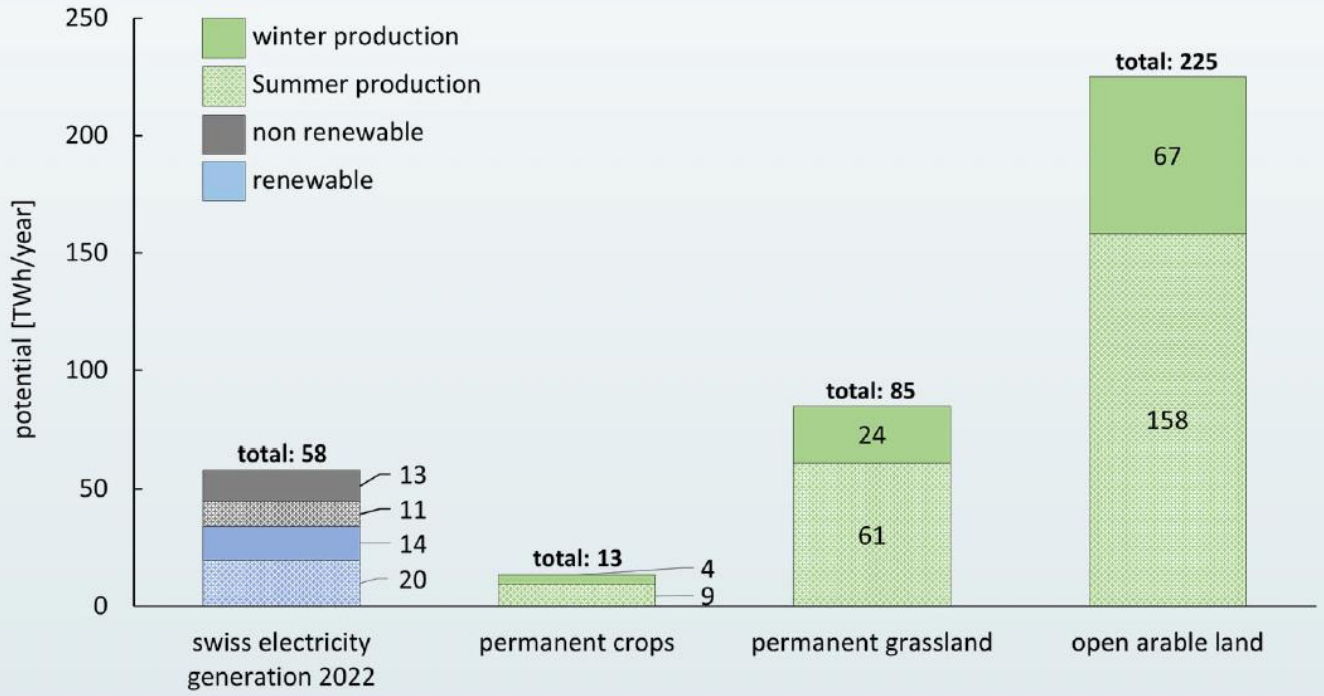
d'électricité issue de ces technologies à 35 TWh en 2035. Ceci afin de compenser l'abandon prévu du nucléaire et de faire face à l'accroissement attendu de la demande en électricité, en raison de l'électrification du parc automobile et du chauffage.

Bonne nouvelle: quoique ambitieuse, la cible de 35 TWh/an en 2035 n'est pas hors de portée, estime un consortium de chercheurs issus de plusieurs universités et grandes écoles, dont le rapport publié en début d'année a été financé par l'Office fédéral de l'énergie.

Since its publication, the Renewable Energy Outlook for Switzerland (REO) was downloaded close to 1'900 times.

It was highlighted in close to 40 articles, including the national ones: NZZ, Le Temps, as well as on TV in the SRF Eco Talk (14:48) and the RTS (04:21).

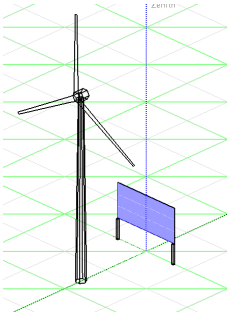
Highlighting Different Options – AgriPV – P&D



The Swiss agri-PV potential totals around 323 TWh/a and is therefore more than 5 times higher than Switzerland's current total electricity production.

The average share of winter electricity is 29 %.

P&D in the Alps



Adressing the Winter Electricity Gap

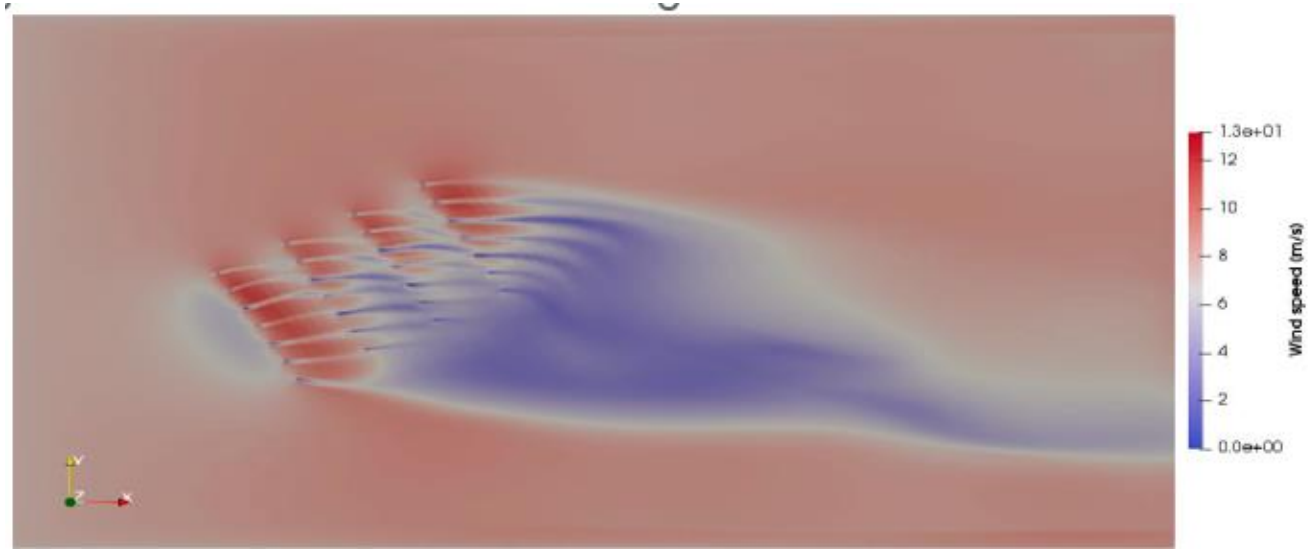
- Large Alpine PV plants Samedan
  - ➡ Gondo
  - ➡ In ski areas (Totalp, Madrisa)
- Connect to wind farm developers (Gotthard, Lukmanier)
- Ongoing Innosuisse Muttsee – Production Advantage Confirmed (first) – Then comes 2024

SUNWELL

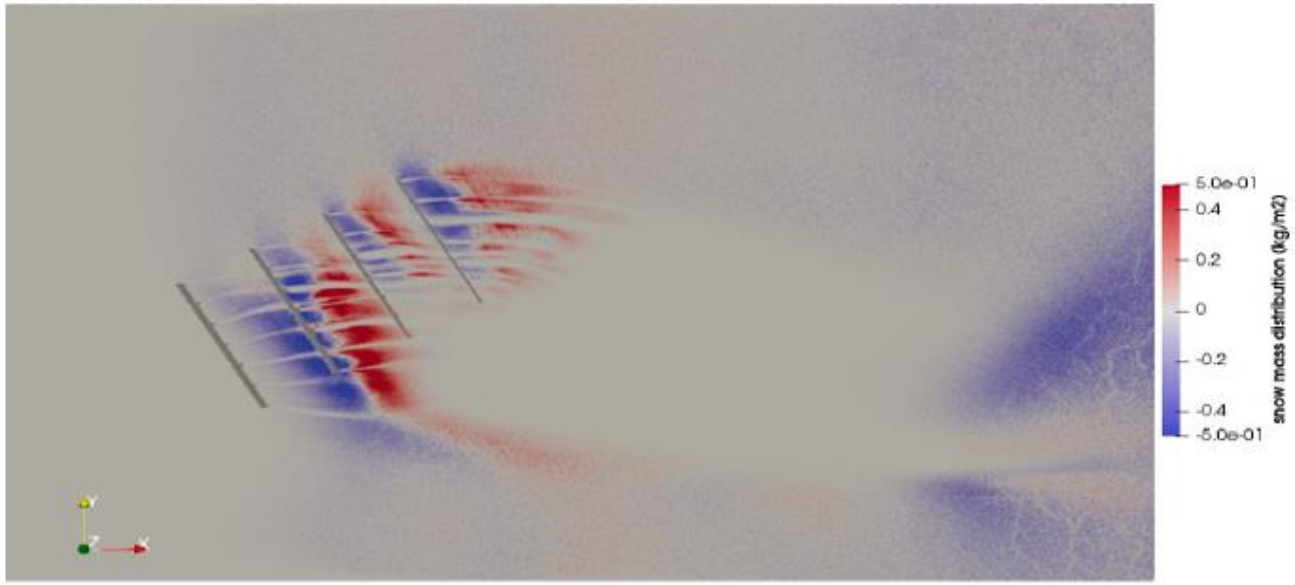
New SFOE P&D : Samedan (SamSo)

On request of a cooperation partner, a new wind model was developed, which allows to make accurate estimates of the maximum wind loads in PV panel fields. This feature is crucial for the design and dimensioning decisions.

The new feature can also be used in future to study snow accumulation in alpine PV fields and develop accumulation mitigation features.



Wind loads on PV panels for the design planned for the Samedan Alpine PV plant



A first assessment of potential snow accumulation between the rows of the Samedan plant.

P&D in the Alps – Biodiversity

In the P&D Samedan, the following factors relevant for biodiversity will be under examination:

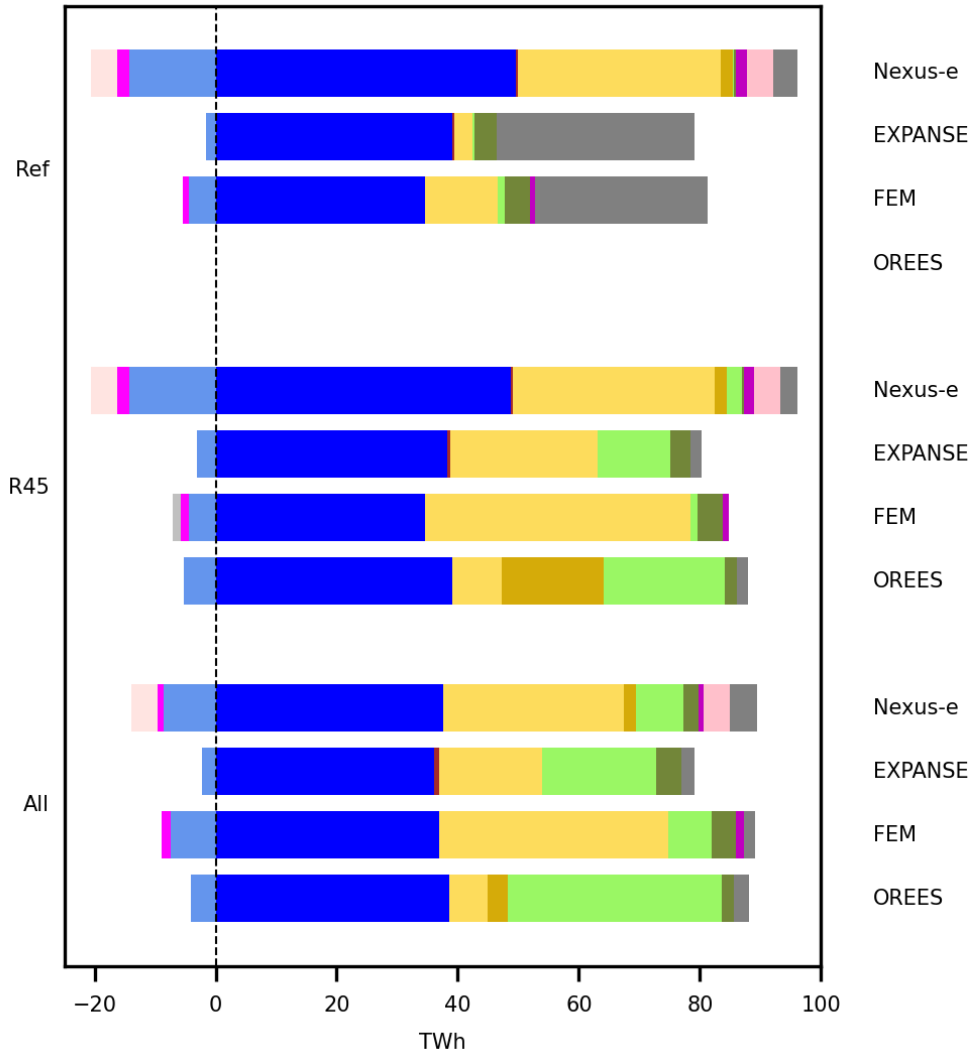
- Overall influence of the installation on the overall biodiversity
- Productivity and quality (content of fiber and nutrients) of the plant communities
- Possibility for dual-use/multi-use

Erneuerbare Energien, Pressemitteilungen, Solarparks 26.09.2024

Studie: Solarparks positiv für Artenvielfalt

Berlin, 26. September 2024 – Wird auf ehemaligen Ackerflächen ein Solarpark errichtet, steigt die Anzahl und die Vielfalt an Pflanzen und Tieren deutlich an. So konnten in PV-Freiflächenanlagen über 350 unterschiedliche Pflanzenarten und eine Vielzahl von Vogel-, Reptilien- und Insektenarten nachgewiesen werden. Das zeigen die heute veröffentlichten ersten Auswertungen der umfangreichen Untersuchung „Artenvielfalt im Solarpark – Eine bundesweite Feldstudie“, die der Bundesverband Neue Energiewirtschaft e.V. (bne) in Auftrag gegeben hat.

National Scenarios and Policy Implications

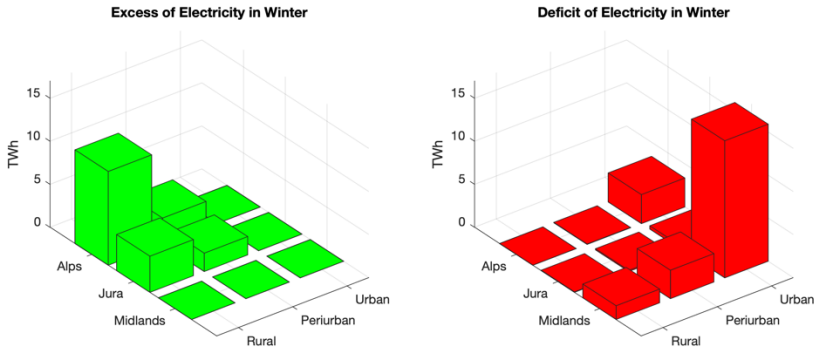


No target – TYNDP 2022 scenario

45 TWh target renewable generation

Add 5 TWh winter import and network capacity restriction

Wind dominated



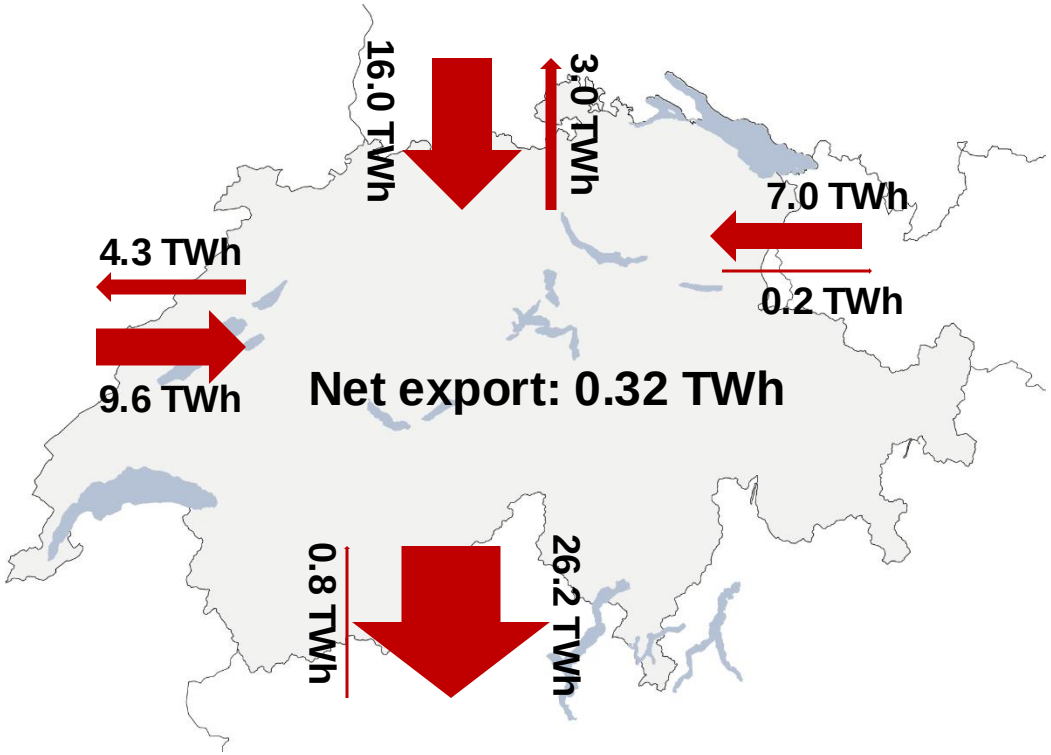
Policy Implications:

- Improve Solar- and Windexpress
- Generate positive reputation for de-centralized installation
- Support grass-root initiatives
- Stay “Alpine”

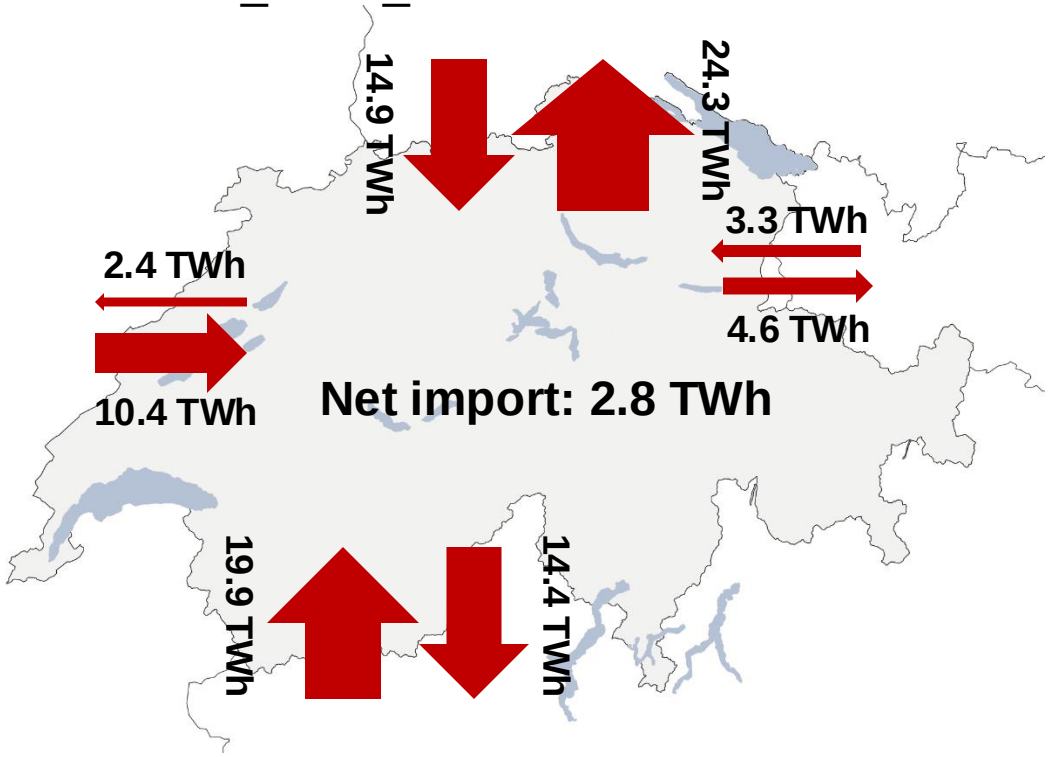
EDGE is supported by the SWEET programme

Imports and Exports

2015



2050: R45_**N100_WNC**



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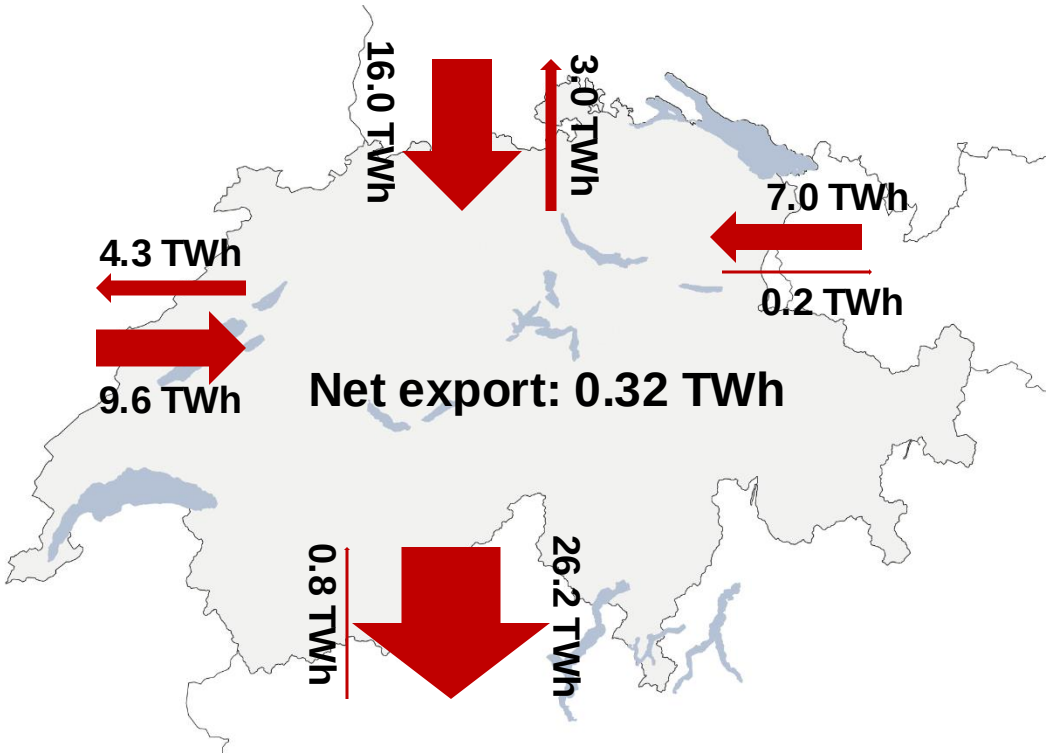
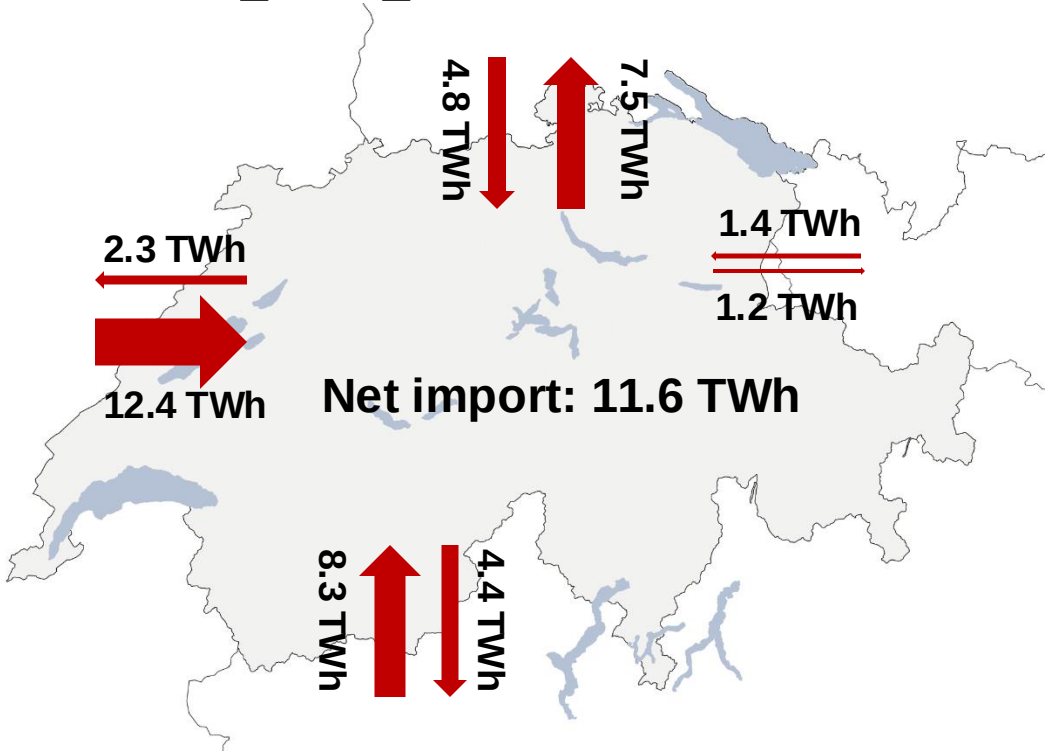


2050: R45_**N030**_WNC



- Reducing integration with Europe does <u>not</u> reduce net imports

Conclusion

- **De-centralized renewable energy generators are feasible and realistic for Switzerland: Technically, Economically and Socially**

- **Challenges exist and are adressed by the EDGE consortium from local to national scales**

Please contact us for any questions or comments:

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