

Meta-study of potential for photovoltaic installations in Switzerland

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This poster presents a meta-analysis of photovoltaic potential studies in Switzerland. Despite wide discrepancies across studies, recent assessments consistently indicate a rooftop PV potential of 50–60 TWh/a. This conservative estimate alone is sufficient to support the realization of Switzerland's energy transition. Moreover, time plays in favor of PV deployment, as average module efficiencies continue to increase.

Introduction

Numerous studies have been conducted to evaluate the potential of photovoltaic systems in Switzerland, considering roofs, facades, infrastructure, or free land installations. An overview of them will be given here. Efficiency of solar cells has steadily increased in the last years [1], showing the important potential this technology has for Switzerland's carbon neutrality goals.

Methodology

All studies on PV potential published between 1998 and 2023 were collected. The underlying assumptions were extracted from these studies. In addition, the authors were contacted and asked about their participation in this meta-study as well as about the accuracy of their data. The data were subsequently classified into different categories, such as roof and façade potentials. Missing values required were calculated and defined. Afterwards, all potentials were normalized to a PV module efficiency of $\eta_{Mod} = 20.55\%$.

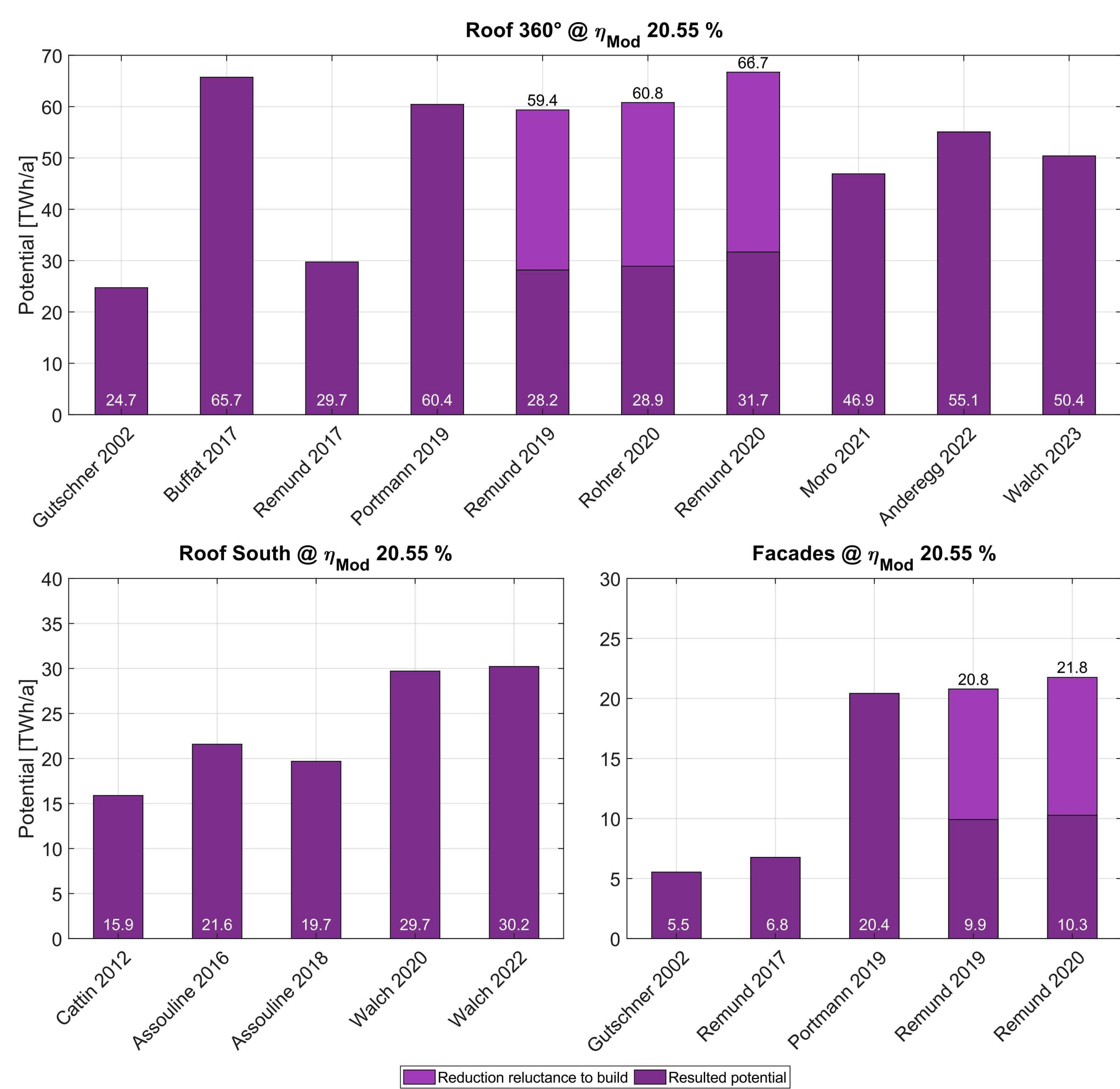


Figure 1: Comparison of PV potential studies for roofs without orientation restrictions (roof 360°), roofs with orientations from -90° to 90° azimuth (roof south) and facades considering the same solar module efficiency of 20.55%.

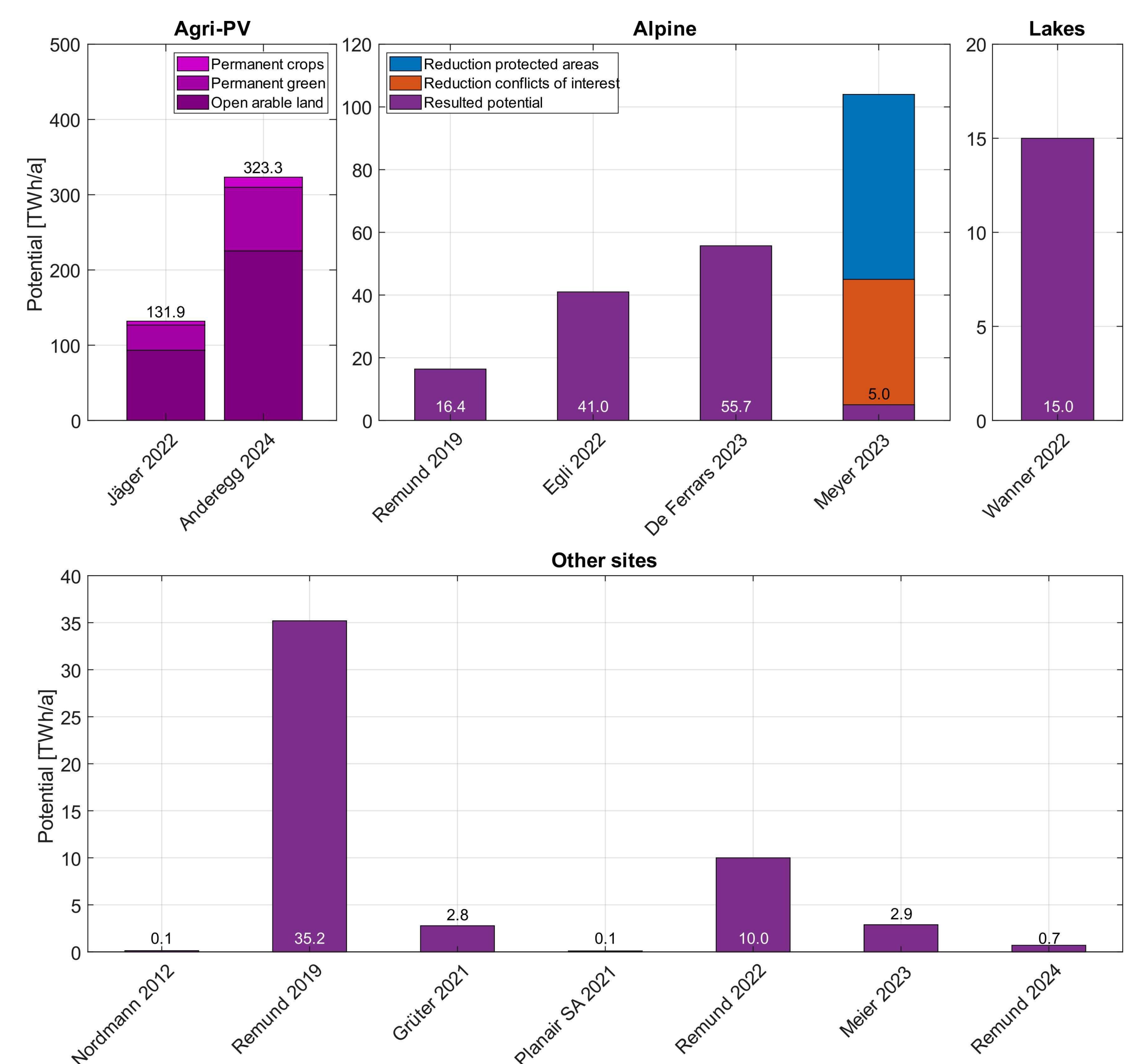


Figure 2: Comparison of PV potentials in other locations. Other sites include, for the highest potential, installation on embankments along roads and reservoirs/dams. Installations in non-constructed areas or on free lands are critical and their actual potential is highly uncertain.

Conclusion

PV-technology potential from roofs and facades combined, even under conservative assumptions (70 TWh/a), would be sufficient for the realization of the Swiss Energy strategy. Significant additional potential has been identified by several studies as well on agricultural land, alpine land, lakes, and other infrastructures. Not fully covered PV-roofs can be seen as a «PV potential killer», as it is not expected that PV installations are changed within the life-time of a PV-module. The lack of reserves and the risk of bottlenecks, especially in winter, could cause issues in power supply, which could be compensated by expanding on alpine PV systems for much needed «winter energy» [2].

References

- [1] Photovoltaik-Barometer 2025: Trends und technische Daten aus der Solarbranche, URL: www.pv-barometer.ch
- [2] Hügi et al., December 2025, Hügi, M., Wyrsh, N., Bucher, C., Hess, D., Ballif, C., Meta-study of potential for photovoltaic installations in Switzerland, URL: <https://doi.org/10.1016/j.egy.2025.08.035>

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