Incentive Structures and Rooftop Suitability in Swiss Solar PV Adoption

A Data-Driven Analysis of Policy Impact and Untapped Potential

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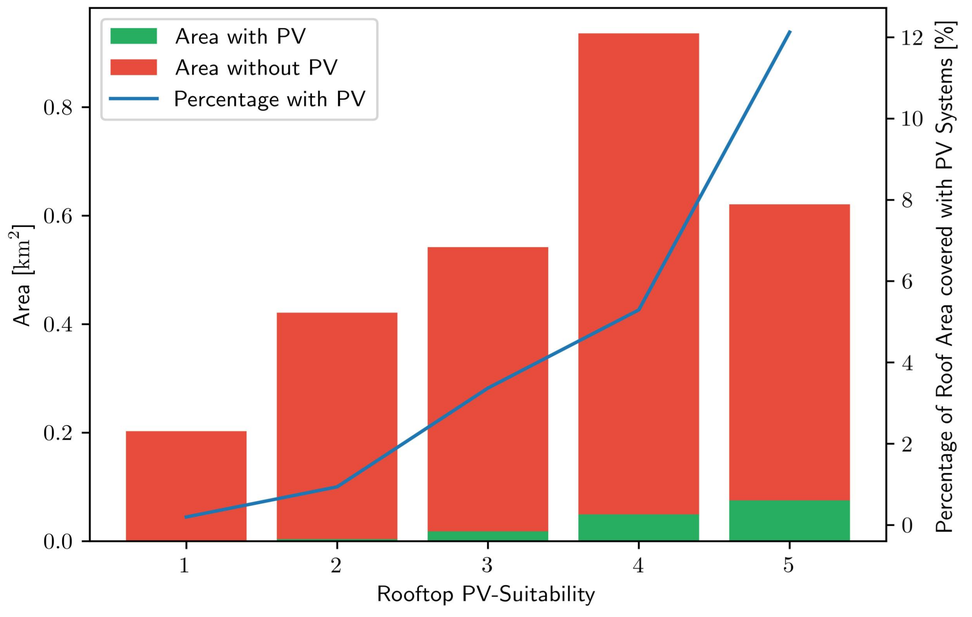
Introduction & Background

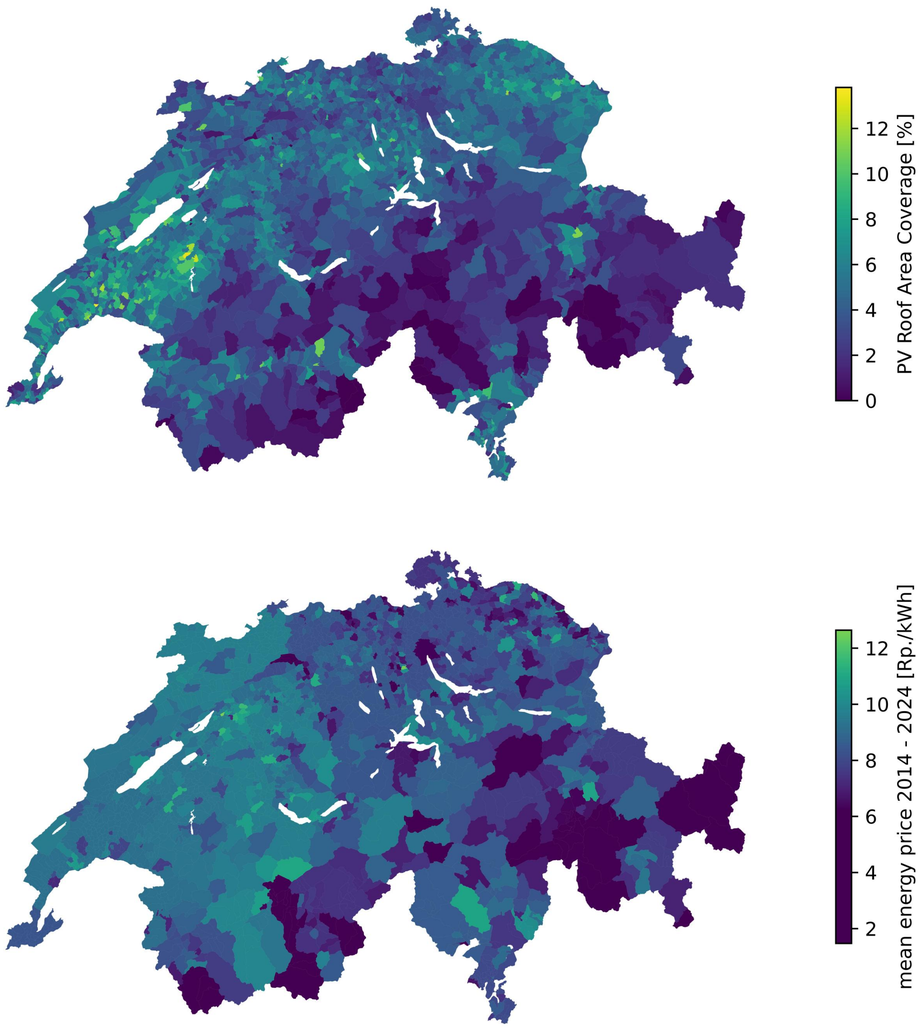
Despite a massive solar **potential of 67 TWh/year**, Switzerland is only **producing 4.6 TWh/year**. Our research investigates how incentives and rooftop suitability shape deployment.

Methods

- Merged **PV installation data** (Pronovo) with **rooftop suitability** (Sonnendach.ch).
- Rooftop **suitability** of **flat roofs** were **increased** by one.
- PV **mapped** to **exact roof** based on roof areas and kWp.
- **Compared similar municipalities** with different **policies**.
- Investigated **distribution** of built PV based on **suitability identifier and location.**



Distribution of PV area with or without PV plants installed based on class specifier in Thun.
The x-axis shows the suitability classes into which the roofs in Thun have been categorized (cf. Sonnendach.ch). The green bars represent the total area of roofs in each class that already have a PV system. The red bars show the amount of roof area that remains unused. The blue line indicates the percentage of roof area in each class that is equipped with a PV system.



Percentage of Roof Area covered with PV plants and mean electricity prices.
Depicted are all municipalities of Switzerland, color-coded according to the percentage of roof area coverage and the average electricity price (see legend on the right). The average energy price has been calculated over a period of ten years.

Conclusion & Key Takeaway

- We're **far behind** the **34 TWh/year** target by 2050.
- PV **coverage** on rooftops with **low irradiation** is very **low.**
- **Subsidies** can **increase PV adoption.** ---> "Only good roofs." Or "All roofs are welcome.".

Results

Suitability vs. Installation Rates:

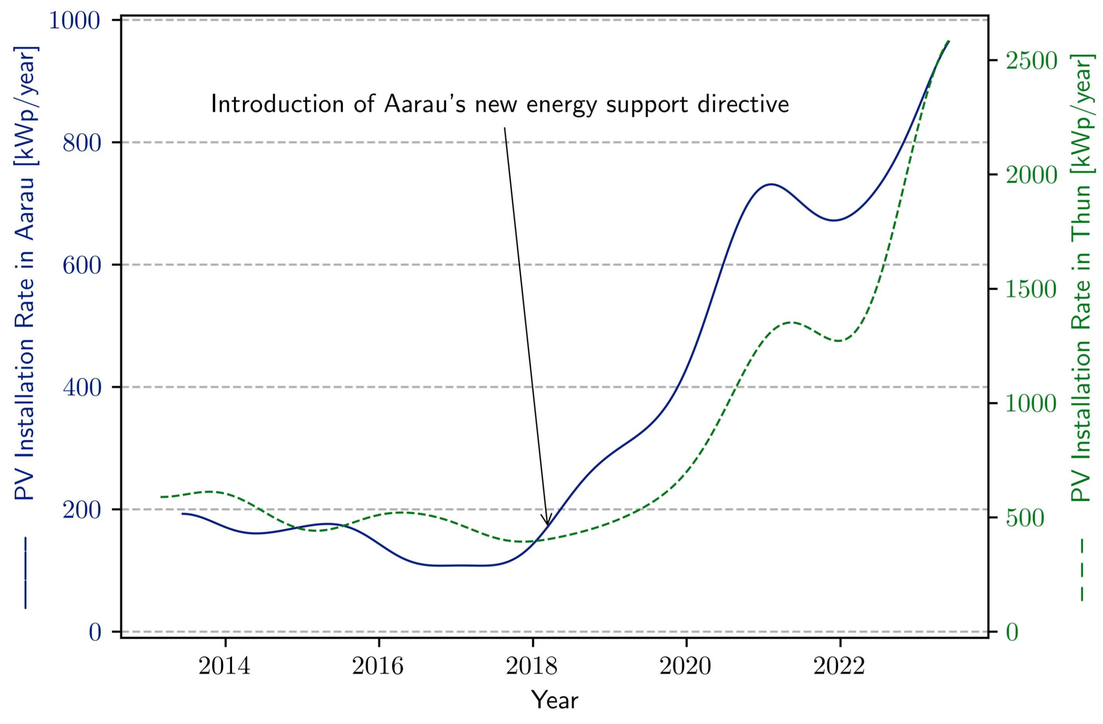
- more PV systems installed on **high-quality roofs**.
- This pattern holds **across all regions** of Switzerland.
- Roofs featuring solar PV often **not** used to their **full potential.**

Effects of Policies:

- Local **energy support directives** impact adoption rates.
- **Example:** After Aarau introduced a **new directive**, PV installations **rose more** than in comparable cities.

Role of Electricity Prices

- **Little correlation** between **PV uptake** and **electricity prices** or feed-in tariffs.



PV installation trend in comparable municipalities Aarau and Thun.
Shown are the PV installation rates in Aarau (blue line) and in Thun (dashed green line). The x-axis represents the timeline. The arrow points to the introduction of a new regulation in Aarau that promoted renewable energy.