

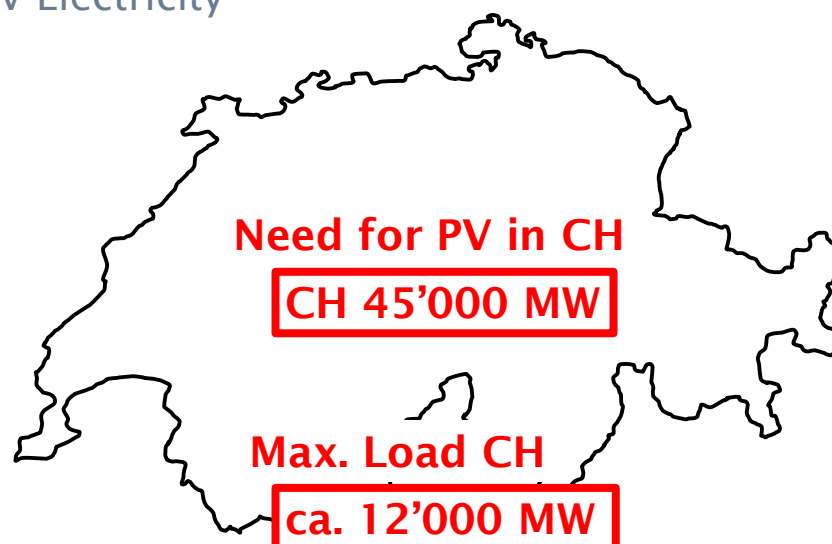


Incentives for Grid-Friendly Solar Power Feed-In: An Overview

23. Schweizer Photovoltaik-Tagung, 1./2. April 2025, Bern
Prof. Dr. Christof Bucher

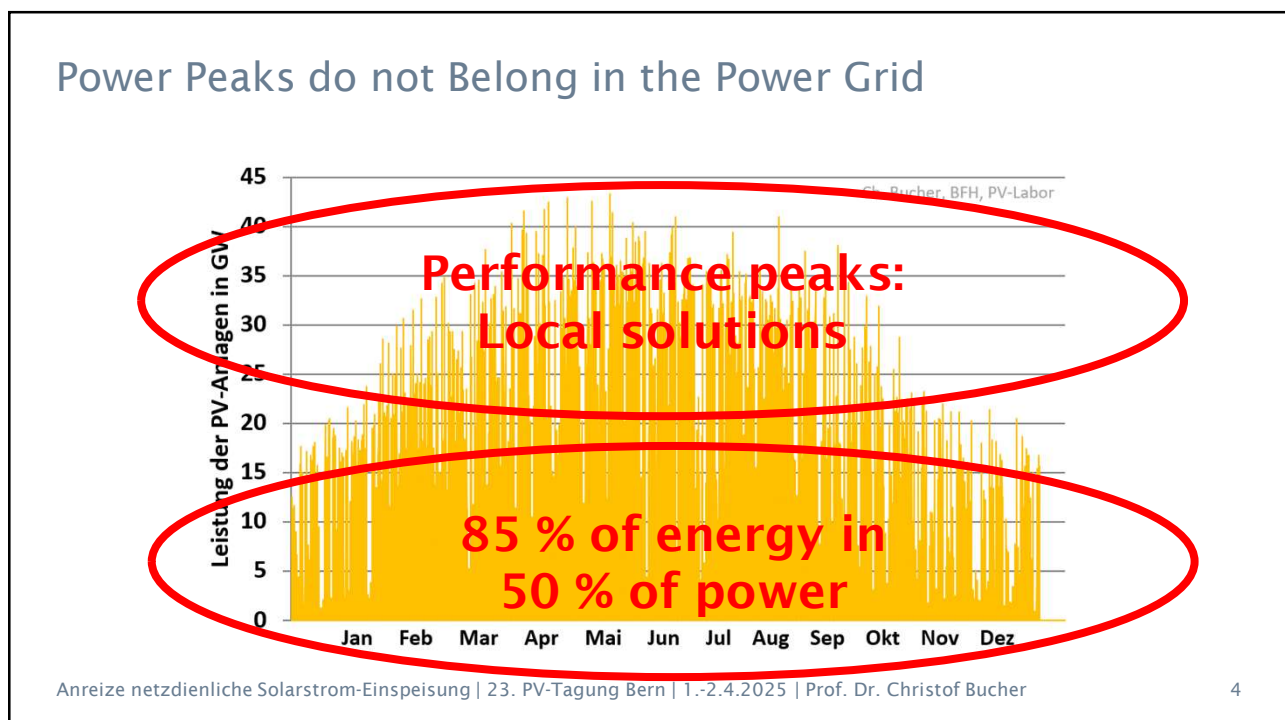
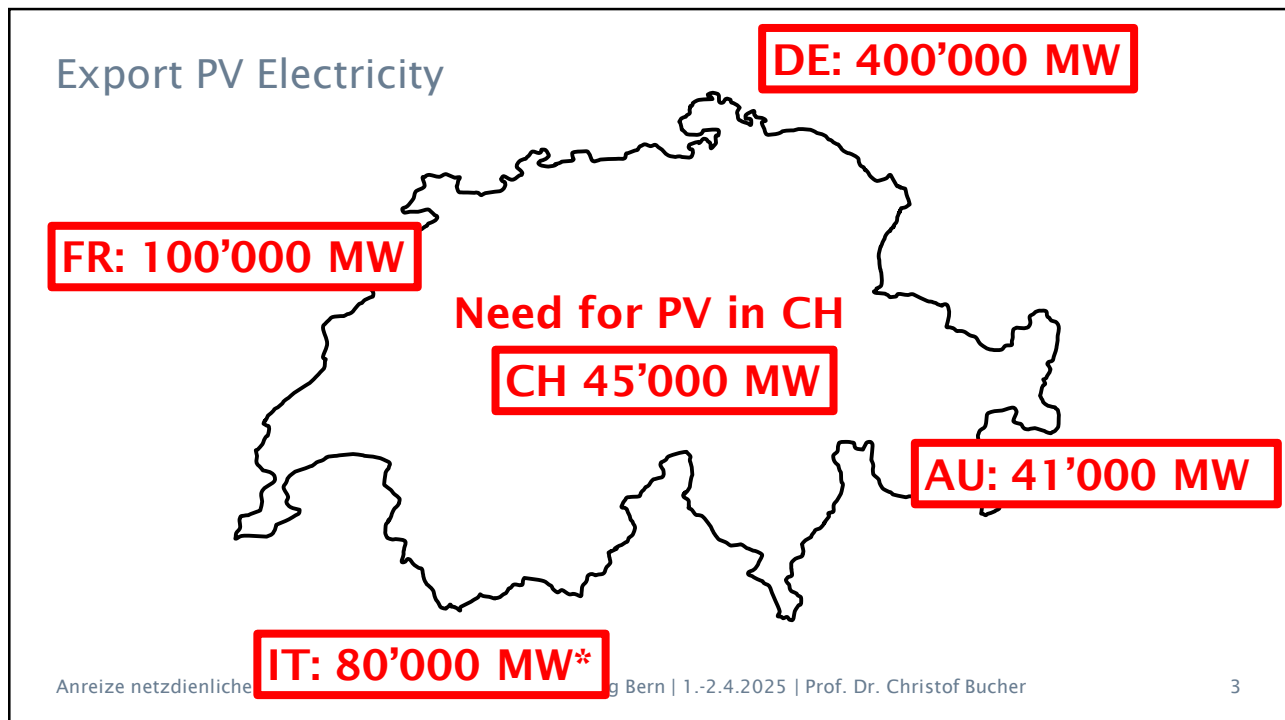
► Berner Fachhochschule | www.bfh.ch/pvlab

Export PV Electricity

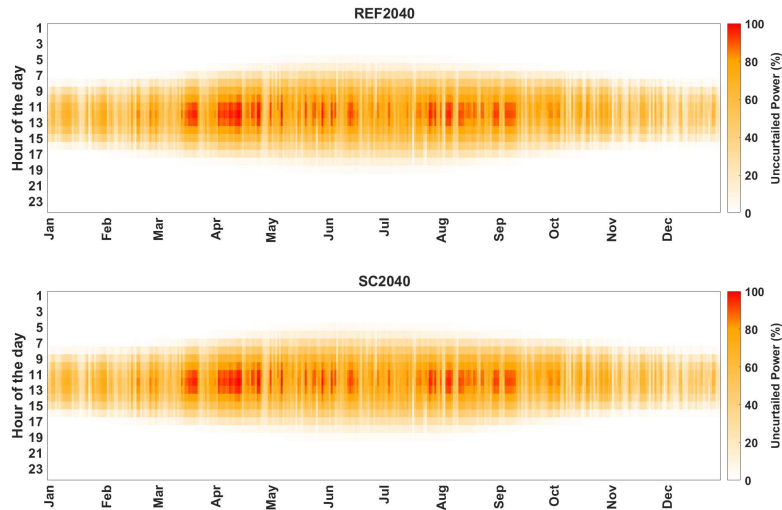


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PV Production before Curtailment



REF2040

«Reference»

- ▶ 25 GW PV
- ▶ 15% Curtailment

SC2040

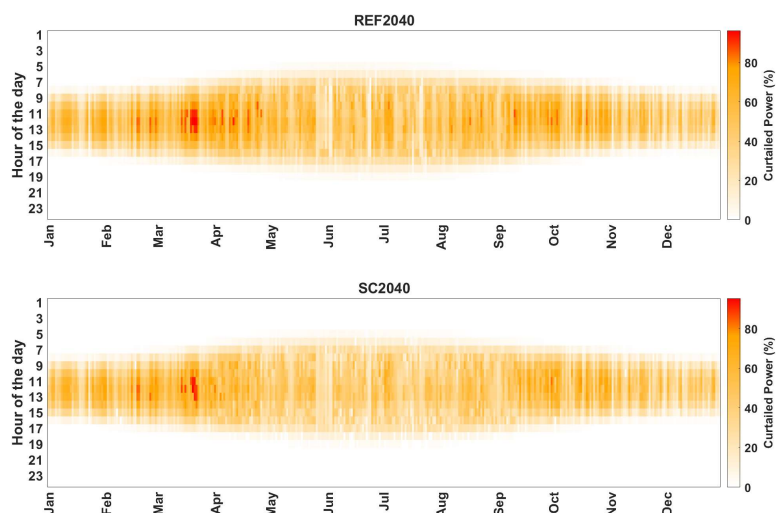
«Sector Coupling»

- ▶ 30 GW PV
- ▶ 23% Curtailment

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PV Production after Curtailment



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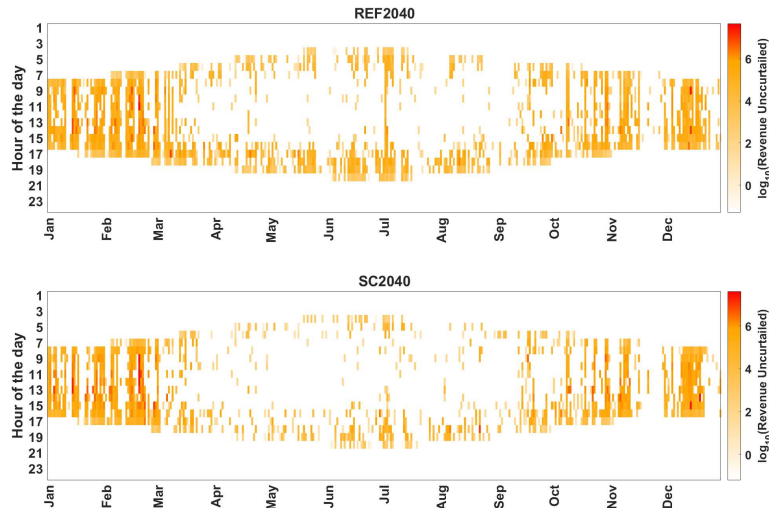
«Sector Coupling»

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- ▶ 23% Curtailment

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Value of Solar Power without Curtailment



REF2040

«Reference»

- ▶ 25 GW PV
- ▶ 15% Curtailment

SC2040

«Sector Coupling»

- ▶ 30 GW PV
- ▶ 23% Curtailment

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Value of Solar Power including Curtailment



REF2040

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SC2040

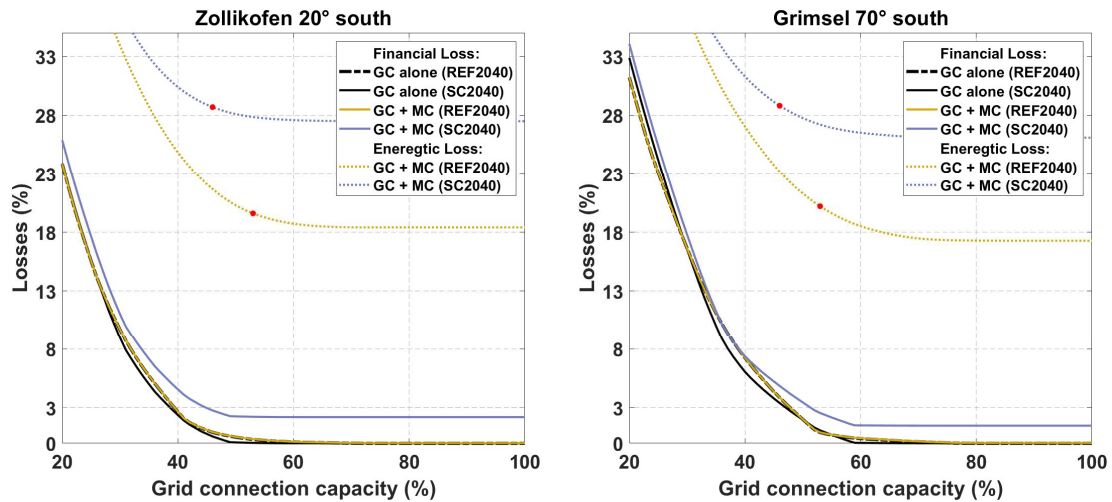
«Sector Coupling»

- ▶ 30 GW PV
- ▶ 23% Curtailment

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Financial Losses as a Function of the Connection Capacity



Total Financial Losses of 3 % at 40-50 % Grid connection capacity

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Consequences of Market-Based Curtailment

Loss Energy Yield: ~20%

Loss Financial Yield: ~2%

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Conclusion

- ▶ The market will not be able to absorb full PV production
- ▶ The top 60% of the power of the grid connection hardly contributes to the financial yield of a PV system.
- ▶ For the energy that the market can absorb, only about 40% grid connection capacity (kW/kWp) is needed

To increase the share of solar power, we do not need stronger distribution grids, but more flexible prosumers (PV systems, consumers and storage systems)

Market economy: We need incentives, so that end customers can build and operate their PV systems flexibly

TOP-40

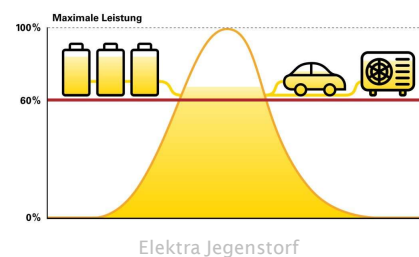
- ▶ TOP-40% of power not to be fed into the grid
- ▶ Remaining feed-in is remunerated higher.

Advantages:

- ▶ Simple instructions, simple implementation, simple control

Disadvantages:

- ▶ Only little influence on consumption
- ▶ Only partial optimisation
- ▶ Deadweight effects (e.g. East-West installations)



Dynamic Feed-In Pricing

- ▶ Switzerland: Grid tariffs
- ▶ Other countries / large consumers: Energy tariffs

Advantages:

- ▶ Comprehensive optimisation / grid support possible
- ▶ Business case possible with flexibilities
- ▶ Scope can be expanded as desired

Disadvantages:

- ▶ Optimal exploitation only with automation
- ▶ For end customers, this may be unpredictable / arbitrary
- ▶ Complex (for DSOs and end customers)
- ▶ Rebound effects possible with day-ahead implementation



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Dynamic High and Low Tariff Periods

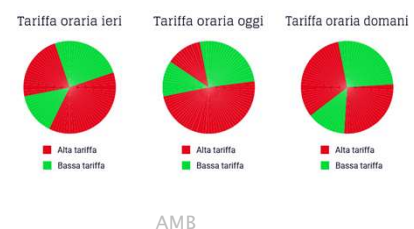
- ▶ Well-known high and low tariffs
- ▶ Dynamic times

Advantages:

- ▶ Partially existing structures

Disadvantages:

- ▶ Only limited optimisation possible

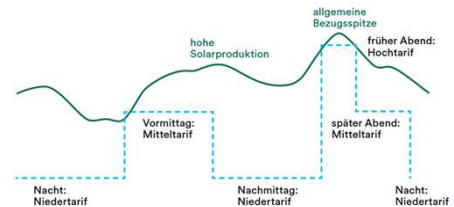


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Other

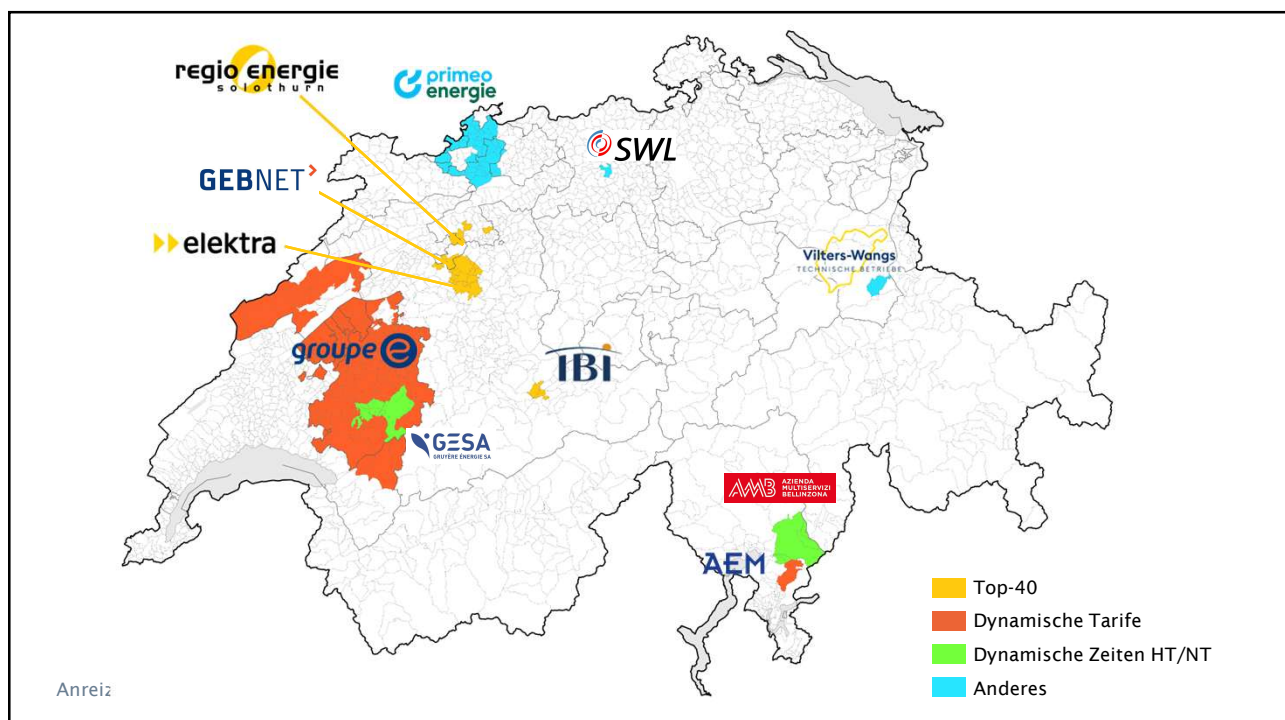
- ▶ TOP-x (Flex 50, Flex 60)
- ▶ Multi-tariff system
- ▶ Flat-rate funding for grid support



Primeo

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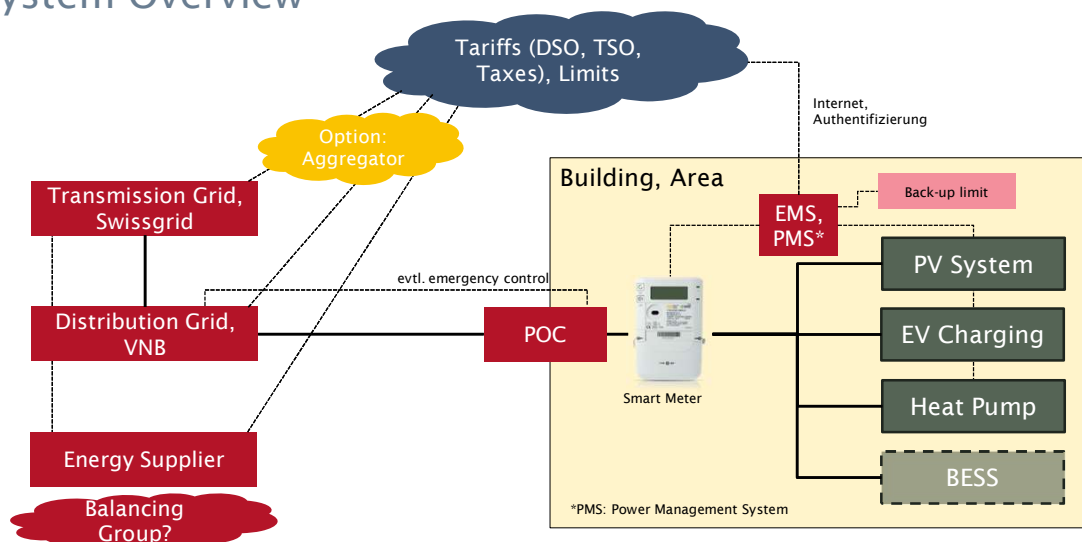


Overview

- ▶ **Dynamic Pricing**
 - ▶ Groupe E
 - ▶ AEM
- ▶ **Dynamic Times HT/NT**
 - ▶ AMB
 - ▶ Gruyère Énergie
- ▶ **TOP-40**
 - ▶ Elektra Jegenstorf
 - ▶ Regio Energie Solothurn
 - ▶ IBI
 - ▶ Gebnet
- ▶ **Other**
 - ▶ Primeo (HT / MT / NT)
 - ▶ SWL (FlexPV50, FlexPV60)
 - ▶ Vilters-Wangs (flat rate)

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System Overview



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How do Prosumers react to Dynamic Tariffs?

- ▶ Agenda: BFH Fachtagung
Netzanschluss
- ▶ www.bfh.ch/fachtagung-netzanschluss
- ▶ 3rd of June 2025, 14:00 – 18:30 Uhr
- ▶ Burgdorf

The screenshot shows the event page for 'Tagung / Fachtagung Netzanschluss 2025'. It includes a description of the event, the date and time (03.06.2025, 14:00–18:30 Uhr), and the location (Burgdorf / hybrid). A 'Steckbrief' (summary) section provides details about the speakers, including Prof. Dr. Christof Bucher. At the bottom, there is a section titled 'Dynamische Tarife' (Dynamic Tariffs) with a brief introduction to the topic.

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Thank you very much for your attention!

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