RESIDENTIAL PV SYSTEMS – TECHNOLOGY TRENDS, REGULATION AND THEIR IMPACT ON MARKET DEVELOPMENT (SIW17-228)

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EXPERIENCE WITH PV POLICIES IN GERMANY SHOWS:

• Sometimes, progress and improvement are two different things.

• Arithmetic average often is a misleading metric. – This is in particular true for monetary figures.

• Designing effective and accurate measurement systems is challenging, even for technicians. Sound interpretation of measurements is even more challenging.
• Residential PV systems up to 7 kWp account only for a minor fraction of total PV capacity (7.25%).
• However, there are many – about 37.5% of the total plant population and about 50% of annual growth (2016).

Data source: Bundesnetzagentur
THE GERMAN PV MARKET – SPECIFIC COSTS AND FEED IN TARIFFS DECREASE.

- During the last decade, costs of PV systems showed a steeply decreasing trend:

Source: German PV Module Price Monitor, BSW-Solar / EuPD Research, Berlin, 2016
THE GERMAN PV MARKET –SPECIFIC COSTS AND FEED IN TARIFFS DECREASE.

- Feed in tariffs showed similar trends.

Source: Bundesnetzagentur (data partly aggregated)
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THE GERMAN RESIDENTIAL PV MARKET – A CLOSER LOOK ON SPECIFIC COSTS.

• However, specific costs (2016) in the segment with smallest capacities (residential) vary a lot.

Comparing Greenfield (100+ kWp) and small building integrated PV <10 kWp, the ratio of feed in tariffs is about 1/1.4. The cost ratio however is up to 1/1.6 for the smallest systems.

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ARE SMALL SYSTEMS STILL PROFITABLE?

- In many cases, feed in tariff is lower than costs of the generated kWh.

For assumptions see paper.
ECONOMICS OF RESIDENTIAL, ROOFTOP PV IN GERMANY – THE RATIONAL OF ‘OWN CONSUMPTION’ ILLUSTRATED.

- Avoided costs for buying electricity are higher*) than 12.3 €ct/kWh for feed in tariff.
- The profitability of a PV plant depends on the share of ‘own consumption’ in the total yield.

*) Common end user prices are 25…29 €ct/kWh. 19% VAT apply, i.e. net benefit is 20+ €ct./kWh.
POLICY AMBITIONS ACCELERATE SMART METER ROLLOUT – THE GAP INCREASES.

- The meter company may place a static ‘smart’ meter if this is technically and economical feasible (Messstellenbetriebsgesetz (MsbG), §§ 29-31).
- In the power range considered, the company may charge an additional 60€ per year.
• Compensating costs of smart meters requires a ±10% increase of ‘own consumption’.
‘OWN CONSUMPTION’ WITH ENERGY STORAGE – DESIGNING ADEQUATE REGULATION TURNS OUT TO BE DIFFICULT.

- Share of ‘own consumption’ can be increased substantially by adding storage. Of course this requires extra investments.
- Storage users with PV systems>10kW had to pay the renewables levy (reduced 40% share) twice: for the electricity generated by PV and for electricity drawn from the battery.
‘OWN CONSUMPTION’ WITH ENERGY STORAGE – DESIGNING ADEQUATE REGULATION TURNS OUT TO BE DIFFICULT.

- Regulation has been adjusted*) – renewables levy is not applicable to stored electricity generated by PV. (Also not to electricity required to cover storage losses.)
- This requires to identify which part of the electricity from the storage originally came from PV.
- This results in odd concepts for metering and battery management. Accuracy is questionable.

*) Renewables Energy Act 2017, §61k
THE DANGEROUS CONCLUSION – AN INDIVIDUAL DOES NOT STRICTLY BEHAVE LIKE THE HOMO ECONOMICUS.

• Residential PV systems are still being installed. Hence, the transformation and decarbonisation of the electrical power system in Germany will happen as projected in policy scenarios.

• SHOULD WE REALLY RELY ON THIS?
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THE GERMAN RESIDENTIAL PV MARKET – TRENDS AND IMPORTANCE

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Data source: Bundesnetzagentur
Reasonable shares of ‘own consumption’ in residential systems without storage in Germany.