

June 2019

Applying the Efficiency First principle to photovoltaic self-consumption in Germany

Eceee Summer Study 2019

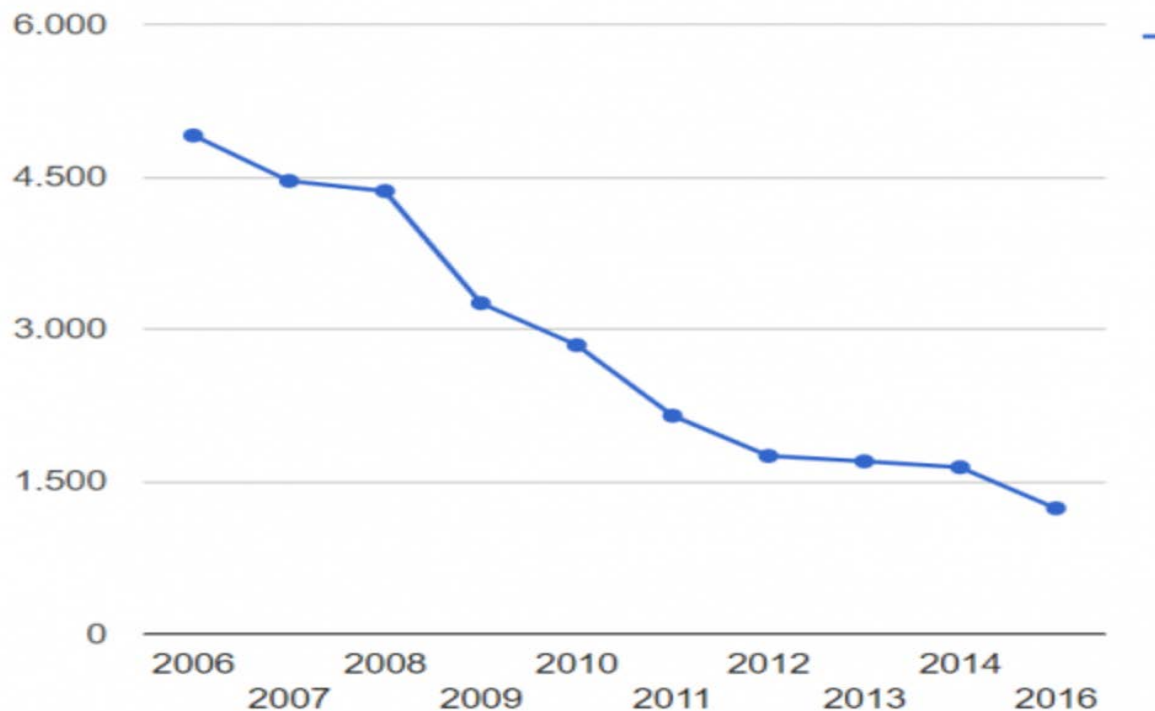
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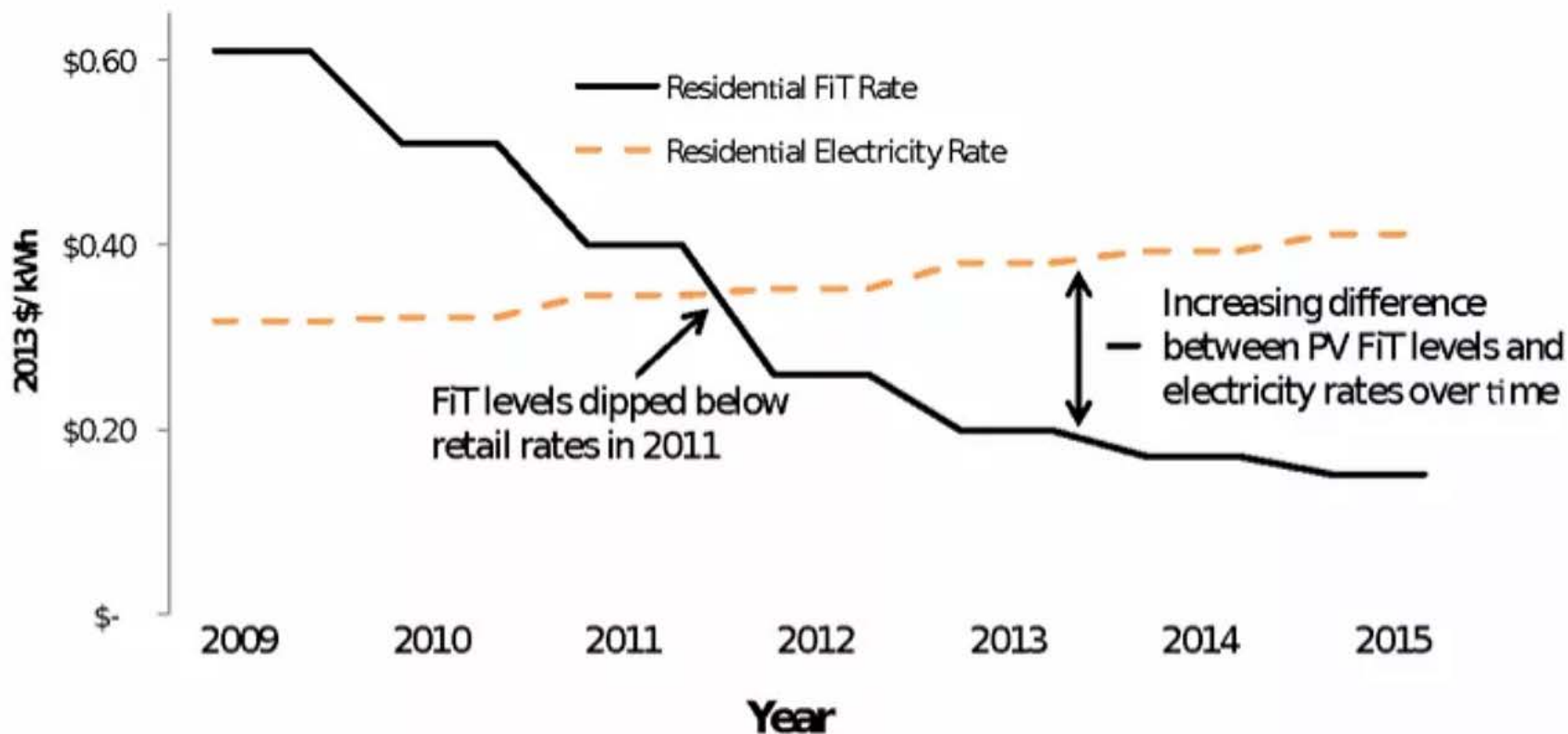


Decreasing PV costs (euros per KW_p up to 10 KW)



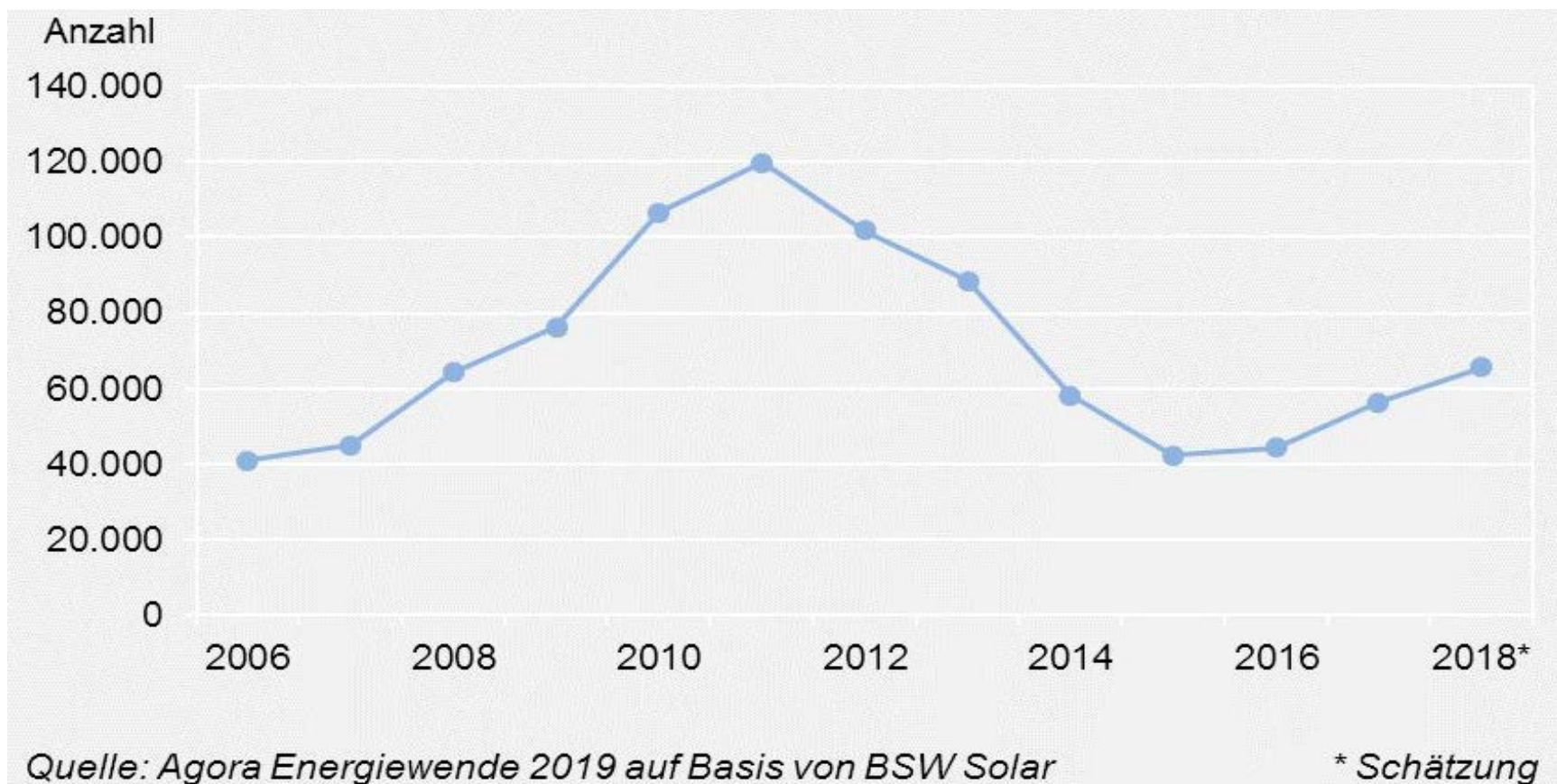
Source: [Photovoltaic prices 2019](#), Photovoltaik.org

Retail rates and feed-in tariffs



Source: Seel et al. "Why Are Residential PV Prices in Germany So Much Lower Than in the United States?" LBNL February 2013 Revision; German Association of Energy and Water, *Current Price Analysis: Households and Industry*, BDEW, May 2013

PV-installations up to 10 kW_p 2006 to 2018



Size of rooftop PV decreased



PV-support via self-consumption, solar storage and tenant power

Merkblatt Erneuerbare Energien

KfW
Bank aus Verantwortung

KfW-Programm Erneuerbare Energien "Speicher"

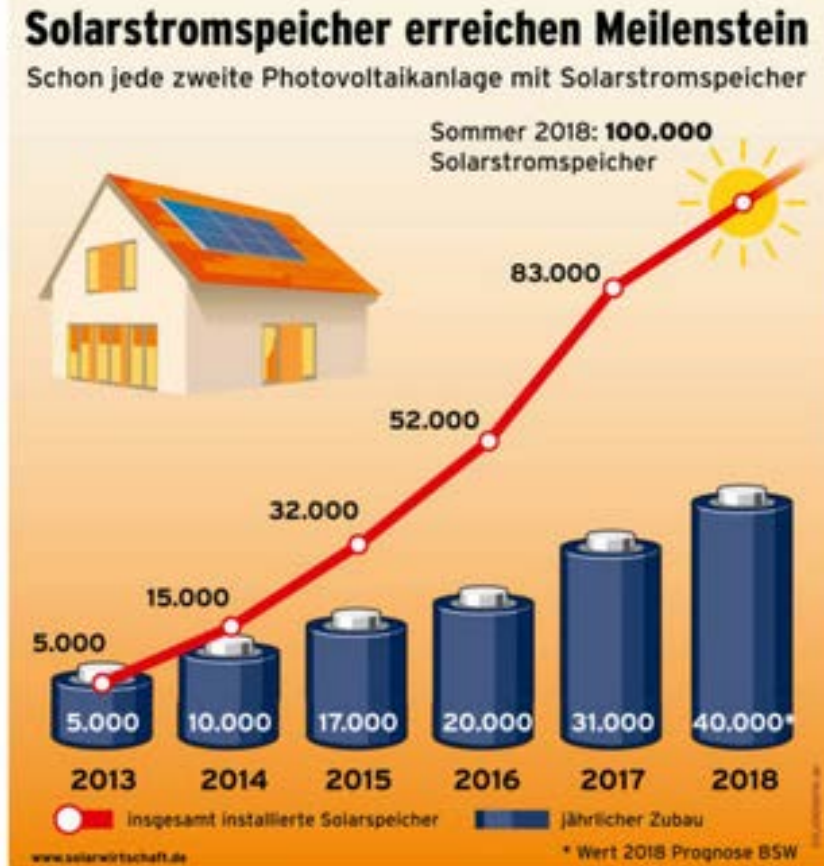
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Finanzierung von stationären Batteriespeichersystemen in Verbindung mit einer Photovoltaikanlage

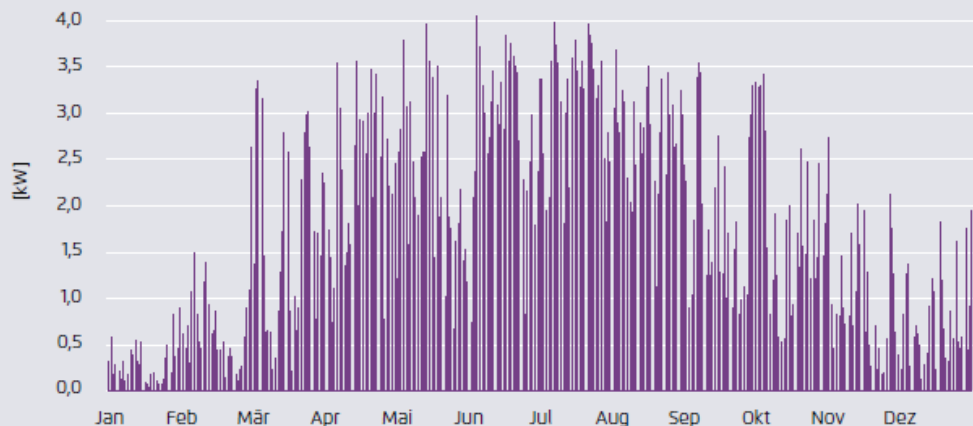
Förderziel

Das KfW-Programm Erneuerbare Energien "Speicher" unterstützt die Nutzung von stationären Batteriespeichersystemen in Verbindung mit einer Photovoltaikanlage, die an das elektrische Netz angeschlossen ist, durch zinsgünstige Darlehen der KfW und durch Tilgungszuschüsse, die vom Bundesministerium für Wirtschaft und Energie (BMWi) finanziert werden.

Im Auftrag des:

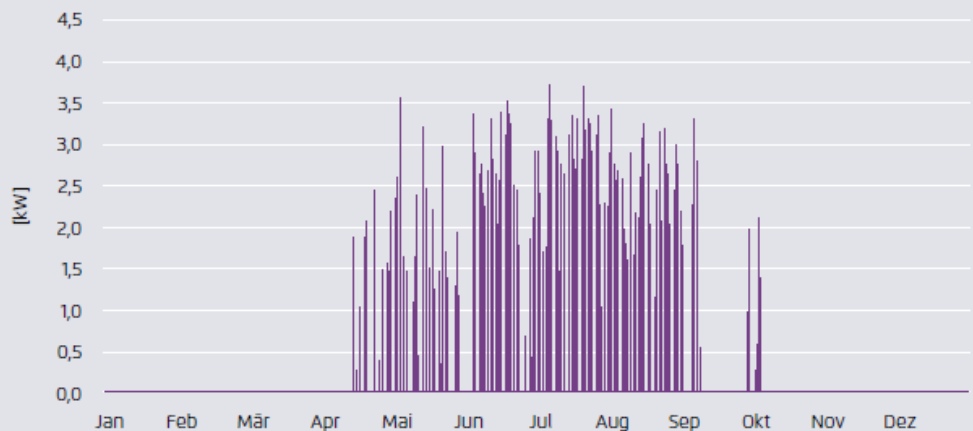


The self-supply approach has a lower system value



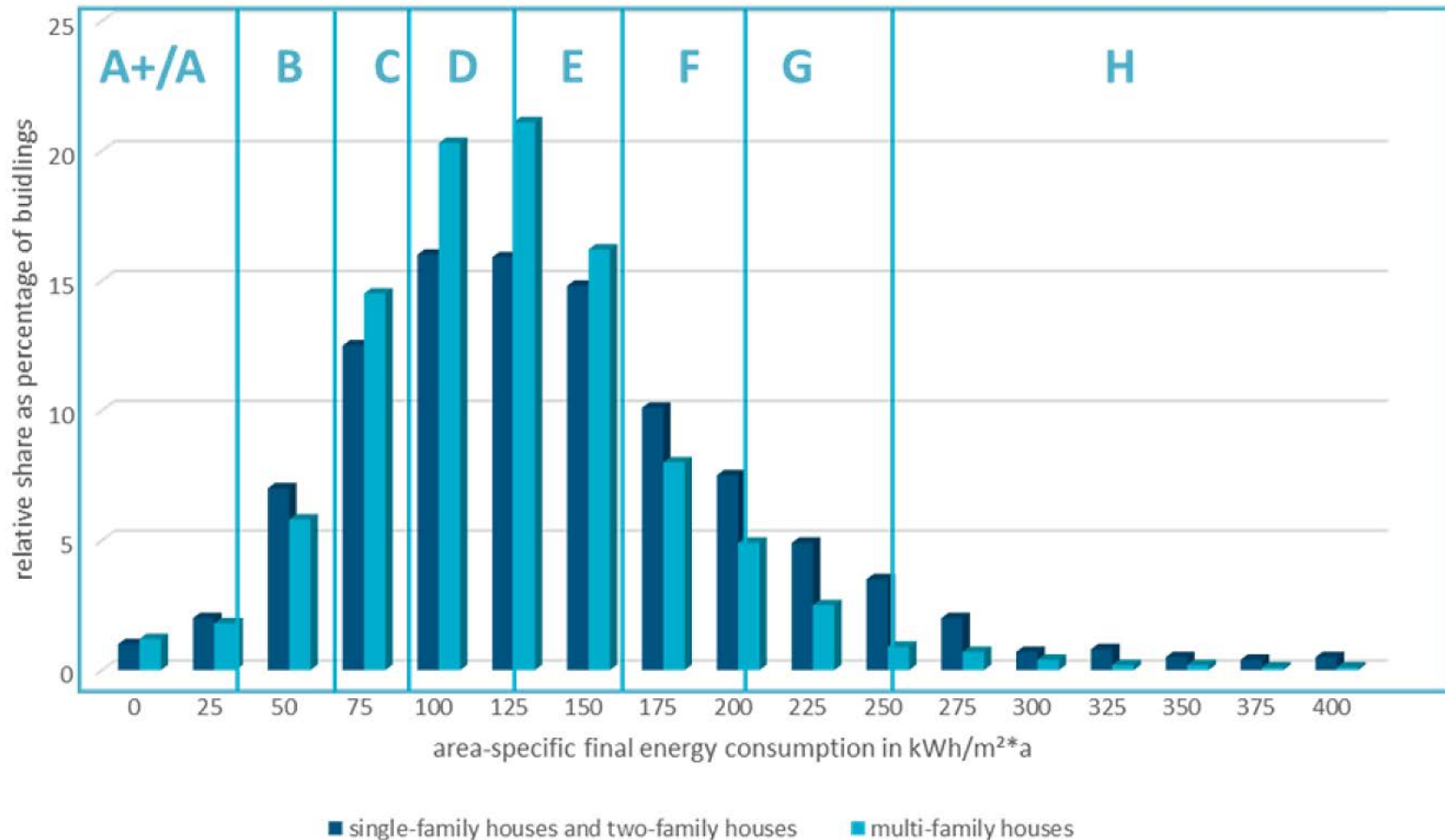
**HH with PV: 4 kWp
consumption:
4.000 kWh/a**

a. Full feed-in



**b. Feed-in after
optimization of
self-supply incl.
HP, storage and
battery**

Efficiency standard of single family houses not addressed well enough



Residential self-supply is lower than today's energy consumption

PV-roof top generation: $100\text{m}^2 \sim 10\text{kW}_p \sim 10.000$ kWh/a

Energy demand of HH

Power: 4,000 kWh/a

Heat: 12,000 kWh/a

Transport: 4,000 kWh/a

20,000 kWh/a



Risk of locked-in investments

Highly profitable PV rooftop investments are adjusted to long-term targets:

- Required roof insulation
- Don't provide surplus of clean power to system
- Not enough clean power for your own needs
- Suboptimal balancing (batteries behind the meter)

Interim conclusion

Why doesn't self-supply of rooftop PV address heat demand and transport demand?

- Technology support (as for batteries) within self-supply is inefficient
- If energy efficiency is cheaper than self-supply, savings should be addressed first

Example UK

- West Yorkshire: Within the „*RE-Charge*“-System Installations of photovoltaics and heat pumps are supported only if efficiency measures of building have been achieved
 - Since April 2012, building code standard D and better is pre-condition for feed-in remuneration
- ⇒ 86 percent of all household customers with rooftop PV invested in wall and roof insulation, too

Example Flanders

Flanders (Belgium) introduced – to receive a so-called *Green Certificate* for PV generation and feed-in, the roof must achieve a thermal resistance of 3 m²K/W (Kelvin/Watt).

Conclusions

- PV feed-in tariff remuneration should differentiate between self-consumption and a full feed-in
- Support for self-supply e.g. batteries, FiT and tenant power only at market value
- Higher remuneration must be linked to decarbonization targets, e.g., heat sector by addressing retrofit investments

About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org



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