Policy recommendations

1. **Acknowledge the paramount role of battery storage in the energy transition.** Electricity storage is a crucial component for the transition towards a climate-neutral European Union by 2050, where high penetration of variable renewable energy sources, like wind and solar, needs to be complemented by flexibility solutions providing uninterrupted energy supply – and among storage technologies, batteries are key. In order to sustain a 100% renewable energy system in Europe, distributed battery capacity needs to grow widely from the level installed today and reach 1,600 GWh by 2050.[1] In any case, to reach a climate-neutral EU by 2050, an appropriate recognition of the role of batteries, together with a review of technical and cost developments of storage technologies, needs to be reflected in EU long-term planning and energy system modelling. At the same time, national policymakers must recognise this huge potential and give more prominence to distributed storage in the revision of their National Energy and Climate Plans.

2. **Establish enabling frameworks for prosumers and self-consumption in members states in accordance with EU legislation.** While the deadline for implementing the provisions of the Clean Energy Package in member states has passed, few countries have moved forward towards transposing them in their national legislations. It is paramount to promote smooth and comprehensive implementation of the Clean Energy Package in all member states – in particular, the articles related to storage and prosumers, in order to remove market distortions and create a level playing field for batteries. This would enable peer-to-peer and aggregation business models, as well as the possibility to provide ancillary services and access new revenue streams. Unlocking the storage potential of EU buildings will be crucial to ensure the achievement of the Fit for 55 Package. In this regard, the upcoming revision of the Energy Performance of Buildings Directive must ensure the EU's Renovation Wave drives the uptake of on-site solar & storage.

3. **Develop a future-proof EU Battery Regulation.** In the forthcoming trialogue negotiations regarding the draft EU Battery Regulation, policymakers shall ensure a balanced battery market in line with EU climate neutrality ambitions. The regulation needs to support the competitiveness of strategic industrial sectors, with provisions that enable an improved sustainability and safety performance, without putting excessive burdens on manufacturers and discouraging investments. It is crucial to implement a timely and appropriate framework for battery requirements, covering key issues such as carbon footprint, recycled content, performance and durability, and due diligence. However, any framework for battery requirements should avoid distortive effects on markets and evaluate trade and competition impacts of the proposed measures.

4. **Better integrate distributed energy resource potential throughout all phases of grid planning.** Power grids, in particular at distribution level, need to be reinforced and modernised, in order to accommodate the uptake of distributed solar & storage and to better value its flexibility potential. To this end, participative and regular grid planning exercises must be conducted at transmission and distribution level and system operators must provide transparency on current and future system needs. In addition, system operators must consider alternatives to grid reinforcements, such as distributed flexibility solutions, when planning the grid, and must be appropriately incentivised.

1 SolarPower Europe & LUT University (2020): *100% Renewable Europe: How To Make Europe's Energy System Climate-Neutral Before 2050.*

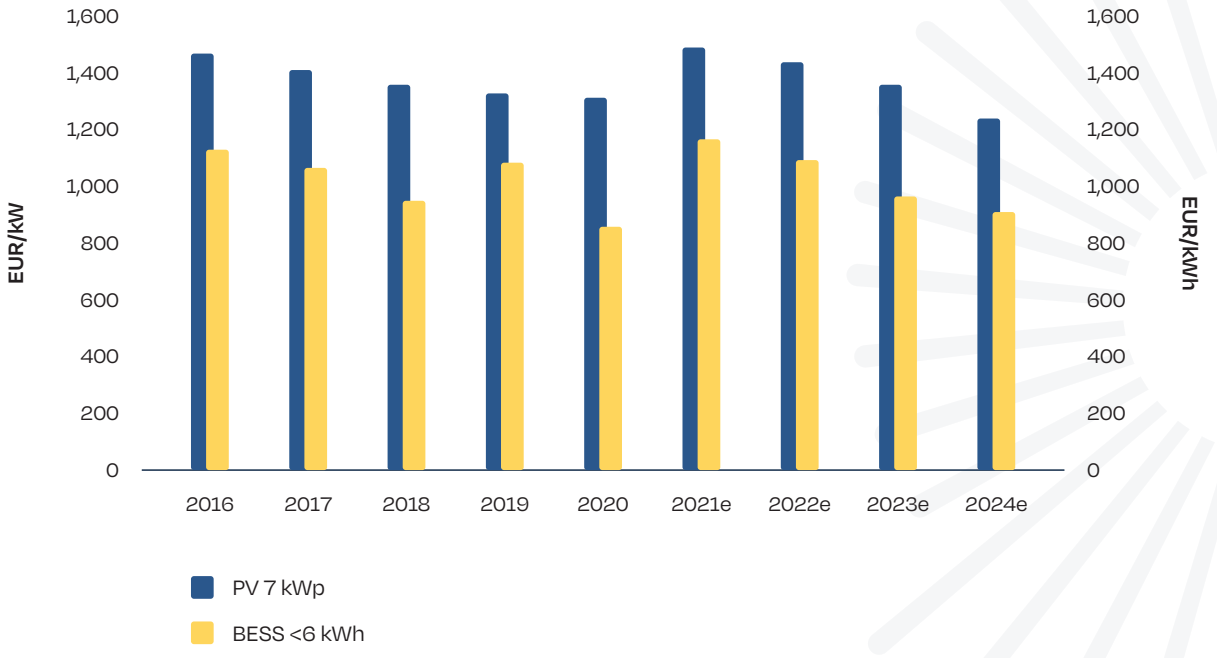
1 Introduction

In 2020, while Europe experienced the effects of a severe health crisis and harsh lockdown measures were enforced in several member states, households looked with increased interest at residential solar & storage solutions as a means to lower carbon footprint, reduce electricity bills and increase energy independency.

Kick-started with incentive schemes, the rapid and continuing decrease of costs and prices for solar PV systems and, in recent years, Battery Energy Storage Systems (BESS), have made these two technologies increasingly attractive to homeowners.

In Europe largest solar & storage market Germany, prices have fallen by 11% for small solar systems and 24% for home storage solutions between 2016–2020 (see Fig. 1.1). Despite a rise in prices taking place in 2021 due to post-lockdown global trade and economic conditions, a decreasing trend in the price of both applications is expected to continue as supply chains adapt.

FIGURE 1.1 SURVEY OF RESIDENTIAL SOLAR & STORAGE PRICES IN GERMANY, 2016-2024



Source: EUPD Research 2021.

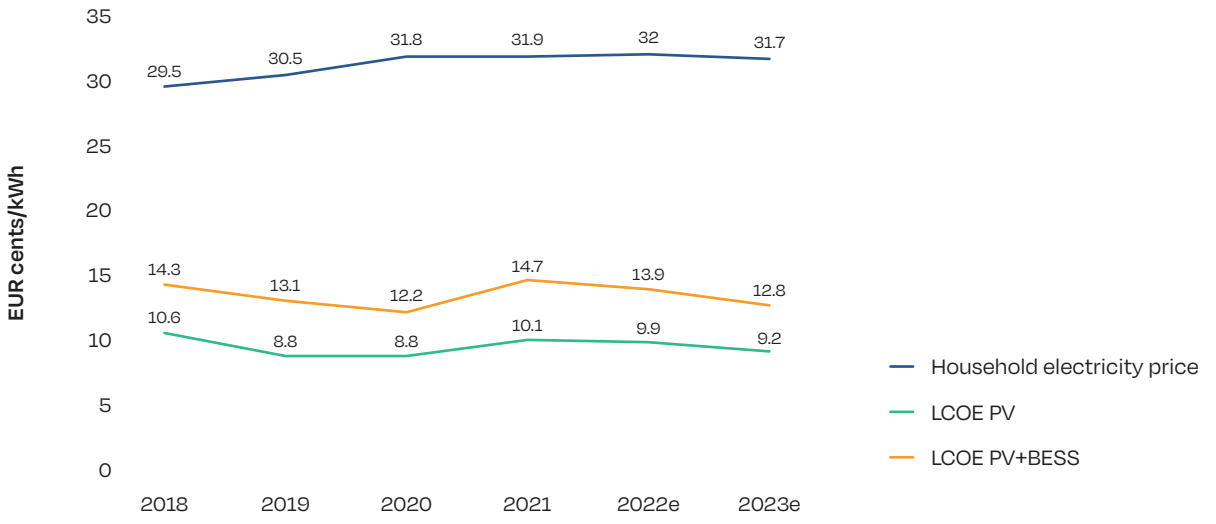
The spread between increasing retail power prices, on the one hand, and solar & storage power prices, on the other, is widening, making the promise of solar & storage more appealing even though national support schemes for pure residential solar systems in Europe are tendentially being phased out.

While power from solar rooftop systems has already been much cheaper than retail electricity in most European markets for several years, now battery storage's rapid cost improvements is also now enabling solar & storage to beat grid power in an increasing number of European countries. In Germany, best-in-class solar & storage systems reached Levelised Cost of Electricity (LCOEs) of 12.2 Euro cents/kWh last year, which is nearly a third of the typical electricity price, one of the starkest differences in European electricity costs (see Fig. 1.2).

The energy prices crisis that Europe is experiencing at the moment this report is drafted exacerbates the need to be less dependent on retail power price volatility. While retail electricity prices are expected to remain high in the medium term, the economics for residential solar & storage will continue to improve. A short-term issue has been a strong uptick in PV component prices in recent months, resulting in the temporarily increase of LCOEs of both standalone solar and solar & storage. However, as the component price crisis is addressed, the downward path in solar & storage costs is expected to continue as of the second half in 2022. Following a 13% year-by-year decrease in lithium-ion battery pack prices in 2020, in the same year Bloomberg NEF forecasted a further 58% price reduction by 2030.

Altogether, these drivers will eventually bring residential solar & storage systems to grid parity on the entire European continent, while policy frameworks are improved to enable the full unlocking of solar & storage potential. This will go hand in hand with the further rollout of smart meters, making new dynamic pricing tariffs available and thus providing a further driver for the uptake of storage technologies.

FIGURE 1.2 COMPARISON OF HOUSEHOLD ELECTRICITY PRICES AND COST OF SOLAR AND STORAGE IN GERMANY



Source: EUPD Research 2021.

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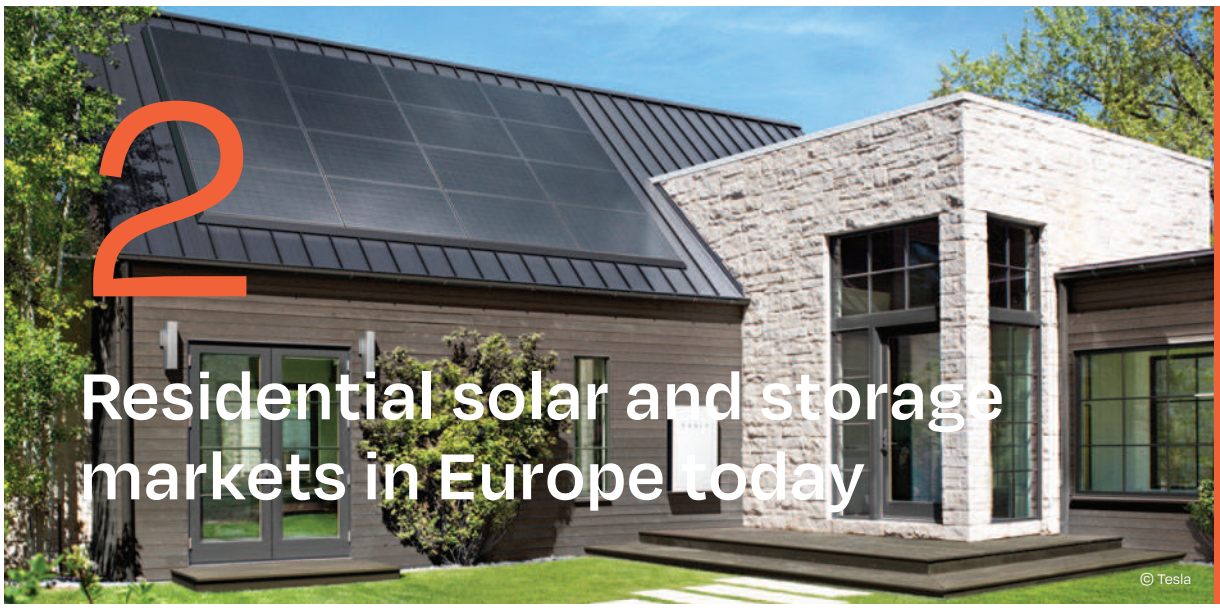

2 Residential solar and storage markets in Europe today

Our first edition of the European Market Outlook For Residential Battery Storage, which was launched last year, depicted a rapidly growing home storage market across the continent. In 2019, Europe installed 747 MWh of new residential storage capacity, a 58% annual increase from the 471 MWh added the previous year.

The strong growth path continued in 2020, with a 44% year-on-year increase in annual installed capacity. For the first time, the European residential battery market reached the landmark GWh scale, totalling 1,072 MWh of storage capacity installed (Figure 2.1). This is equivalent to about 140,000 battery systems installed in 2020 compared to the 99,000 installed in 2019. In other words, not only the GWh milestone was reached – also, for the first time, more than 100,000 battery units were installed in one single year.

FIGURE 2.1 EUROPE RESIDENTIAL BESS ANNUAL MARKET 2013-2020