Profitability of Decentralized Battery Storage for Consumers and Utilities—A Business Case for Germany?

Broghan Helgeson | ewi Energy Research & Scenarios | Rotterdam, 29.06.2017

Accelerating the Transition to Zero Carbon: Why battery storage is expected to contribute

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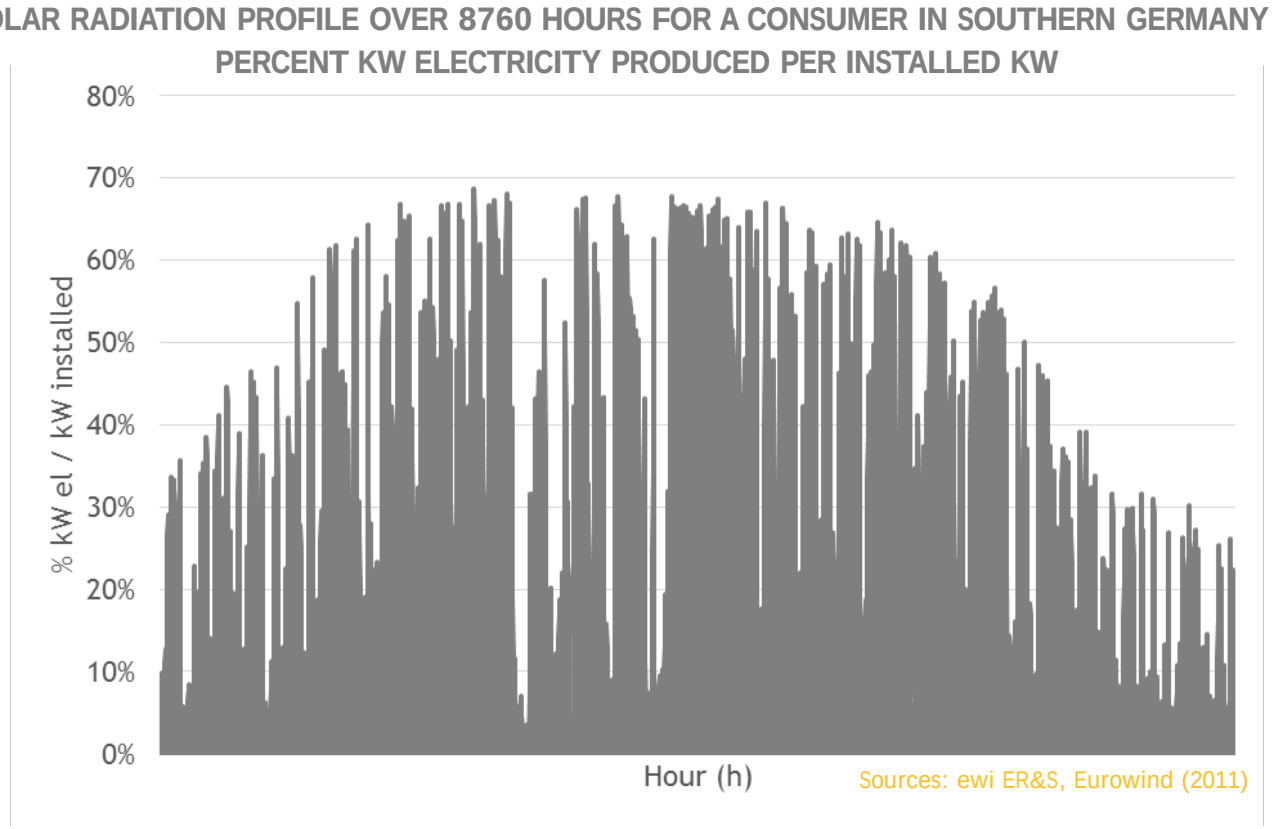

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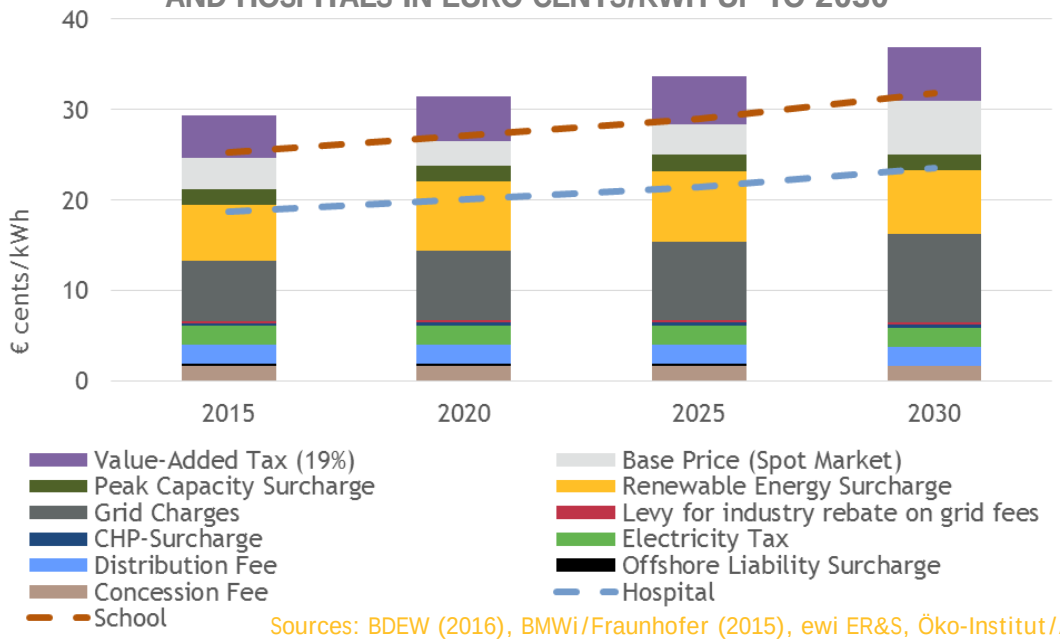
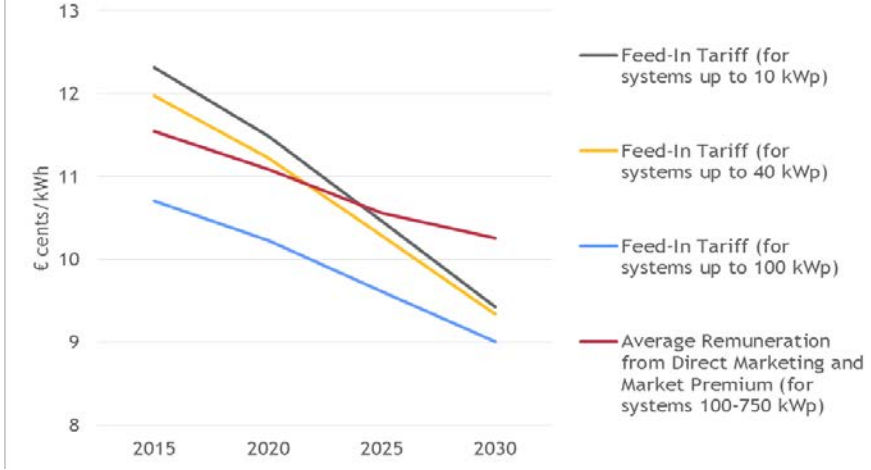
RETAIL ELECTRICITY PRICES FOR SINGLE-FAMILY HOMES, MULTI-FAMILY HOMES, SCHOOLS AND HOSPITALS IN EURO CENTS/KWH UP TO 2030



Sources: BDEW (2016), BMWi/Fraunhofer (2015), ewi ER&S, Öko-Institut/Agora (2016)

REMUNERATION FOR PV SYSTEMS UP TO 2030 IN EURO CENTS/KWH



Sources: ewi ER&S, Bundesnetzagentur (2016), Öko-Institut/Agora (2016)

Accelerating the Transition to Zero Carbon: Why battery storage is expected to contribute

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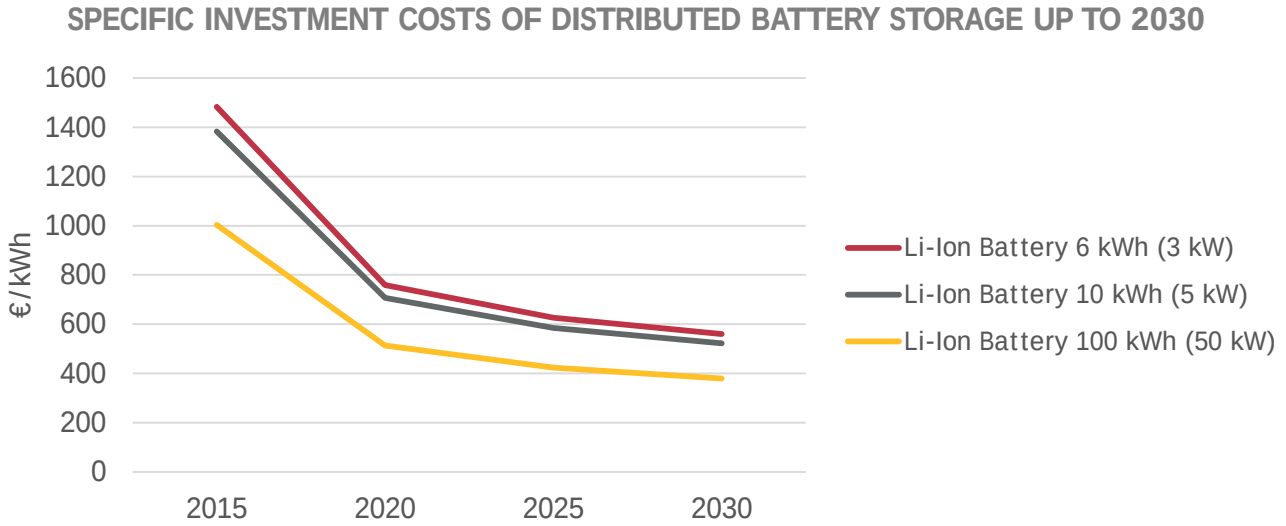
- Experienced rapid technological advancement and cost reduction



Source: ewi ER&S, CSIRIO (2015), Lazard (2015), Sonnenbatterie (2016), Tesla (2016), World Energy Council (2016)

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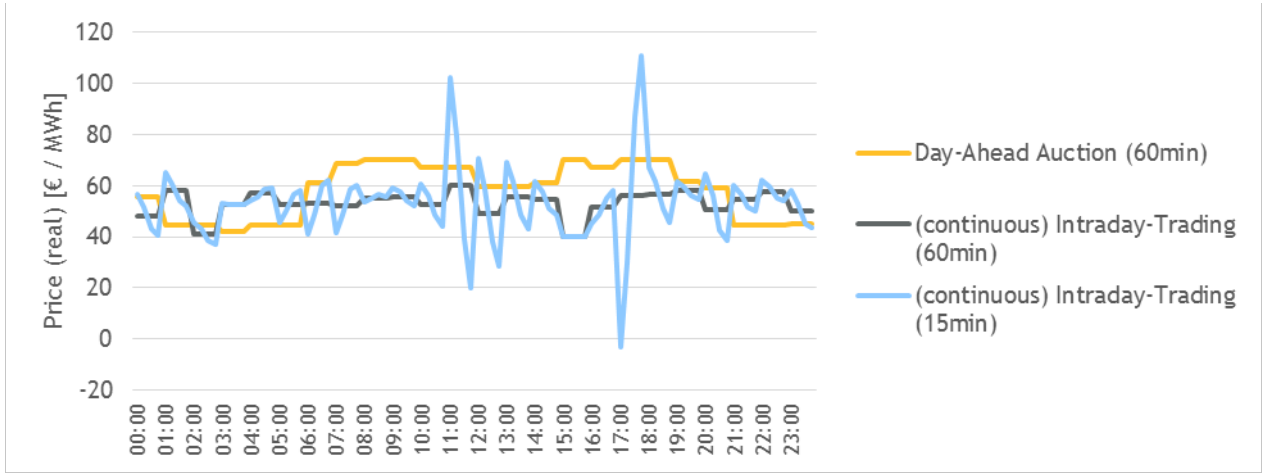
EXEMPLARY ELECTRICITY PRICES ON THE GERMAN DAY-AHEAD AND INTRADAY MARKETS



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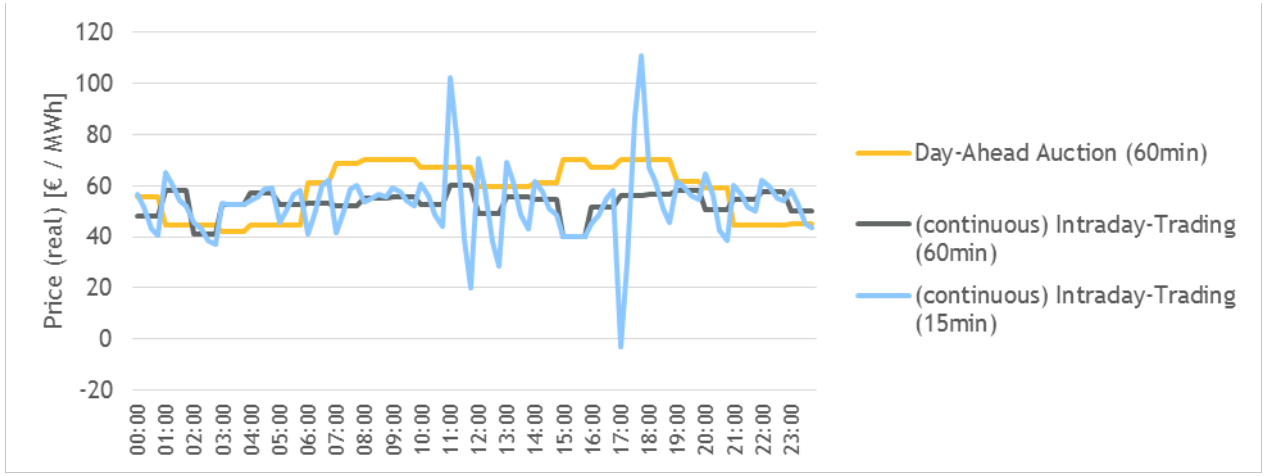
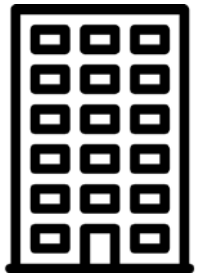


Source: ewi ER&S

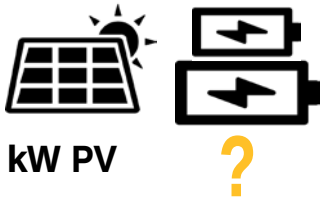
Is battery storage profitable for small-scale consumers (with PV)?
Could the profitability of battery storage be improved under a contracting model?

Quantitative Analysis



Multi-Family Home

Case 1: A consumer covers their electricity demand by optimizing their investment decisions up to 2030 according to their closed cost-minimal solution („Business as Usual“)



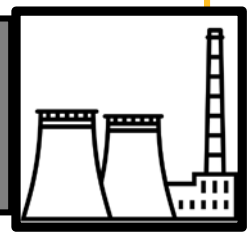
Costs w/out exogenous investment in a battery in 2020

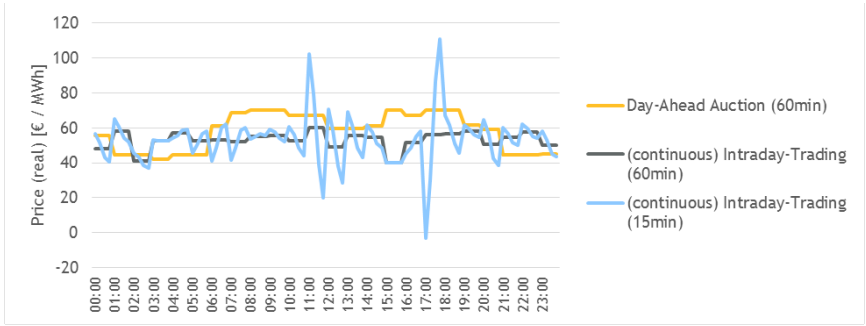
Δ Costs

Case 2: A consumer invests in battery storage with a PV system in 2020 and their energy service provider (utility) can then sell their battery‘s unused capacity on a number of markets („Utility Contracting Model“)

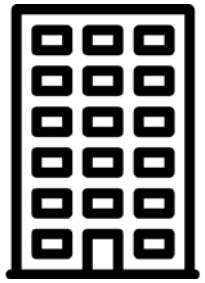
Costs with exogenous investment in a battery in 2020

Utility + Consumer Profits from Selling Unused Battery Capacity



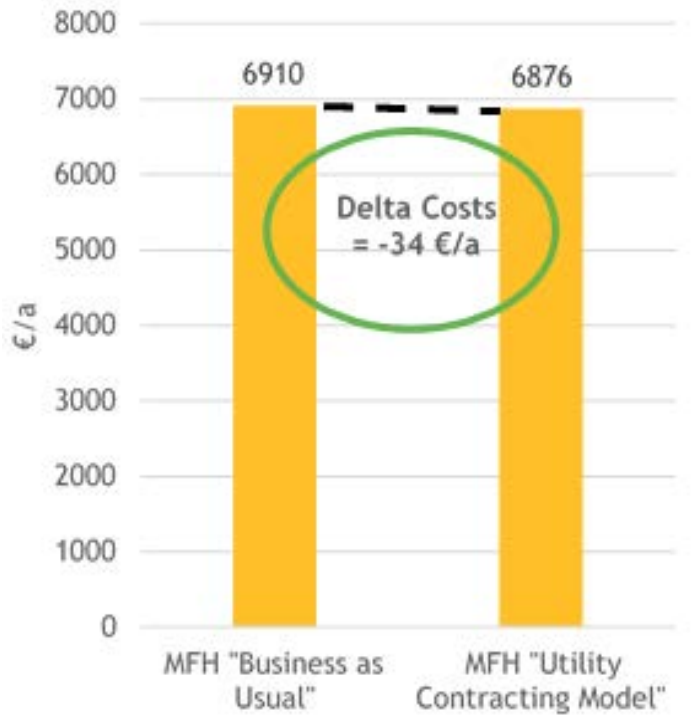


Source: ewi ER&S; icons designed by Freepik from Flaticon



	Business-As-Usual	Utility-Contracting-Model
40 kW PV	✓	✓
5 kW/ 10 kWh Battery	x	✓

AVERAGE ANNUAL NET COSTS (INCLUDING REMUNERATION AND MARKET REVENUE) AND THE DELTA COSTS BETWEEN "BUSINESS-AS-USUAL" AND "UTILITY-CONTRACTING MODEL"



Source: ewi ER&S; icons designed by Freepik from Flaticon

Main Findings

- Battery storage appears only to be profitable (in the short term) for multi-family homes when they are able to earn revenue from selling excess battery capacity on the intraday market
  - Consumers with battery storage are also able to reduce their variable costs, profiting from storing excess PV generation during the day to cover hours of peak demand during the evening
- Changes in regulatory assumptions (e.g., restructuring of grid charges) would impact the business case for PV and battery storage
- Future application for grid services could also increase the profitability of batteries through, e.g., pooling and peer-to-peer networks via blockchain (such as the recent project from Sonnenbatterie and TenneT)

Thank you for your attention!

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