Reform der EE-Förderung

Investitionssicherheit als Grundlage des Ausbaus der erneuerbaren Energien – eine ökonomische Perspektive

Lion Hirth · 1. April 2025 · 25 Jahre EEG

EE-Förderung: “ob” und “wie”?

Sollte man Erneuerbare überhaupt fördern?

- Ökonomie-Lehrbuch: CO_2-Preis reicht

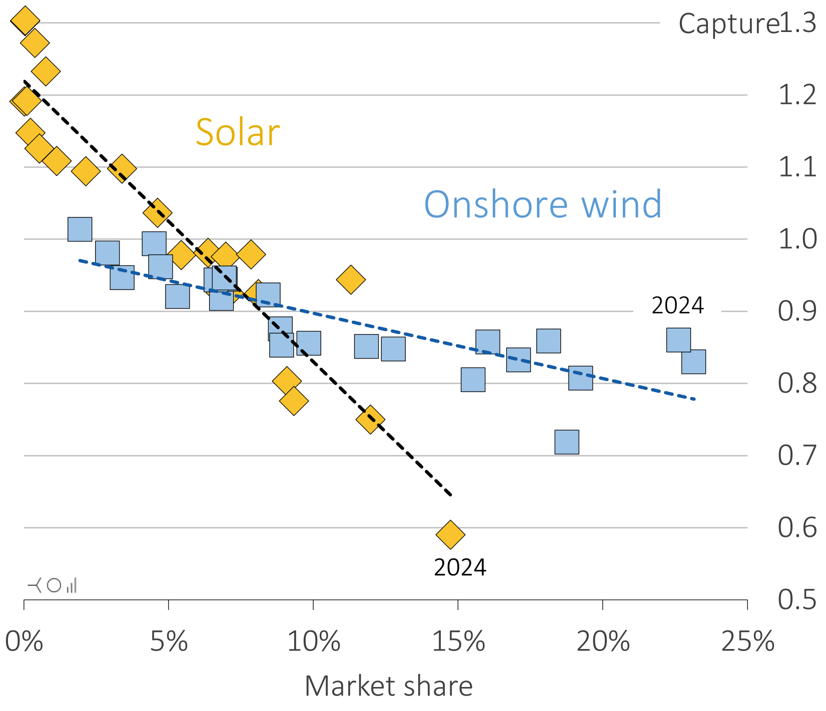
Politische Argumente

- Industriepolitik: Strompreise würden steigen
- Energiepolitik: EE-Ziele je Jahr/Technologie

Ökonomische Argumente

- Regulatorische Risiken in Klima- & Energiepolitik (Staatsversagen)
- Konsumentenschutz, max. 2 Jahre Stromverträge, kurzer Hedging-Horizont der Vertriebe (Marktversagen) → Fristentransformation
- Spricht für Absicherung gegen langfristige Preisrisiken

Marktwert von Wind und Solar



Zwei Design-Ziele bei Förderinstrumenten

Ziel 1: Strommarkt-Anreize wirken lassen (verzerrungsfrei)

- Keine Verzerrung durch Förder- und Abschöpfungsinstrument
- Insbesondere: Anlagen sollen bei Negativpreisen abregeln, bei Positivpreisen produzieren
- Nicht nur Day-Ahead-Markt, sondern auch nachgelagerte Märkte (Intraday)
- Auch für Investition: Anreiz für systemdienliche Anlagenkonfiguration (große Rotoren / OW-Solar) erhalten

Ziel 2: Cashflow-Risiken absichern (De-Risking)

- Absicherung von unproduktiven Preis- und Mengenrisiken
- D.h., Risiken, die Projektentwickler nicht beeinflussen kann (Krise und Kriege, gutes vs. schlechtes Windjahr)
- Je besser diese Risiken staatlich abgesichert werden, desto geringer Kapitalkosten, günstiger EE-Zielerreichung, niedrigere Strompreise

Probleme der Marktprämie

Problem 1: Fehlanreize auf dem Day-Ahead-Markt

- Produktion trotz negativer Preise (in Förder-Jahren) bzw. Abregelung trotz positiver Preise (in Abschöpfungs-Jahren, wenn Marktprämie mit Rückzahlung)

Problem 2: Verzerrte Gebote auf den Kurzfristmärkten (Intraday, Balancing)

- Zahlung wird eingepreist (wie eine Steuer) und verzerrt Verhalten – diese Märkte werden jedoch immer wichtiger

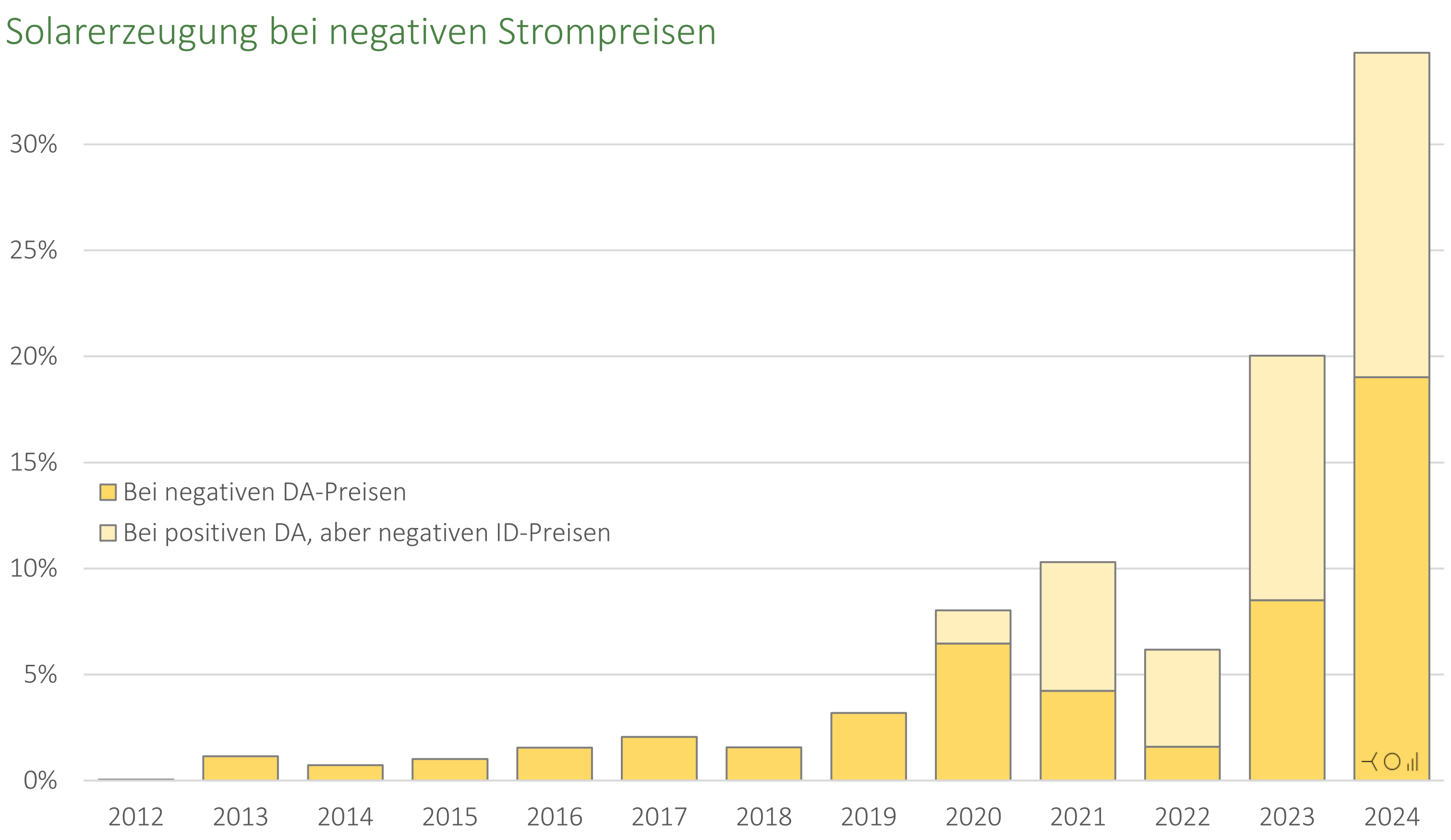
Problem 3: Keine Absicherung des Wetter-Volumenrisikos

- Wetterrisiko (gutes vs. schlechtes Windjahr) ist unproduktiv und erhöht Kapitalkosten – und damit Erzeugungskosten

Problem 4: Neue Erlösrisiken durch negative Preise

- Aussetzen der Förderung bei negativen Preisen (6h / 3h / 1h-Regel) ist aus Dispatch-Gründen sinnvoll (Problem 1), schafft aber neue Erlösunsicherheit – und ist auf Intraday-Preise nicht anwendbar (Problem 2)

Negativpreise sind ein zunehmendes Problem



Negative Preise in 5% der h

- Dazu nochmal 6% negative ID-Preise

Solarbesonders betroffen

- Ein Drittel der Erzeugung bei negativen Preisen!
- Steigender Trend – Kein Ende in Sicht

Abregelung ist wichtig

- Sonst kritisch für Systemsicherheit
- Daher Aussetzen der Förderung richtig (ohnehin europarechtlich vorgeschrieben)

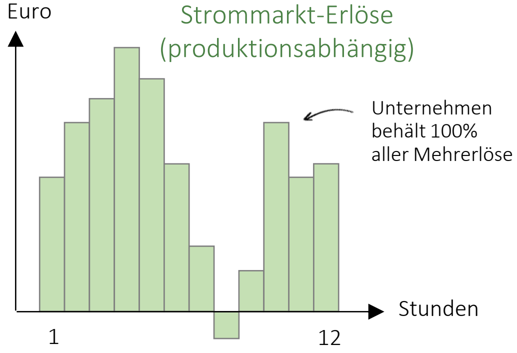
Aber: Neue Erlösunsicherheiten

- Aussetzung der Marktprämie bei negativen Preisen schafft Erlösrisiko

Lösung: Kapazitätszahlung & Produktions-Unabhängigkeit

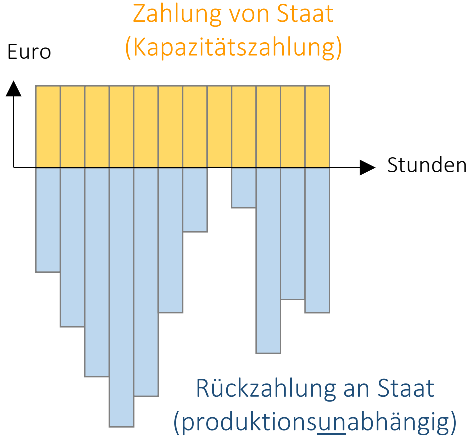
Risiken lassen sich durch Kapazitätszahlung lösen (Probleme 3 + 4)

- Erzeuger erhalten jährlich fixe Kapazitätszahlung vom Staat (Zahlung)
- Im Gegenzug geben sie ihre Erlöse ab (Rückzahlung)
- Keine „Abschöpfung“, sondern „Tausch“ (Fixed-for-Floating Swap)



Anreize lassen sich durch Produktionsunabhängigkeit reparieren (Probleme 1 + 2)

- Rückzahlung tatsächlicher Erlöse? → gäbe kein Anreiz, überhaupt noch zu produzieren
- Stattdessen: Rückzahlung basiert auf objektiver Produktions*möglichkeit* (Referenzprofil)



Im Ergebnis

- Vollständiger Erhalt aller Strommarkt-Anreize → Effizienz und operative Systemstabilität
- Sehr weitgehende Stabilisierung des Cash-Flows → Günstige Kapitalkosten & Strompreise

Implementierung: Herausforderung und Lösungsansätze

Thema 1: Anreize für Systemdienliche Anlagen (Definition der Kapazität)

- Keine Förderung von reiner Nennleistung (MW) – erwünscht: großer Rotor, Ost-West Solar
- Deswegen: Zahlungen basierend auf *korrigierten* MW
- Vielversprechender Ansatz: Korrektur um Rotordurchmesser etc. auf Basis Typen-Gutachten

Thema 2: Berechnung der Produktionsmöglichkeit (Referenzprofil)

- Base-Profil, lokale Messungen der Windgeschwindigkeit, gesamte Flotte, etc.
- Vielversprechender Ansatz: eines oder mehrere regionale Profile aus Wettermodellen (ERA5)

Thema 3: Standortkorrektur (Regionale Differenzierung)

- Heute erreicht durch Referenzertragsmodell (übrigens viele Schwächen)
- Vielversprechender Ansatz: Windschwächere Standorte mit größeren Zahlungen

Definition der Kapazität: Fehlanreize vermeiden

Vermeiden: Kapazitätszahlung je MW Nennleistung

- Dadurch Anreiz gesetzt, die Nennleistung zu maximieren
- Hohe Nennleistung verursacht mehr Probleme (Netzengpässe) und schafft weniger Wert (Stromerzeugung bei mittleren Windgeschwindigkeiten)
- Gilt für Wind (Rotordurchmesser) und für Solar (Ausrichtung, DC/AC-Verhältnis)

Stattdessen: je *korrigierte* MW

- Korrektur der Nennleistung um technische Parameter wie Rotordurchmesser und Nabenhöhe
- Produktionsunabhängig: Erwartungswert vor der Investitionen (keine Erzeugungswerte)
- Standortunabhängig, d.h. „Typenqualifikation“ (keine projektspezifischen Gutachten)

Definition der Kapazität: *korrigierte* MW

Mögliches konkretes Vorgehen

- Typenspezifisches TR2-Gutachten, heute für Referenzertrag genutzt
- Normiertes Verfahren zur Ermittlung der Volllaststunden bei Normbedingungen unter Berücksichtigung von Nabenhöhe, Rotordurchmesser, Generatorleistung etc.

Option 1: Zahlung je erwartete Erzeugung (MWh)

- D.h. Skalierung mit erwarteten Volllaststunden

Option 2: Zahlung je erwarteten Wert (EUR)

- D.h. zusätzlicher Bonus für hohen Marktwert
- Produktion zu Randzeiten (PV) bzw. bei Schwachwind (Wind) wird stärker gewichtet
- Ökonomisch sinnvoll, quantitativ nachrangig (ca. 10% des Energie-Effekts)

Referenzprofil: transparent aber akkurat

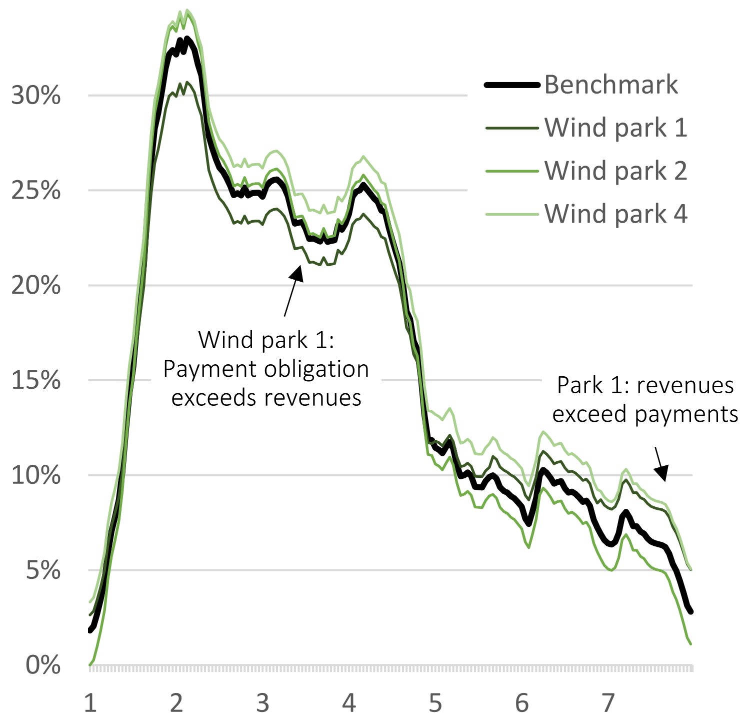
Basis für Rückzahlung ist ein Referenzprofil (Benchmark)

- Schätzung der stündlichen Produktions*möglichkeit* des Windparks (nicht die tatsächliche Produktion)
- Ziel: transparentes und einfaches Verfahren, dass die tatsächliche stündliche Produktionsmöglichkeit gut abschätzt, ohne vom Windpark beeinflussbar zu sein
- Übrigens: (Monats-)Marktwert heute auch produktionsunabhängig

Drei Optionen für das Referenzprofil

- Option 1: Anlagenscharfe Messung (Anemometer, AAP) – Parkverschattung schwer zu berücksichtigen, komplex, fehleranfällig
- Option 2: Durchschnittliche Einspeisemenge aller Anlagen je Technologie – diese Anlagen reagieren aber selbst auf den Markt
- Option 3: Anhand eines Wettermodells

Produktion vs. Referenzprofil (Illustration)



Benchmark profile vs. individual wind parks (illustration).

Referenzprofil aus Wettermodell

Abschätzung der Produktionsmöglichkeiten auf Basis eines Wettermodells

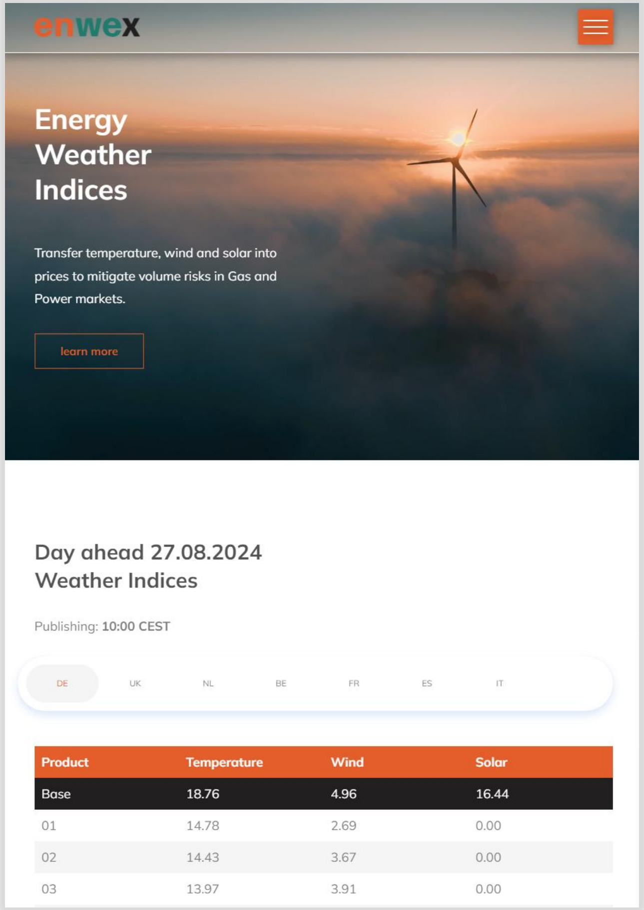
- Relevante Wetterdaten aus Re-Analyse Wettermodell, z.B. Windgeschwindigkeit
- Umrechnung in Erzeugungsmöglichkeit (MW) durch generische Leistungskennlinie (repräsentativ für typischen Neubau-Windpark)

ERA5-Wettermodell scheint geeignet

- Öffentliche Daten, transparente Methodik, auf Dauer verfügbar (ECMWF)
- Wird am Strommarkt für Prognosen und Handel verwendet
- Vielzahl an Wetterparametern sowohl für Wind als auch Solar

Geographische Auflösung

- Ein nationales Referenzprofil denkbar – … oder mehrere Regionalprofile



Wettermodell: Beispiel enwex-Indizes

Deutschlandweites Erzeugungspotenzial

- Basierend auf ECMWF ERA5-Datensatz (~28km x ~18km)
- Mittelwert der Erzeugungspotenziale am geografischen Mittelpunkt der Bundeländer, gewichtet mit installierter Leistung
- Einfach nachvollziehbare Formel (in Excel implementiert und transparent veröffentlicht)
- Wenige transparente Parameter definieren gesamten Index

Wird für Handelsprodukte verwendet

- Gehandelte Produkte auf Flex Power und ENMACC
- Wind, Solar, und Temperatur-Produkte

Aktuelle Weiterentwicklung

EE-Verbände: große Sorge und Skepsis vor produktionsunabhängigen Fördersystemen

- Ansätze des Optionenpapier aus der PKNS werden kontinuierlich weiterentwickelt, im engen Austausch mit Verbänden

Potenzialbasierter CfD

- Aufteilung aller Viertelstunden in „gewöhnlich“ (ohne Fehlanreiz) und „anreizproblematisch“ (mit Fehlanreiz)
- Gewöhnliche ¼h : normaler CfD auf Basis Jahresmarktwert, gezahlt für tatsächliche Produktion
- Problematische ¼h: Aussetzen der Förderung bzw. Abschöpfung
- Neu: Zahlung der wegfallenden Förderung als zusätzliche Prämie in gewöhnlichen Stunden (Skalierung)
- Skalierungsfaktor: Verhältnis gewöhnliche/problematische Stunde aus objektiven Daten (nicht eigener Anlage)

Potentialbasierte Kapazitätszahlung

- Zusätzlich: Zahlung auf Basis der (korrigierten) Leistung, dadurch Absicherung gegen schlechte Windjahre

Allerdings

- Noch nicht alle Probleme gelöst
- Deutlich komplexer

Neon Neue Energieökonomik ist ein energiewirtschaftliches Beratungsunternehmen mit Sitz in Berlin. Als Boutique sind wir seit 2014 spezialisiert auf anspruchsvolle quantitative und ökonomisch-theoretische Analysen rund um den Strommarkt. Mit Beratungsprojekten, Studien und Schulungen unterstützen wir Entscheidungsträger bei den aktuellen Herausforderungen und Zukunftsfragen der Energiewende. Zu unseren Kunden gehören Regierungen, Regulierungsbehörden, Netzbetreiber, Energieversorger und Stromhändler aus Deutschland und Europa.

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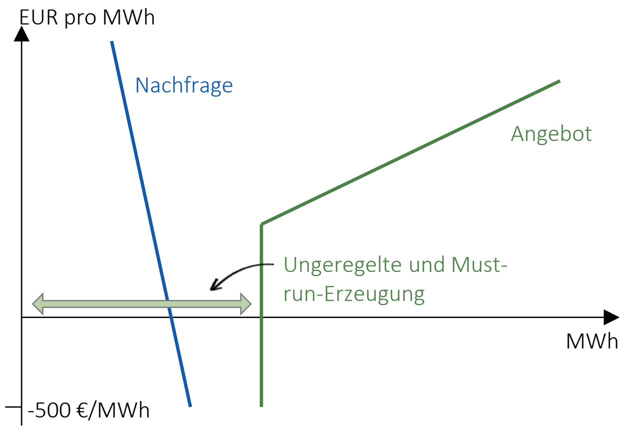
Andere Baustelle: Stromüberschuss

Bisherige Diskussion betrifft Marktprämie

- Zwar sind die meisten Erneuerbaren sind in der Marktprämie – aber nicht alle
- Aber ca. 60 GW Solar sind in der Einspeisevergütung – 70% des Solarzubaus!
- Überhaupt kein Anreiz für Reaktionen auf negative Strompreise

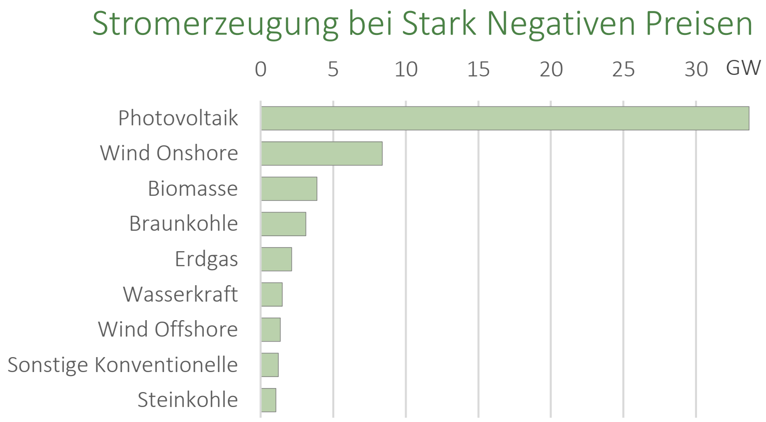


Problem 1: Stromüberschuss-Situationen

- Day-ahead, Intraday, Balancing
- Überfrequenz, Notabschaltungen

Problem 2: Förderkosten

- Dieses Jahr nur 200 Mio. zusätzlich durch ungeregelte Solar
- Bei Stromüberschuss sehr hohe Kosten vorstellbar (Milliarden)



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Neon – energy economics for the real world

- **11** years since Neon's startup in 2014
- **90** projects completed: for governments, regulators, TSOs, utilities, traders
- **70k** following on LinkedIn and Twitter
- **60** years of collective electricity sector experience
- **50** academic publications (earning us six PhDs and a professor title)
- **1** passion: electricity markets

Neon Neue Energieökonomik is a Berlin-based boutique consulting firm for energy economics, founded and directed by Lion Hirth.

As a boutique consultancy, we specialize in sophisticated quantitative assessments and economic analyses of electricity markets since 2014.

With consulting projects, studies, and training seminars, we support decision-makers tackling today's pressing issues and future challenges of the energy transition.

Our clients include governments, regulatory authorities, grid operators, energy suppliers and electricity traders across Germany and Europe.

Our specialty: electricity market design

Electricity markets

Day-ahead & Intraday | Balancing | Ancillary services
Imbalance pricing | Flexibility | PPAs
Schedules | Forward markets | Retail tariffs
Capture rates | Smart charging
Tenders | REMIT | Bidding strategies

Power grids

Nodal pricing | Network charges
Grid fee forecasts | Dynamic grid fees
Bidding zones | Market coupling
Locational incentives | Grid cost allocation
Injection charges | Connection charges
Grid fee exemptions & rebates

Energy policy

Support schemes | CfDs | Capacity mechanisms
Long-term transmission rights | EU EMD
Clawback | Industrial subsidies & rebates

As a boutique, we focus on one single area: electricity market design.

For the German government, we have worked on the revenue cap and CfD design, market-based redispatch and locational price signals, the coal phase-out and system services procurement.

For private sector clients, we have worked on forward markets, intraday trading, retail tariffs, balancing reserves, imbalance pricing, bidding zone split, and the EU electricity market reform.

Some of our projects are delivered within days, other stretch over years.

Clients from across the public and private sectors

We are proud of our clients.

And we are happy about their diversity: they include public sector institutions such as the German Economics Ministry and the European Commission, as well as companies across the energy sector, including utilities, traders, project developers, TSOs and DSOs, and large power consumers.

We also advise clients in the financial sector, international organizations such as the IEA and think tanks such as Agora Energiewende.

Impactful studies based on rigorous methods

Our work relies on rigorous methods and is informed by academic research.

We love data. For our quantitative studies we use state-of-the-art data science, econometrics and numerical optimization.

Collectively, we have published well over 50 academic articles in leading peer-reviewed journals.

We also maintain the power market model EMMA and have a background in load flow model.

For many years, Neon has run Strommarkttreffen, a network of 5000+ energy professionals from academia, industry, and policy.

Combining academic excellence with industry experience

Prof. Dr. Lion Hirth
Founder and director

Dr. Ingmar Schlecht
Principal Consultant

Vlada Maksimova
Consultant

Anton Hoffmann
Consultant

Dr. Anselm Eicke
Senior Consultant

Jonathan Mühlenpfordt
Senior Consultant

Dr. Clemens Lohr
Consultant

Dr. Alexander Neef
Consultant

As a team of seasoned electricity market experts, we collectively bring 60 years of experience to the table.

Prof. Dr. Lion Hirth is founder of Neon and serves as its director.

Dr. Ingmar Schlecht is Principal Consultant, leading the work on support schemes and forward markets.

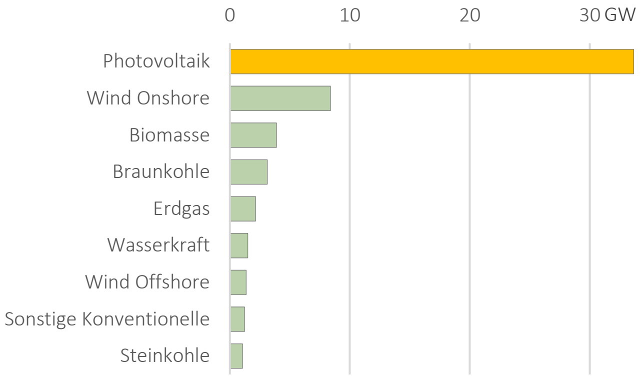
Dr. Anselm Eicke is Senior Consultant specialized in imbalance pricing and network charges.

Jonathan Mühlenpfordt is Senior Consultant and data analyst and coder.

Dr. Clemens Lohr, Vlada Maksimova, Anton Hoffmann and Dr. Alexander Neef work as Consultants at Neon. ▶

Project highlight: BMWK – Excess electricity (2024/25)

Generation mix during strongly negative prices

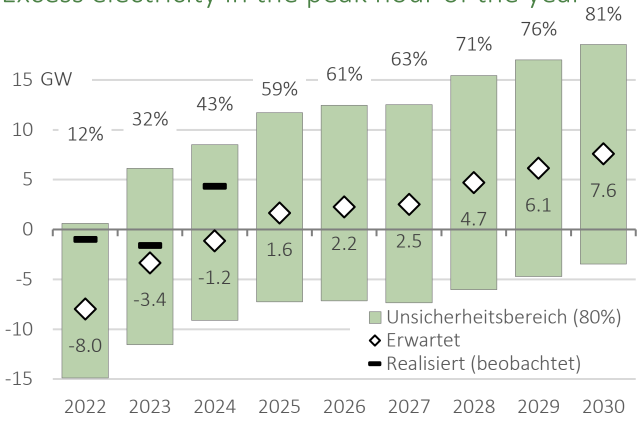


The fast expansion of solar energy comes at a price: because many investments are small-scale and subject to a feed-in-tariff, they keep generating even if supply exceeds demand.

As a consequence, prices drop into negative territory more frequently, inflating support cost.

There is increasing concern that the electricity market does not clear even if prices reach -500 €/MW (the minimum), causing physical problems and triggering emergency response by system operators. This is a situation we call "excess electricity".

Excess electricity in the peak hour of the year



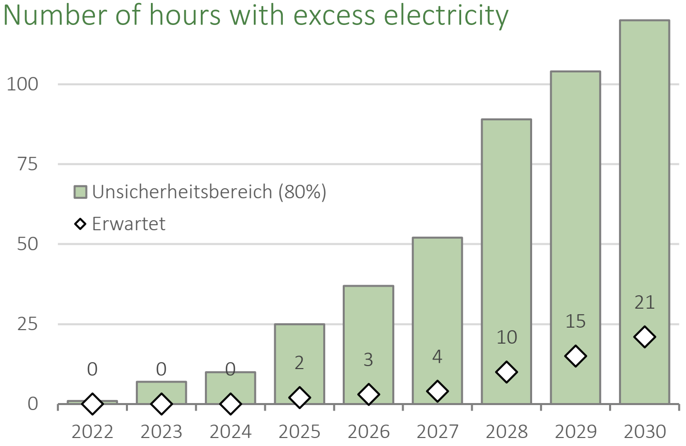
In this project, we forecasted the probability of excess electricity situations for coming years and supported the German government addressing the problem.

Excess electricity situations are impacted by many factors, including the response rate of wind and solar generators to market prices, imports/exports, and weather patterns.

Our analysis explicitly accounts for this uncertainty, being based on 40k simulated years.

We estimate the likelihood of at least one hour with excess electricity to increase to 59% in 2025.

Number of hours with excess electricity



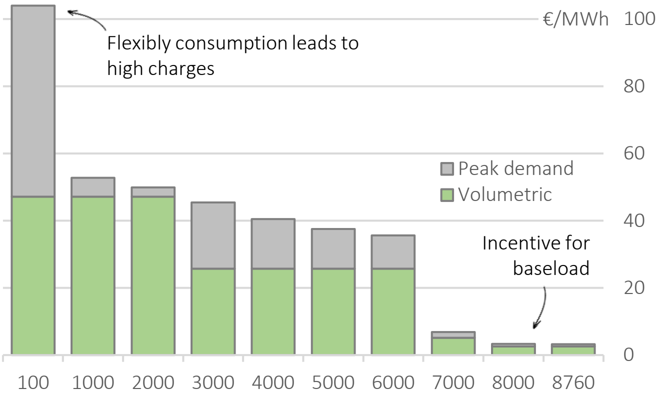
While for 2025, our point estimates suggests that 2 hours with day-ahead prices of -500 €/MWh occurs, the uncertainty range shows that there is a 10% chance that at least 25 of such hours occur.

This does not only imply 25 instances of operational challenges for system operators, but each of these hours will drive up the costs of renewables subsidies by approximately EUR 50mn.

It is key that all future generation investments, regardless of size and technology, are exposed to wholesale price signals.

Project highlight: TenneT – Grid fee rebates (2024)

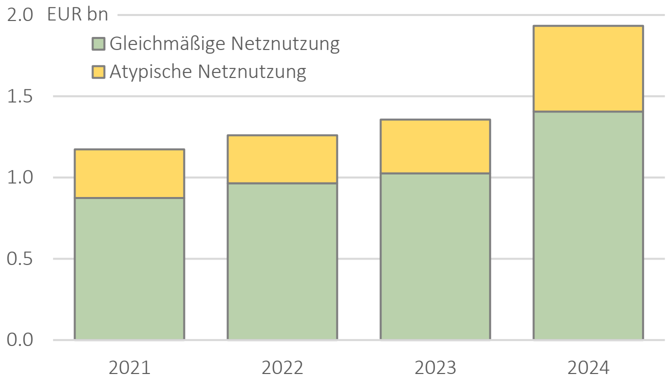
Industrial network charges



Grid fees have increased strongly in recent years across many European markets, driven by inflated congestion management and grid expansion costs. They have become an increasingly political topic.

For decades, Germany's system of rebates for grid fees for heavy industry (§19.2 StromNEV) has prevented industrial demand-side response, reinforcing an incentive that is provided by peak-demand charges (pictured).

Financial value of grid fee rebates

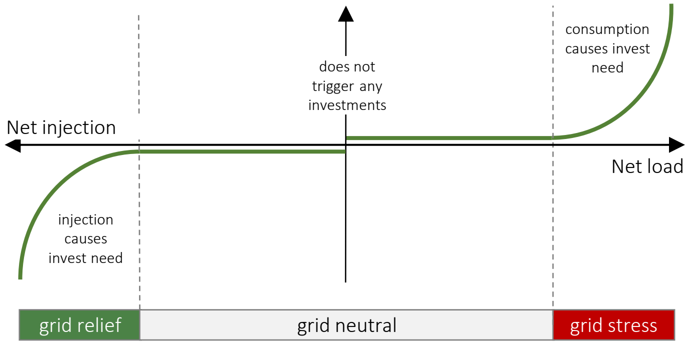


One reason being the large significance of the rebate as a subsidy to energy-intensive industry (pictured).

Finally, a reform window has opened.

In this project, we identify the numerous problems of the current rebates and propose a range of reform options.

Marginal network costs



Our preferred long-term reform is to link the rebate to the impact a load has on marginal grid costs (pictured).

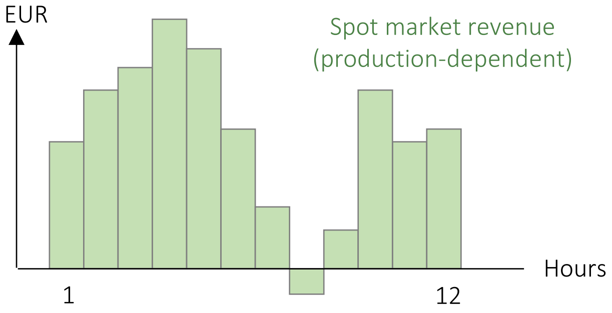
In particular, if a load is located in a region with abundant generation, it is likely to reduce curtailment and grid investments, hence have a negative marginal cost impact.

If an industrial load is located in a scarcity region, it will increase grid costs instead.

Because the network load changes with weather and time of the day, such a rebate must be dynamic, changing every hour. The report is published (DE | EN).

Project highlight: BMWK – Support schemes (2024)

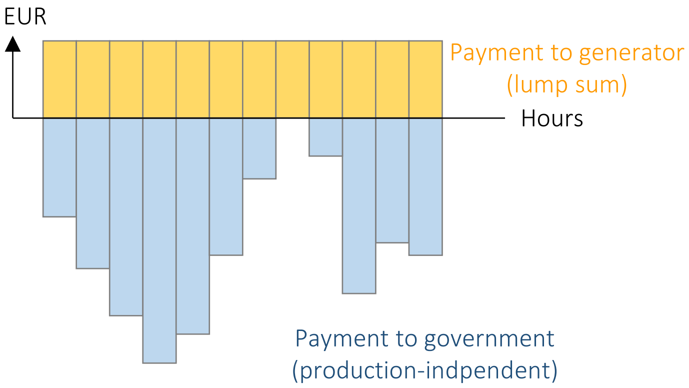
Spot market



Germany needs to update its renewables support scheme for wind and solar energy to comply with EU law.

A particular concern is to reduce dispatch distortions such as the lack of incentive for wind and solar generators to curtail at times of negative day-ahead or intraday prices.

Financial Contract-for-Differences

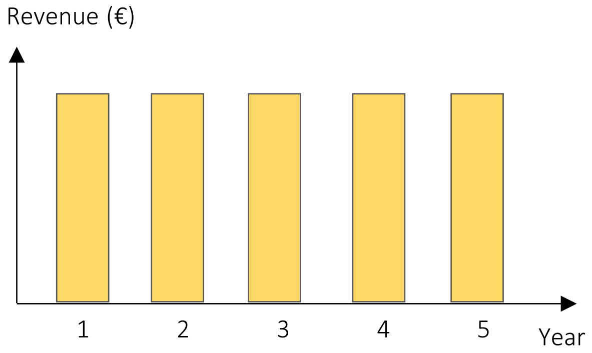


In this project, we provided assessment and advice on a range of options ranging from incremental reforms to the financial contract-for difference, a concept that we had developed in an academic paper in 2022.

The Financial CfD (pictured) is essentially a fixed-for-floating swap: The government pay an annual lump sum to the generator, who in return surrenders its spot market revenues.

However, to keep incentives for maintenance and quality, it is not the actual revenues, but the revenue derived from a benchmark. The benchmark is calculated from weather data.

Stable revenues



As a result, generators are hedged not only against price risk, but also against volume risk (good vs. bad wind years).

In addition, unlike conventional CfDs, this contract does not need to be suspended in times of negative prices, another source of cash-flow uncertainty.

As a result, the contract provides generators with undistorted market price signals and a certain cash flows, which should bring down cost of capital further.

Project references: 2025 / ongoing

Progress report solar (BMWK). Along with our partner ZSW, we write the current edition of the regular progress report on solar energy. We are tasked with assessing the impact of dynamic tariffs and dynamic grid fees on small-scale solar. Ongoing.

Electricity strategy (BMWK). Support of Germany's economics ministry in developing and implementing the overall strategy in transforming and decarbonizing the country's electricity supply. Ongoing.

Electricity grid (BMWK). This large project, lead by Consentec, supports the German government in a range of questions related to network expansion planning. We provide advice on grid financing, including cross-border cost sharing and reforms of network charges. Ongoing.

Demand-side flexibility (BMWK). Everyone lives demand-side flexibility, but it hasn't taken off yet. A crucial reason are various regulatory hurdles, from the (lack of) smart meters to peak demand network charges. We support Germany's DOE in this domain. Ongoing.

Renewables support scheme (BMWK). Germany needs to reform its support scheme by 1 Jan 2027. A particular concern are undistorted dispatch incentives for wind and solar energy. Along with our partners Guidehouse and Consentec, we provide assessment and advice on various proposed reforms. Ongoing.

Settlement price (utility). Several European countries move towards more liberal imbalance settlement rules and introduce a symmetric imbalance settlement price. Against this background, we supported a utility updating its trading and investment strategies. 2024-25.

Scheduling process (TSOs). Market parties have to submit a schedule to their connecting TSO, forecasting generation and consumption. However, they often have an incentives to submit a biased forecast. For the German TSOs, we evaluate options to improve schedule accuracy, building on lessons learned from other countries. 2024-25.

Excess electricity (BMWK). The fast expansion of solar energy comes at a price: because many investments small-scale and subject to a feed-in-tariff, they keep generation even if supply exceeds demand. In this project, we forecast the probability of excess electricity situations for coming years and support the German government addressing the problem. Ongoing.

Smart charging (Rabot). Dynamic tariffs allow owners of EVs to benefit financially from charging their cars when it is cheapest. Time-of-use grid fees, intraday optimization, and bidirectional charging leverage such optimization. For Rabot Energy, a smart charging pioneer, we quantify the financials for a range of typical German drivers. 2024-25.

Injection charges (TenneT). Countries such as the Netherlands are discussing introducing injection charges as a mean to distribute offshore grid connection costs more fairly. With our partner Consentec, we provide an economic assessment such injection charges. 2024-25.

EU electricity market design (BMWK). European legislation shapes electricity markets, and more change is coming. This project provides continuous support and advice for Germany's DOE in upcoming EU electricity market negotiations in a variety of topics ranging from support schemes to grid fees and capacity mechanisms. Ongoing.

Capacity mechanism (BMWK). After a political decision to introduce a capacity market, this two-year project develops such a market for Germany's BMWK. The overall project is coordinated by Consentec, we lead the work on hedging obligations. Ongoing.

Project references: 2024

Real-time price (Elia). Belgium TSO Elia works on reforming its imbalance settlement price in the context of PICASSO. As part of a review committee, we provide input and assessments and support external communication. 2023-24.

Grid fees (Industrial company). Network charges make up an ever-increasing share of industrial electricity bills, jeopardizing electrification investments. We provide forecasts of TSO grid fees until 2040, including projections of capacity and energy charges. 2024.

Support schemes (BMWK). Germany needs to update its renewables support scheme for wind and solar energy to comply with EU law. A particular concern is to reduce dispatch distortions. We provide assessment and advice on a range of options ranging from incremental reforms to fixed-for-floating swaps

Solar price effect (BSW). Imagine a year without solar energy. With reduced supply, wholesale prices would be much higher than they actually are. For trade association BSW, we empirically quantify this solar price effect. 2024.

§19(2) StromNEV (TenneT). For decades, Germany's system of rebates for grid fees for heavy industry has prevented industrial demand-side response. Finally, a reform window has opened. In this project, we identify the numerous problems of the current rebates and propose a range of reform options. 2024. Report (DE | EN)

Network charges (Chancellery). Rising network charges are an increasing concern for policy makers, driven by concern about industrial competitiveness. For Germany's chancellery, we assessed current and future development of grid costs and network charges. 2024.

Offshore tender (RE project developer). Offshore wind tenders now often include non-price criteria. We reviewed the tender documents for a European offshore project and provided input regarding system integration. 2024.

Wind competitiveness (RE project developer). The cannibalization effect threatens to make wind energy a victim of its own success. For a large onshore developer, we assess future factors that support wind competitiveness and provide input for a new business strategy. 2024.

Value of flexibility (ZVEI). Small-scaled demand-side flexibility resources such as EVs, heat pumps, and solar batteries are widely acknowledged as core ingredients of future energy systems, but scale-up is sluggish in practice. In this report, we estimated the economic value for markets and grids based on a numerical Python model. 2023-24. Report (DE | EN)

Dynamic FIT (50Hertz). Germany now has 60+ GW of solar capacity under the feed-in-tariff. Those generators won't stop producing, even if oversupply sends wholesale price in negative territory. For TSO 50Hertz, we develop a reformed feed-in-tariff that incentives producers to turn off in situations of oversupply. 2024.

Imbalance settlement price (Swissgrid). Concerned about large system imbalances, Switzerland has decided to reform its imbalance settlement price. We provide quantitative assessment of proposed pricing system and develop a new pricing regime. Our proposal is derived from first principles and informed by the real-world experience of other countries. 2024.

Cross-border forward markets (TSOs). European TSOs issue long-term transmission rights. ACER had proposed numerous changes, including the establishment of a virtual hub. In this report for the German TSOs, we develop an analytical framework to assess cross-border forward markets and assess these proposals. 2023-24. Report

Project references: 2023

Passive balancing (multi client). Market parties bet on the imbalance settlement price, thereby helping to balance the system. This study commissioned by a group of market parties explains the mechanisms and addresses concerns about this kind of "passive balancing". 2023. Report (DE | EN)

Industrial power prices (Agora Energiewende). 2023 saw an intensive political debate about introducing subsidized prices for heavy industry. For Agora Energiewende, we developed a feasible proposal of such a subsidy that maintains incentives for short-term flexibility and heading. 2023.

Network charges (Staatskanzlei Niedersachsen). Today, distribution grids are often expanded because of generators, yet costs are put on the shoulders of local consumers. This leads to the paradoxical situation that electricity prices for consumers tend to be highest where electricity generation is largest. 2023.

Electricity market reform (European Parliament). Assessment of electricity market reform proposals such as CfDs, PPAs, price caps, and peak shaving. Joint project with Bruegel for ITRE committee. 2023. Report

Smart retail tariffs (LichtBlick). Proposal for a dynamic retail tariff that offers customers price insurance without stifling decentralized flexibility (report DE | EN) and dynamic grid fees (report DE | EN). 2023.

Revenue cap implementation (BNetzA). Germany's energy regulator is tasked with implementing the revenue cap on power generators. Along with Frontier Economics, we provided economic expertise. 2023.

Electricity market design (Agora Energiewende). Support of Germany's leading energy think tank on electricity market design, in particular regional dynamic network charges. 2022-23. Report (DE | EN)

Gaming (TenneT). Game-theoretical assessment of local markets for flexibility, formally identifying optimal increase-decrease bidding strategies and mitigation measures. Joint work with Takon and ZEW. 2021-23. Working paper

Coal exit (BMWi). Germany's government committed to cancel carbon certificates along with its coal exit. In this project with Aurora, we provided estimates how many certificates to delete. 2021-23.

Project references: 2022

Intraday / Balancing (TSO). Econometric identification of the link between intraday prices and balancing activation based on millions of individual transactions. We found a strong correlation, a possible sign for insider trading. 2022.

Electricity market design (Utility). Analytics and assessments on the EU market design reform, focusing on offshore wind. Topics included CfD design and transmission access guarantees. 2022.

Imbalance settlement pricing (Elia). Support in developing a new imbalance settlement pricing scheme in Belgium in the context of PICASSO. 2022.

Future gas costs (E3G). Assessment of future costs of gas supply for Berlin-based think tank E3G. 2022. Report

Home battery storage (Sonnen). Simulations for optimizing home battery storage operations during the energy crisis. 2022.

PV support scheme design (Swissgrid). Support scheme for solar energy centered around generation adequacy. We proposed an optimized contract for differences. 2022.

Consumer centric market design (50Hertz / Elia). Study on better integration of flexible consumers into power markets, particularly device-specific metering, passive balancing, and ex-ante firm imbalance pricing. 2022.

Balancing markets (Utility). For a European storage investor, we provided an assessment of multiple European balancing markets and long-term balancing price forecasts. 2022.

Future Energy Outlook (TransitionZero). Advice on setting up a global energy outlook, including recruitment and technical model development. 2021-22.

Charging infrastructure (Agora Verkehrswende). Partnering with Consentec, we assessed the market for public EV charging infrastructure and developed a proposal for a competitive market design. 2021-22. Report

Nodal pricing model (TSO). Development of a GAMS load flow model of Europe for simulations of locational marginal prices. 2021-22.

Dispatch Hubs (Elia / 50Hertz). For TSOs Elia und 50Hertz we assess the incentives implied in multiple variants of their “Dispatch Hub” proposals, in particular incentives for inc-dec gaming. 2020-22. Report

Neon Neue Energieökonomik is a Berlin-based boutique consulting firm for energy economics. As a boutique, we specialize in sophisticated quantitative assessments and economic analyses of electricity markets since 2014. With consulting projects, studies, and training seminars, we support decision-makers tackling today's pressing issues and future challenges of the energy transition. Our clients include governments, regulatory authorities, grid operators, energy suppliers and electricity traders across Germany and Europe.

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