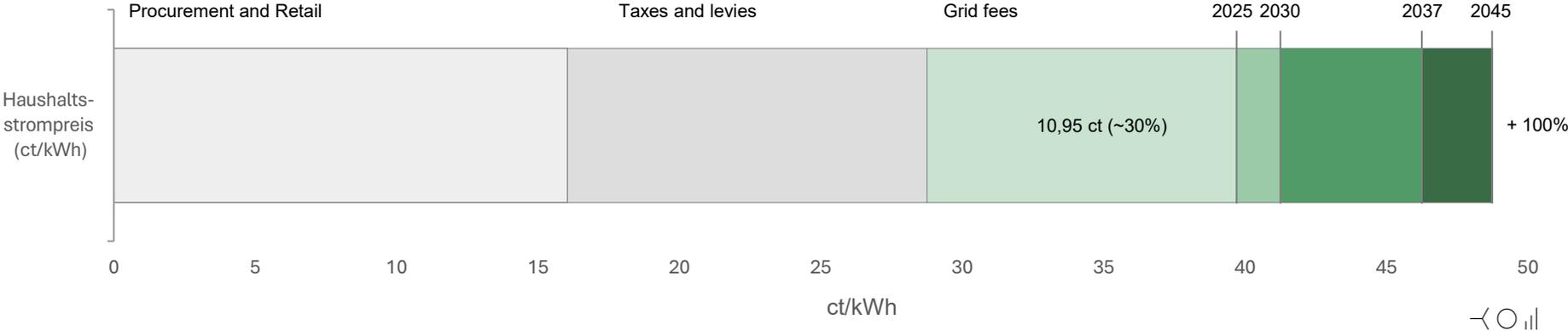ENERGY BY UNTERNEHMERTUM

# GRIDS & BENEFITS

**Webinar**

**Johanna Bronisch,** Neon Neue Energieökonomik
15. February 2026

# Power grids are under pressure:
## Congestion, expansion and lack of incentives

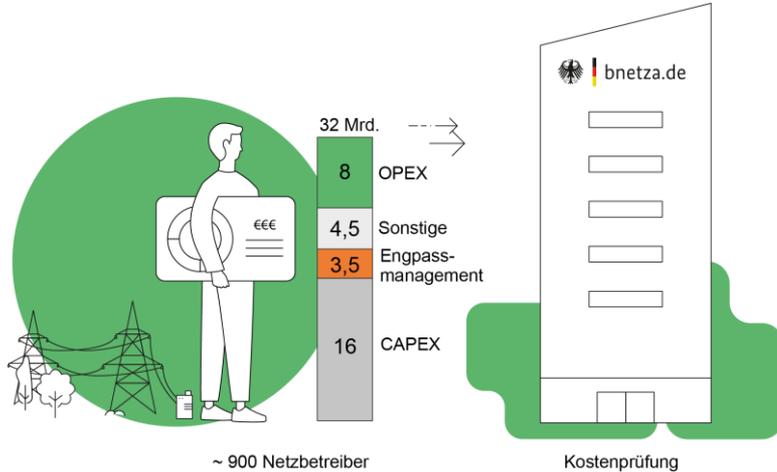# Grid fees are predicted to double for households by 2045



Procurement and Retail    Taxes and levies    Grid fees    2025 2030    2037    2045

Haushalts-strompreis (ct/kWh)

10,95 ct (~30%)

+ 100%

0    5    10    15    20    25    30    35    40    45    50

ct/kWh

# How are grid fees for consumers calculated?



**COST CALCULATION**
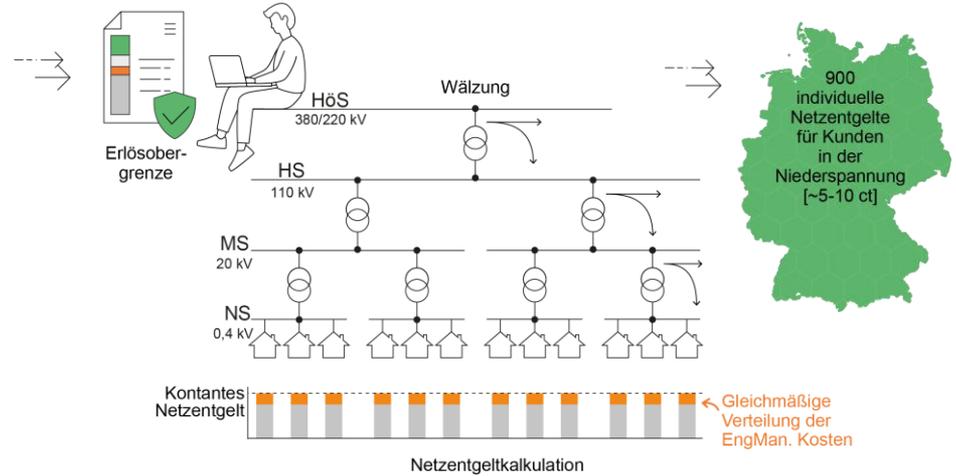
32 Mrd.

| | |
|---|---|
| 8 | OPEX |
| 4,5 | Sonstige |
| 3,5 | Engpass-management |
| 16 | CAPEX |

~ 900 Netzbetreiber

bnetza.de

Kostenprüfung

**COST RECOVERY**

Erlösober-grenze

HöS 380/220 kV — Wälzung

HS 110 kV

MS 20 kV

NS 0,4 kV

Kontantes Netzentgelt → Gleichmäßige Verteilung der EngMan. Kosten

Netzentgeltkalkulation

900 individuelle Netzentgelte für Kunden in der Niederspannung [~5-10 ct]

# Why are grid fees bound to increase so much?
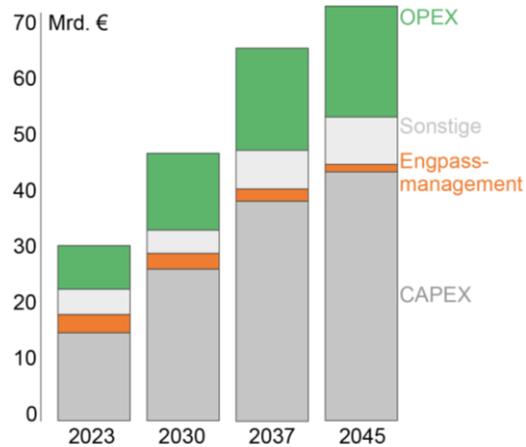


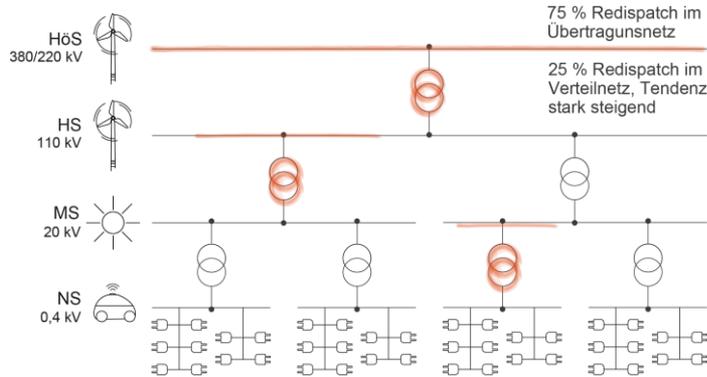Estimated annual grid costs for electricity infrastructure in Germany
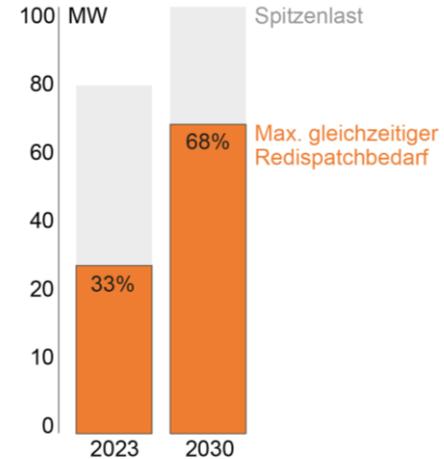


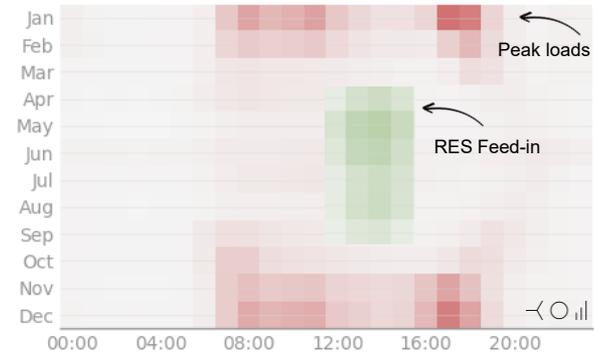Share of simultaneous redispatch demand relative to Germany's peak load

# Identifying when and where grid congestion drives up costs



75 % Redispatch im Übertragunsnetz

25 % Redispatch im Verteilnetz, Tendenz stark steigend

HöS 380/220 kV

HS 110 kV

MS 20 kV

NS 0,4 kV



Peak loads of an exemplary distribution grid (HS/MS)

Peak loads

RES Feed-in

Quelle: Bundesnetzagentur

# Is household electrification a blessing or curse for grIds?
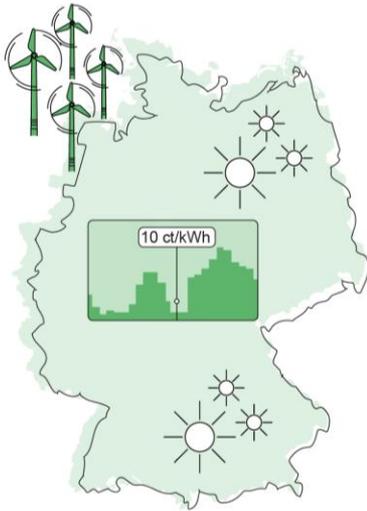


**Price Optimization**
Consumption is optimized according to the uniform wholesale price, which helps the integration of renewables and creates savings for end customers
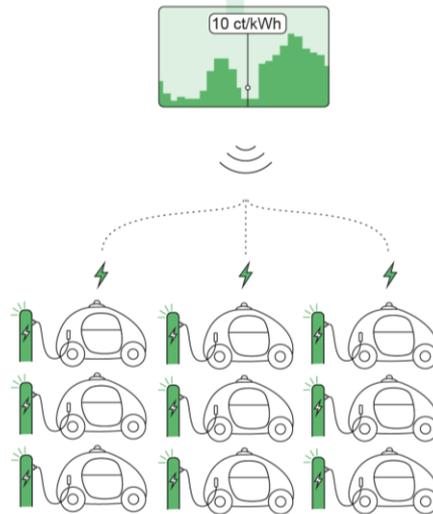
**Increased Synchronicity**
More price optimization also through "MiSpeL" increases synchronicity without taking into account grid constraints
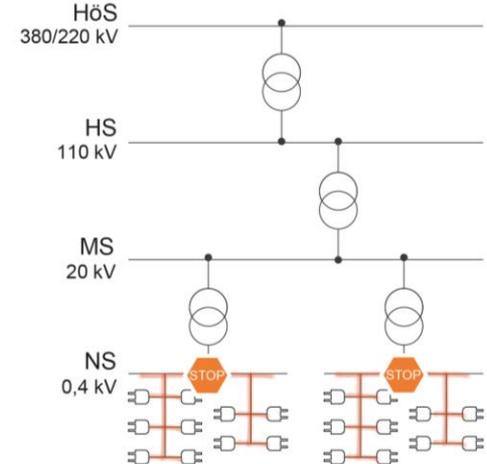
**§14a EnWG**
This can lead to new bottlenecks. DSO can limit capacity in cases of severe congestion. However this harms the acceptance of e-mobility.

# Germany is introducing a new grid fee system, that will incentives grid-friendly consumption

Financing grids vs. providing incentives

- Financing: Recovery of costs through a fixed fee and a unit rate
- Incentives: Symmetrical, dynamic volumetric unit rate that are revenue-neutral for the grid operator

Who should be incentivised?

- All grid users, down to the low-voltage level
- Because consumers at all voltage levels can help relieve congestion in the higher voltage levels

Which bottlenecks are considered, when calculating the incentive?

- Extra-high to medium voltage (grid levels 1–4)

BNetzA proposal for the new network tariff system from 2029 onwards

€/kW

€/MWh

GP

AP

+

-

Fixed Fee

Unit rate (volumetric)

Financing grids

Providing incentives
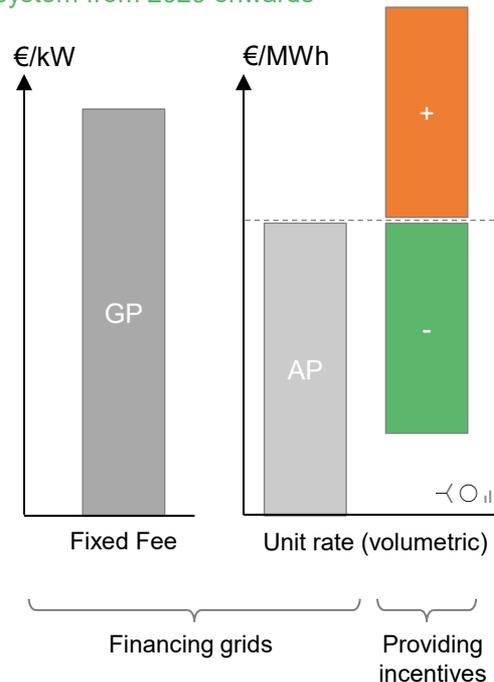
# Grids & Benefits: Piloting dynamic grid fees

# We implemented dynamic grid fees in four grid areas and more than 500 flexible assets (EVs)
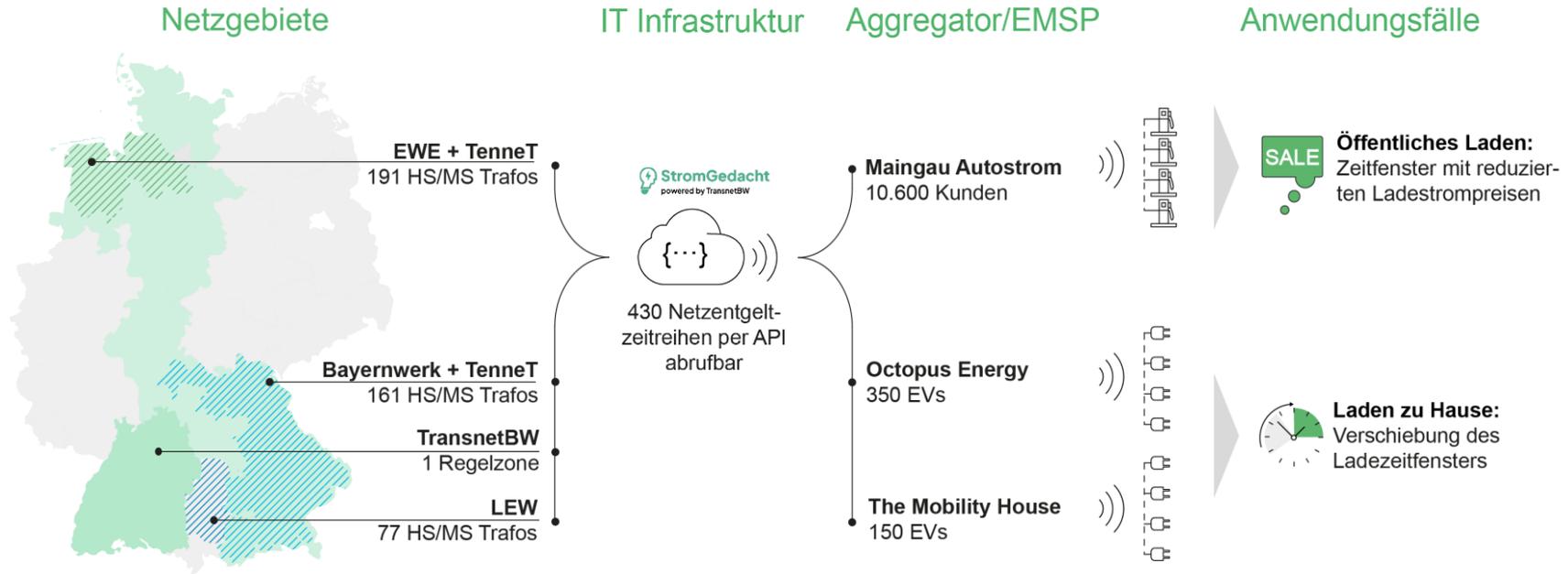


Netzgebiete

EWE + TenneT
191 HS/MS Trafos

Bayernwerk + TenneT
161 HS/MS Trafos

TransnetBW
1 Regelzone

LEW
77 HS/MS Trafos

IT Infrastruktur

StromGedacht
powered by TransnetBW

{···}

430 Netzentgelt-
zeitreihen per API
abrufbar

Aggregator/EMSP

Maingau Autostrom
10.600 Kunden

Octopus Energy
350 EVs

The Mobility House
150 EVs

Anwendungsfälle

SALE **Öffentliches Laden:**
Zeitfenster mit reduzier-
ten Ladestrompreisen

**Laden zu Hause:**
Verschiebung des
Ladezeitfensters

# Die 10 Gebote der Preisbildung

| Parameter | Grids & Benefits Design |
|---|---|
| Reference | Redispatch / Relative Load |
| Considered voltage levels | Voltage Level 1-4 |
| Recipients | Low Voltage Level |
| Aggregation of upstream voltage levels | Redispatch 2.0 NKK |
| Instruments to prevent new downstream congestions | None |
| Spatial Resolution | HV/MV Transformer |
| Temporal resolution | 15 Min |
| Tariff structure or number of price levels | Price continuum, no tiers |
| Standard Fee, Symmetry, Min/Max | Modul 3 Standardtarif, Min: 0ct to max: 18 ct |
| Time of calculation and Publication | Publication at 10 a.m. on D-1, valid for 24h |

# Daily grid fee patterns follow generation profiles
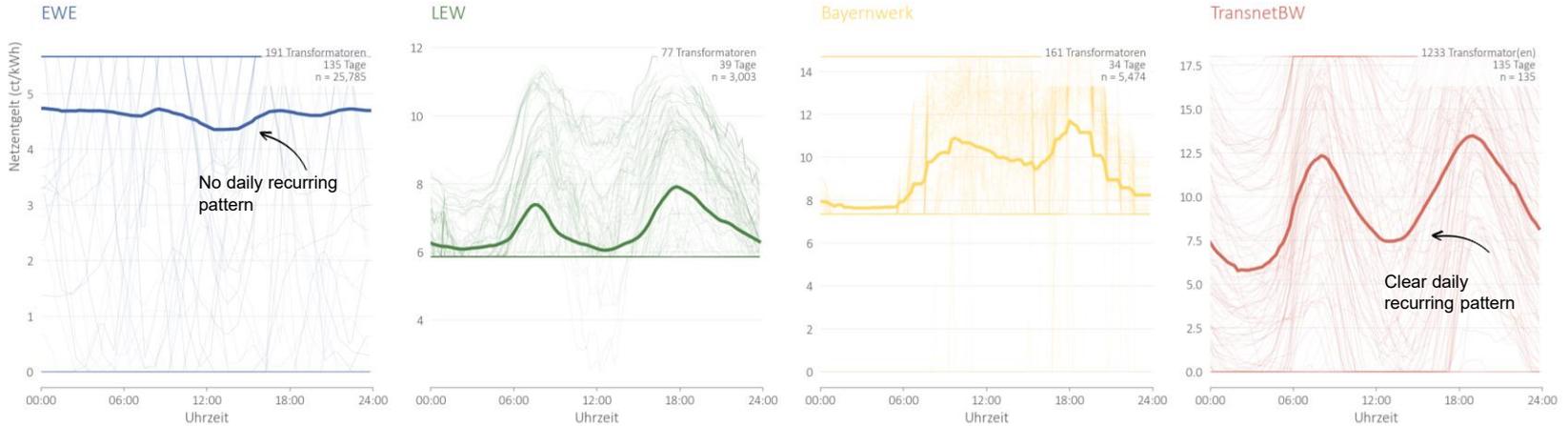


Winter 2025

# Networks are different - spatially and temporally



LEW Trafo HS/MS Nr. 5



EWE Trafo HS/MS Nr. 1
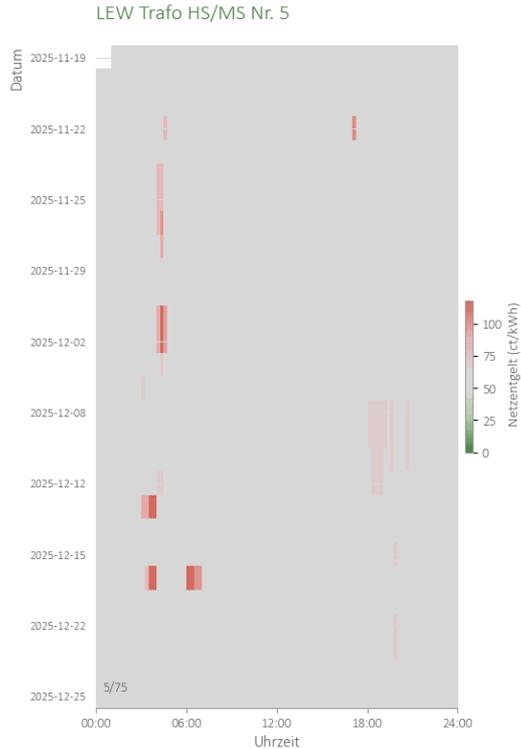
## Daily Patterns

- Solar feed-in (LEW) = predictable, periodic
- Wind feed-in (EWE) = unpredictable, irregular

## Locations

- Correlate strongly and result in clusters

## No one size fits all

- Design of grid charges must reflect differences
- Complexity should be kept as low as possible
- Necessary: short lead time
- Not necessary: high spatial granularity, many price levels

# Vehicles are connected for charging at night

## Potential for load shifting

- Observation period: October 25 - January 2026

- Average duration of connection: 13 h

- Load can only be shifted if cars are connected to the charging station

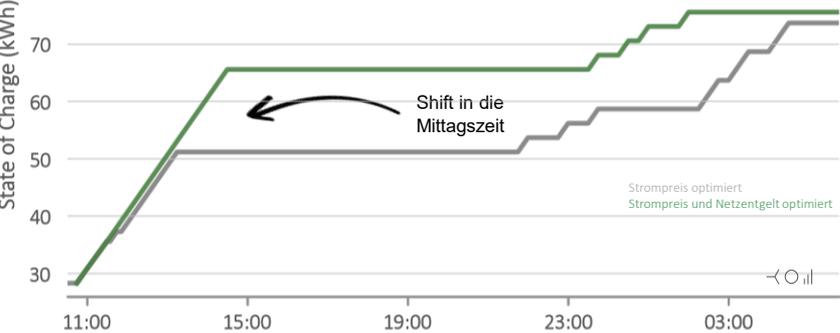Tageslastprofil: Angeschlossene Fahrzeuge
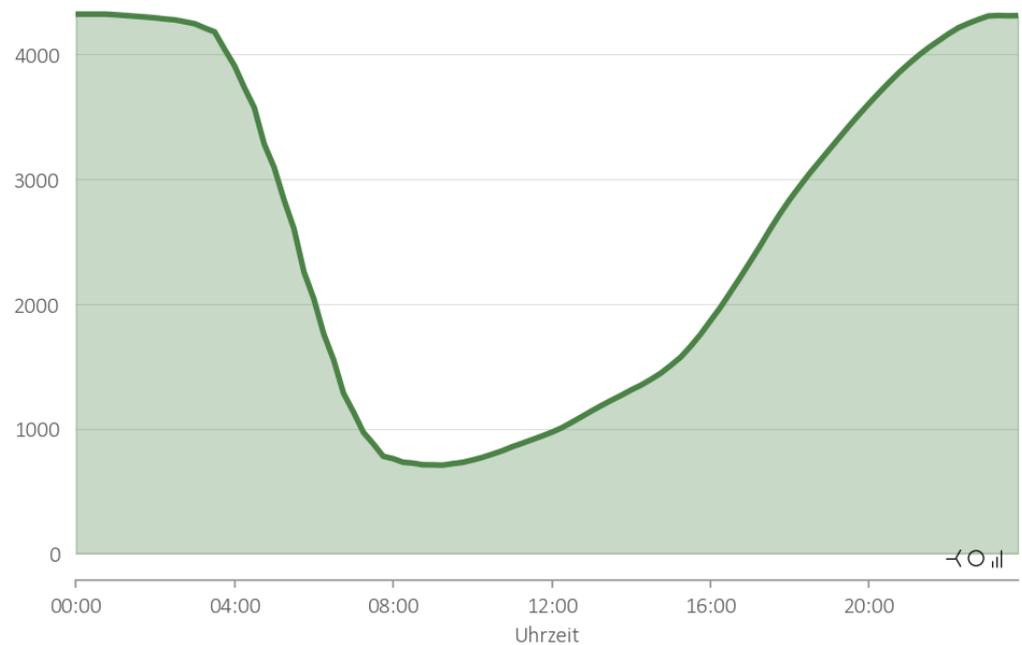
# Dynamic grid fees rewrite charging schedules

Wholesale price with constant grid fee and dynamic grid fee
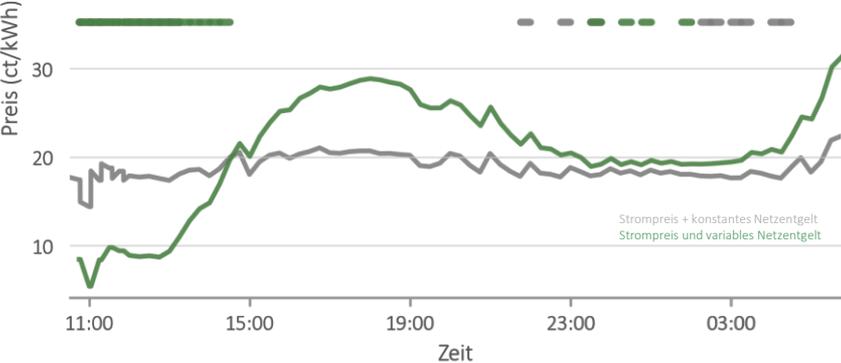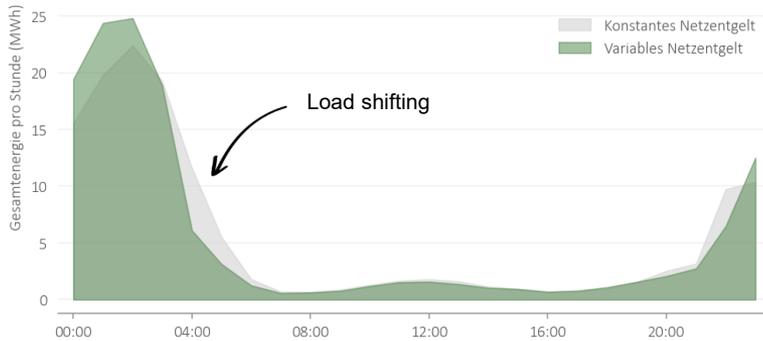


Charging schedules: Wholesale price (grey) or Wholesale price and dynamic grid fee optimised (green)
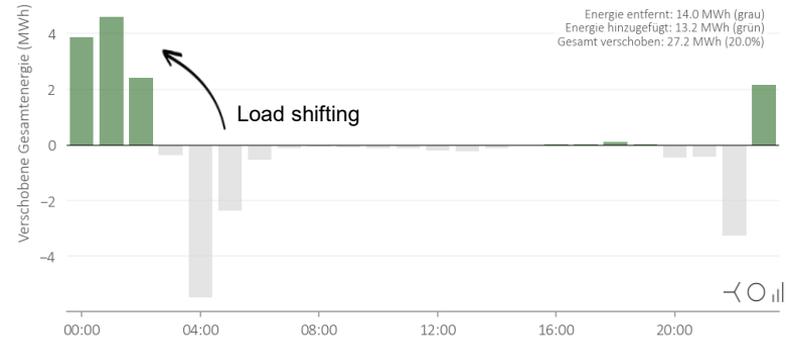
# In total, 20% of consumption is shifted



Gesamter Energieabruf nach Tageszeit (Stündlich)



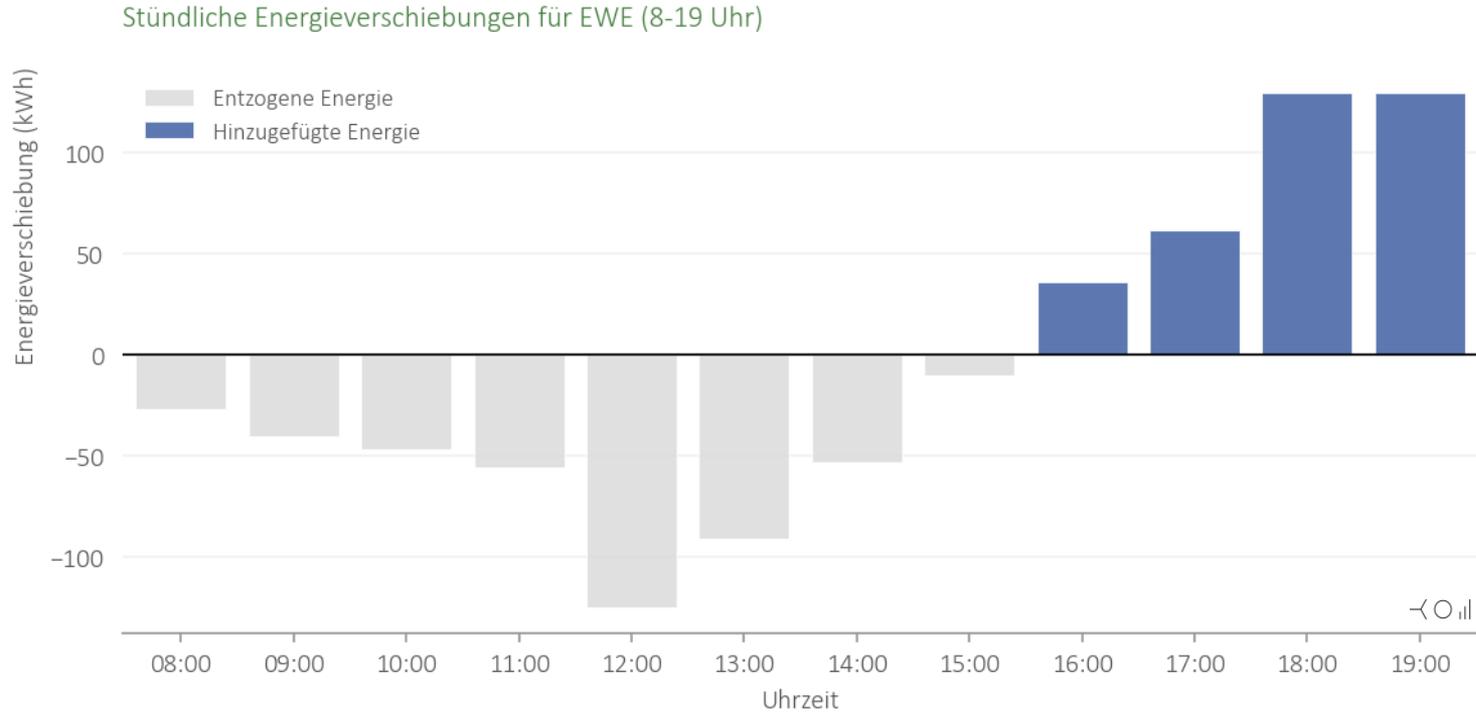Gesamte Energieverschiebung: Variabel - Konstant (Stündlich)

- Figure shows all charging processes summed up across the four pilot networks
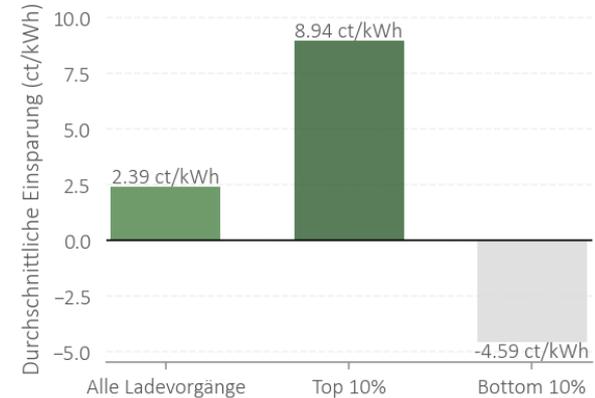- Most load shifted from typical peak hours in the morning and evening

- Figure shows the hourly change in consumption across all charging processes

# Load shifting in the EWE grid leads to an increase in the early evening hours



Stündliche Energieverschiebungen für EWE (8-19 Uhr)

Legend: Entzogene Energie, Hinzugefügte Energie

Y-axis: Energieverschiebung (kWh)
X-axis: Uhrzeit

# Pilot customers benefit from an average saving of 2.4 ct/kWh



Geladene Energie nach Preis
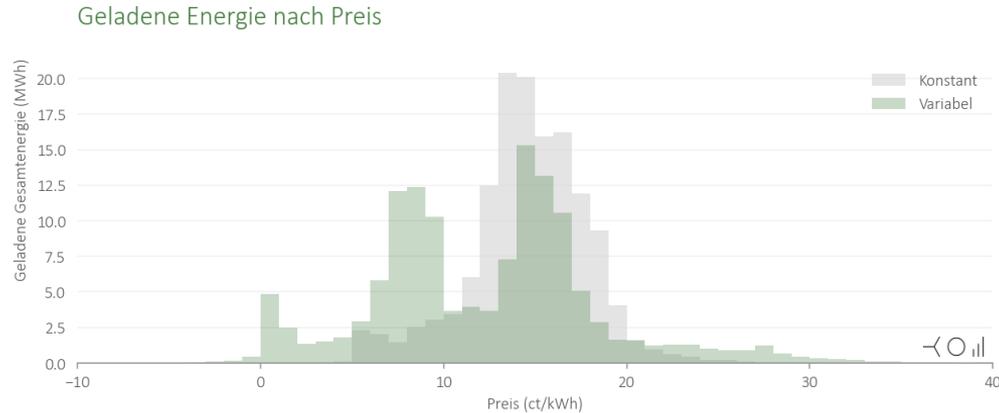


In the future, symmetrical grid fees can provide a significant savings potential for V2G

# Our pragmatic reform proposal for DSOs

# Proposal for a pragmatic reform of the current time of use grid fees

Keeping few fixed fee levels per network area

- High tariff, low tariff and standard tariff (expandable up to 5 levels if necessary)
- Translation of the dynamic energy price from higher voltage levels into the fixed pay levels of the NS

Moderate geographical subdivision of grid areas possible

Publication of beats via central data platform

- as a 15-min time series before the Day-Ahead auction for each area

Division of DSOs into three groups

- Individual roadmap, uniform framework
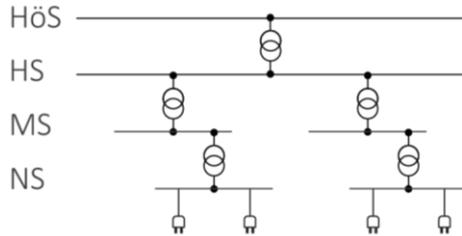- Each group receives its own roadmap

Embedded in a uniform grid fee system, formats and process world

**\*kuratives Lastdimmen muss als Notfall-Maßnahme möglich bleiben**

# DSO classification according to needs and abilities

## 1 — EXEMPT NETWORK OPERATORS



- No structural bottlenecks or
- Low sensitivity to upstream bottlenecks or
- Little connected flexibility / low SteuVE connection capacity or
- No redispatch capabilities, e.g. area network operators, network operators without 24/7 staffing
- Cost-benefit not balanced
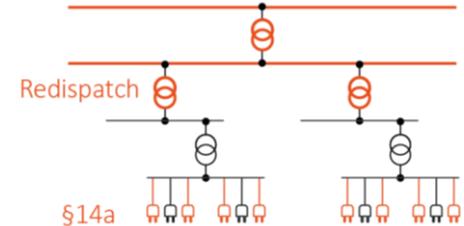- Upstream grid operator sets the counting times

## 2 — NETWORK OPERATORS Downstream of congestion
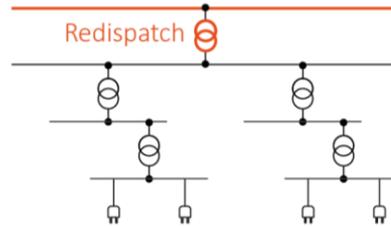


- Redispatch measures only from upstream network levels 1 – 4 or
- Grid connection in a 13k relief region
- Translates the dyn. Energy price of the higher voltage levels in beats for the LV

## 3 — NETWORK OPERATORS Featuring congestion in LV



- Own redispatch needs and/or
- Load Dimming
- Sets the beats also against the background of your own bottlenecks

# Summary

## Quantitative results of Grids & Benefits

- Pricing mechanism must be able to map differences between distribution grids
- Dynamic grid charges lead to a shift of 20% of the charged electricity
- Customer flexibility pays off: up to 9 ct/kWh savings

## There are minimum requirements for a new Module 3

- Alignment with the new network charge system (incentive function)
- Scope of opportunity for distribution system operators
- Prevention of rebound effects or new bottlenecks

## We are working on a technically and process-wise feasible concept for low voltage

- Data platform (incl. reprocesses)
- Adaptation of the data in the UTILMD
- Bottleneck Forecast
- NB-NB Coordination

# GRIDS & BENEFITS

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