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Sector Coupling

Challenges and Implications of the Energy Transition

gridSession

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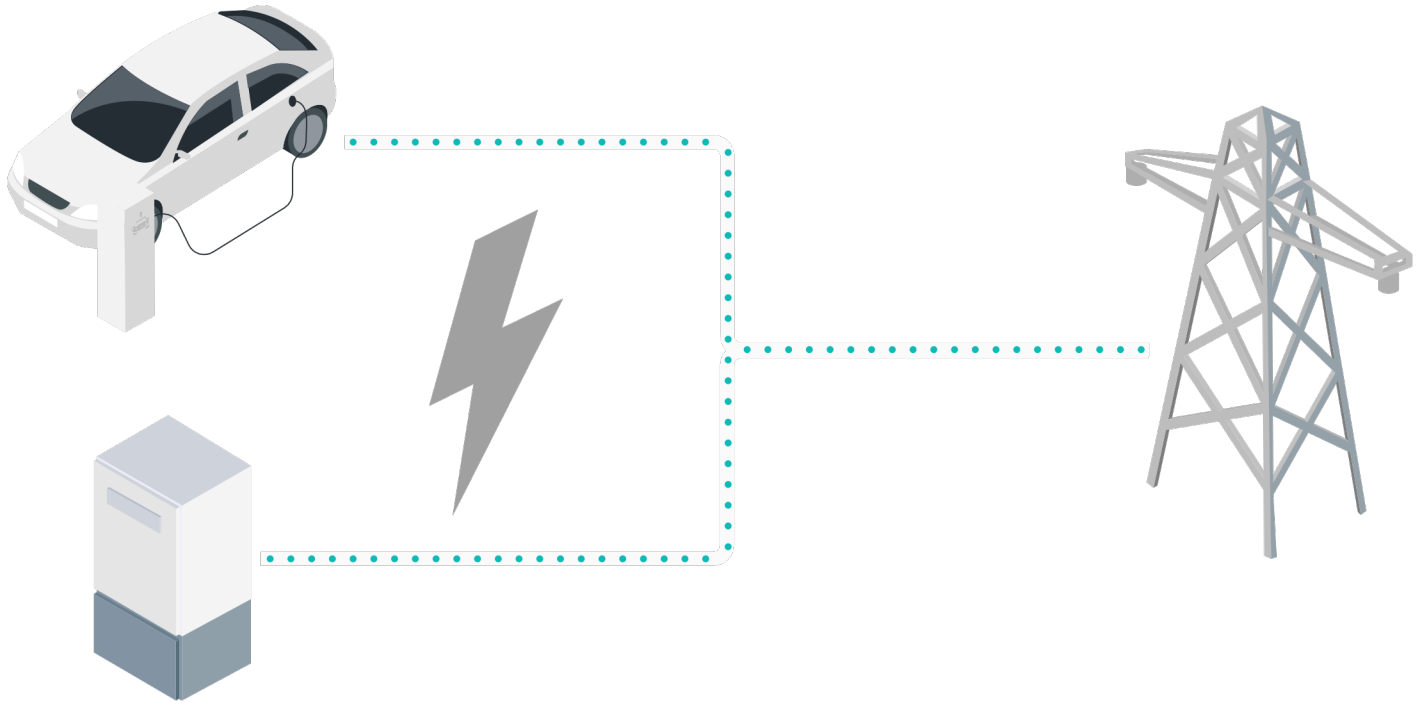
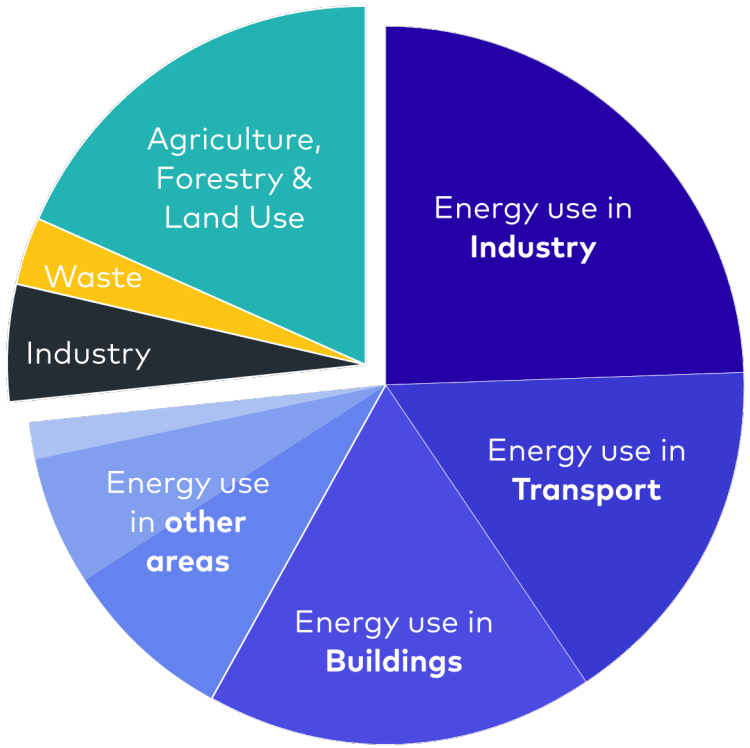
What is sector coupling?

Interconnection of the energy consuming sectors
with the power producing sector

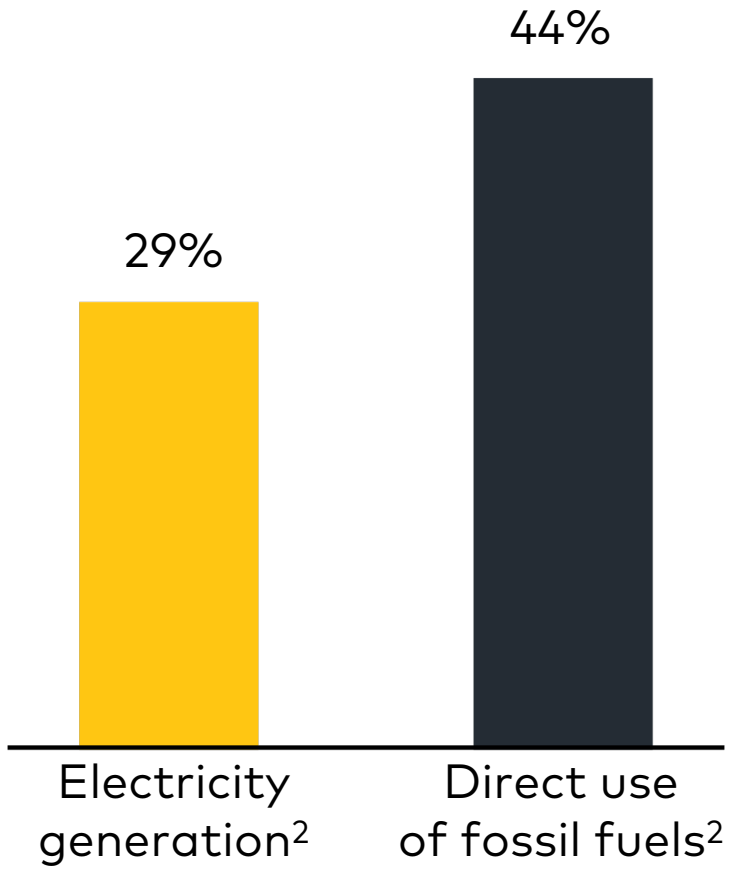


Fossils keep driving global CO_2 emissions



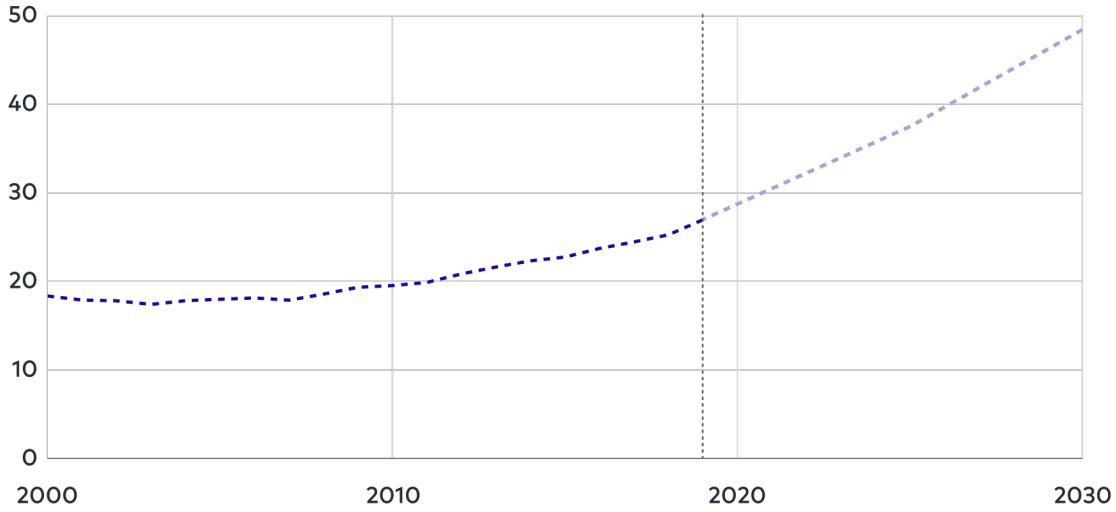
Relative CO_2 emissions by sector[1]

Energy accounts for 73% of all global CO_2 emissions



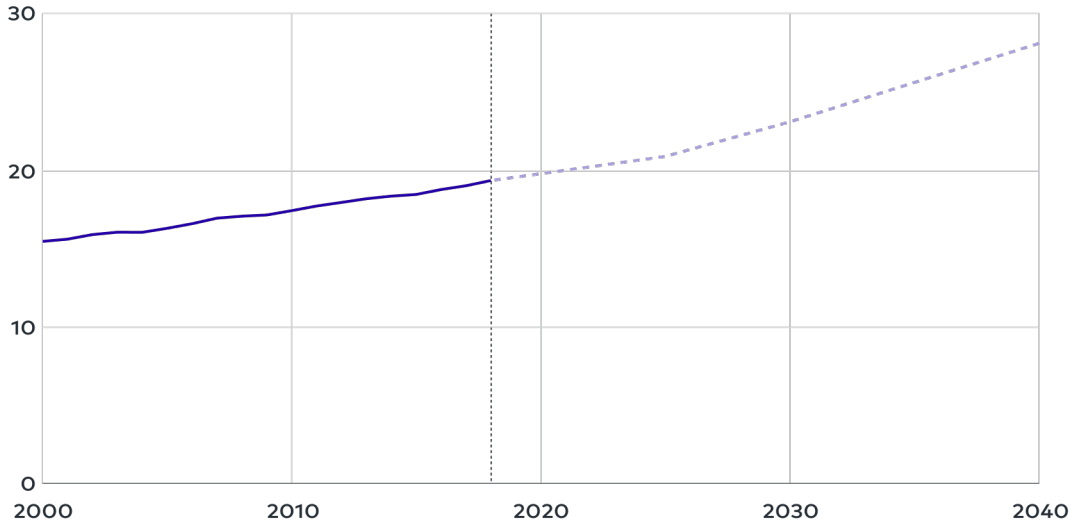
Sources:
1) Our World in Data (2016). Emissions by Sector.
2) Fraunhofer Institute for Solar Energy Systems ISE (2020). Paths to a Climate-Neutral Energy System. The German Energy Transition in its Social Context.

Generating electricity from renewables is only half the pie



Share of renewables in total electricity generation
→ 2019: 27%

Trajectory to meet climate goals:
2030: 50%
2040: 66%

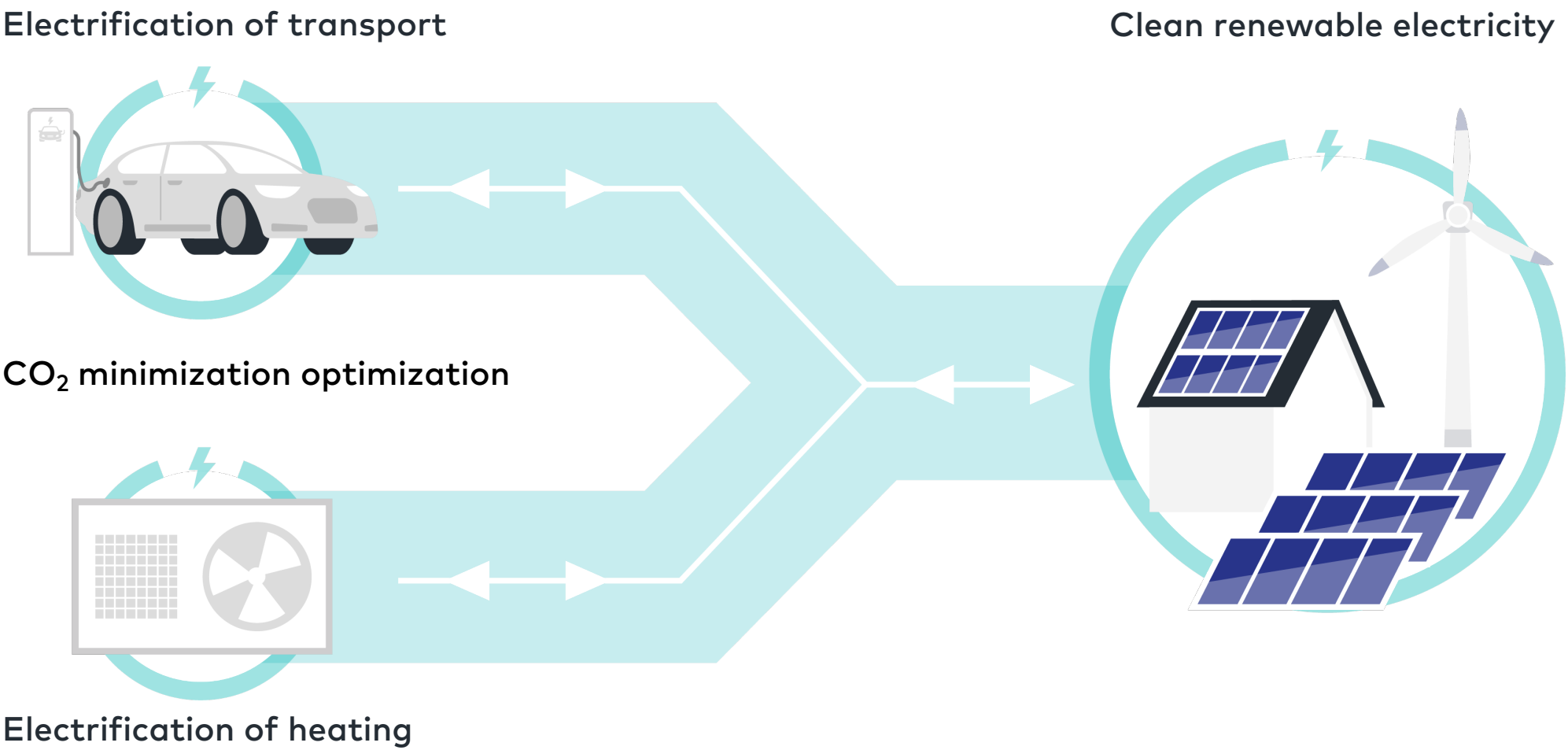


Share of electricity in total final energy consumption
→ 2019: 19%

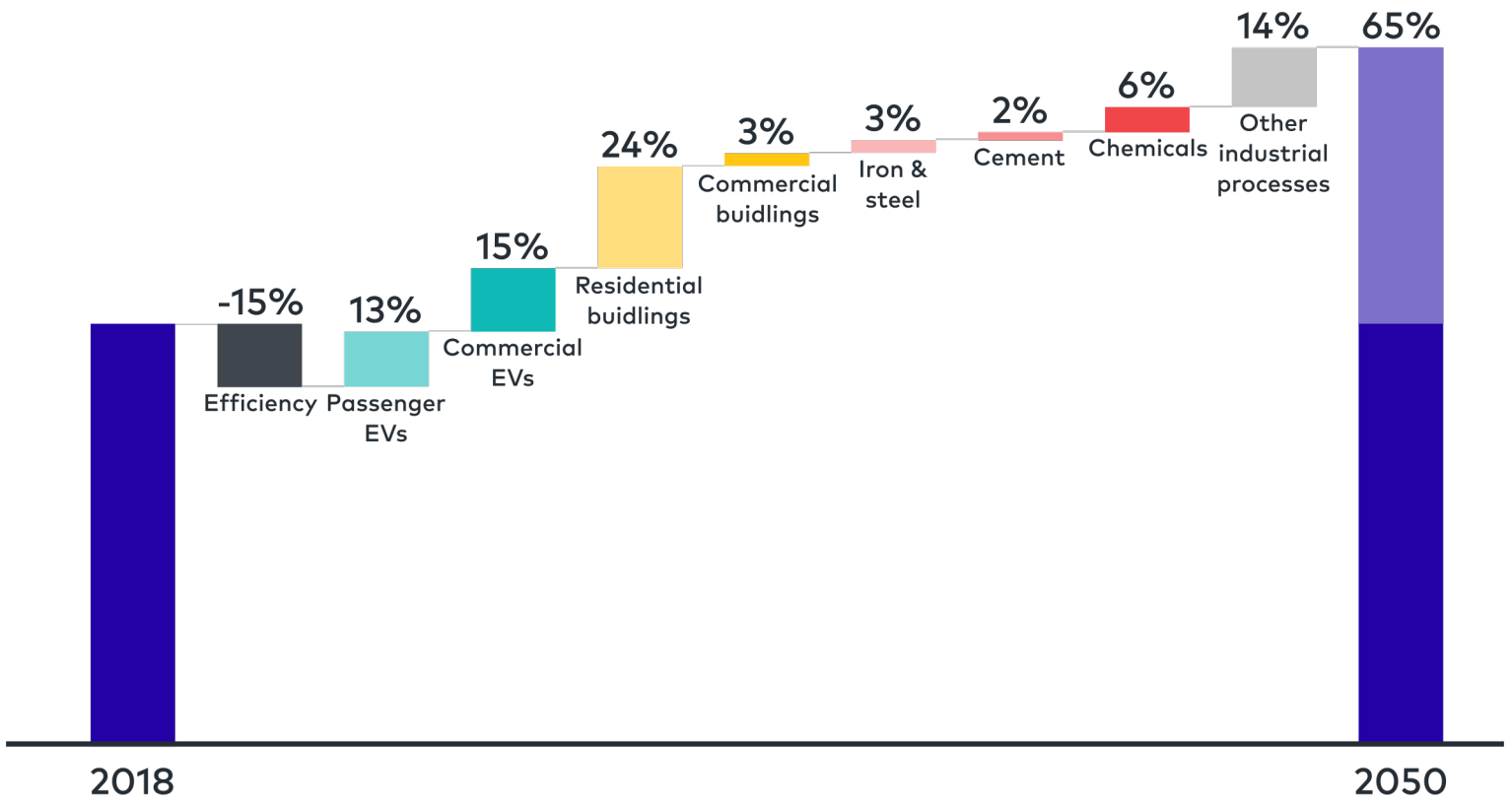
Trajectory to meet climate goals:
2030: 23%
2040: 28%

Sources: International Energy Agency (2020). Renewables Report 2020

Climate policy revolutionizes electricity, transport and heating



Change in electricity demand in Northern Europe due to sector coupling



Sources: BloombergNEF (2020). Sector Coupling in Europe

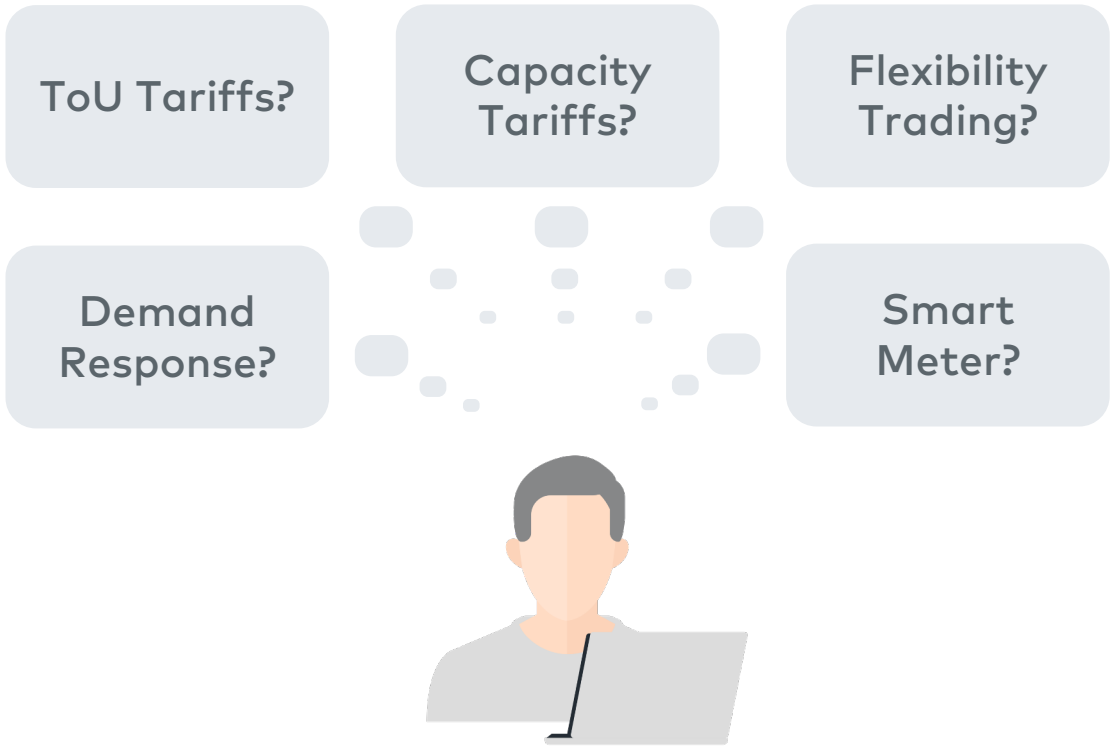
Electricity system challenges cause regulatory reactions

Electricity system challenges	Regulatory answers
Increase clean electricity generation capacities	Incentivise renewable investments
Match consumption of EV etc. with renewable generation	Expose load to price signals ⇢ ToU tariffs ⇢ Aggregation for flex markets
Reduce impact on grid	Reduce peak loads by ⇢ reflecting scarcity in grid fees and/or capacity tariffs ⇢ allowing grid operators to curtail loads

Implications for electricity consumers

- Increase renewable generation capacity (self-consumption incentive)
- React to energy prices (ToU tariffs)
- Reduce peak-load (grid fees and/or capacity tariffs)
- Allow aggregation and control of flexibility for ancillary services

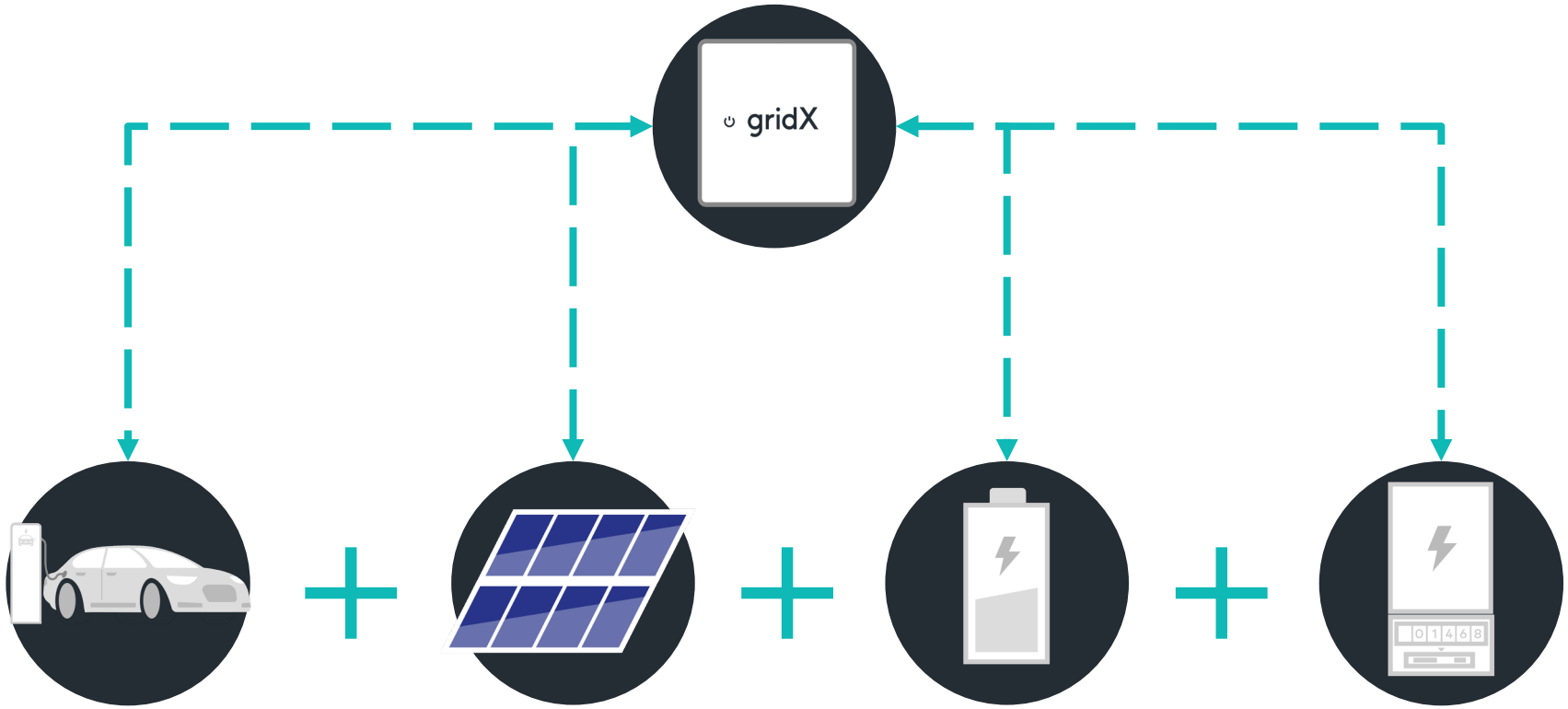
Complexity and customer's acceptance



Products, tariffs and offers that **increase pressure to act** are **not accepted by customers**.
There is a general acknowledgement of the increased complexity due to digitalization and energy transition. However, customers do **not show a willingness to act actively**.

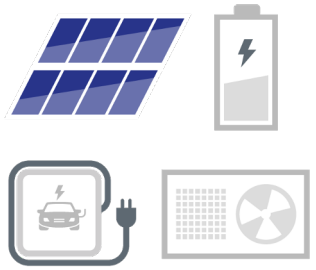
Sources: BDEW (2017). Digitalization from a Customer's Perspective

End customers will demand a holistic product concept



XENON platform allows to build digital energy products in no time

Distributed energy resources



DERs produce, store and consume energy

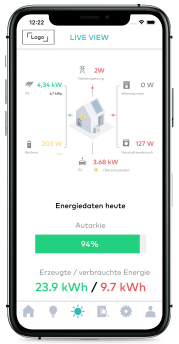
Edge services

Connect DERs to XENON

Cloud services

Process, store and consolidate data

User interfaces



Visualize and manage DERs

XENON domains

Customers that trust our solutions

innogy DHL VIESMANN e·on GOLDBECK

Thank you!

Scan the QR code to arrange a meeting!

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