



Tysk-Svenska Handelskammaren
Deutsch-Schwedische Handelskammer



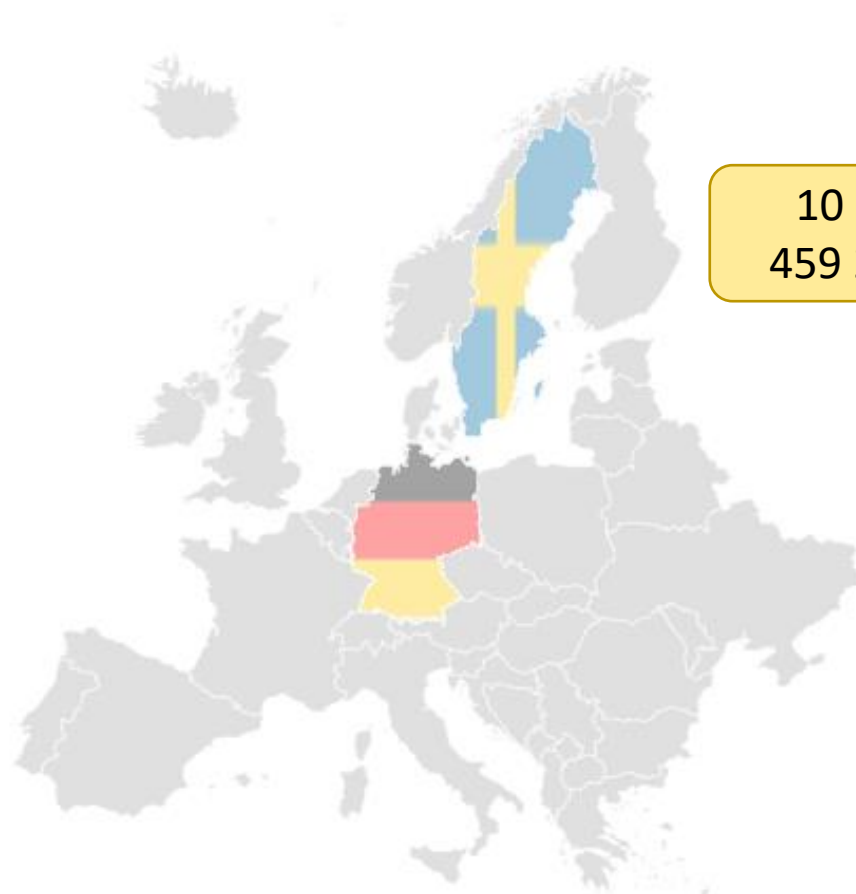
26 May 2021

Business opportunities for Swedish smart grid companies in Germany

*A report on behalf of
Smart City Sweden*



Towards Germany...



10 million
459 295 km²



82 million
357 112 km²

"Mittelstand"





16 federal states





North Rhine-Westphalia (NRW)

- Most populous and most densely populated state
- BIP: 697.125 MEUR (2020)
- Central location: more than 160 million people living within a radius of 500 km around Düsseldorf
- Large industrial sector: every fifth euro of Germany's total industrial turnover generated in NRW





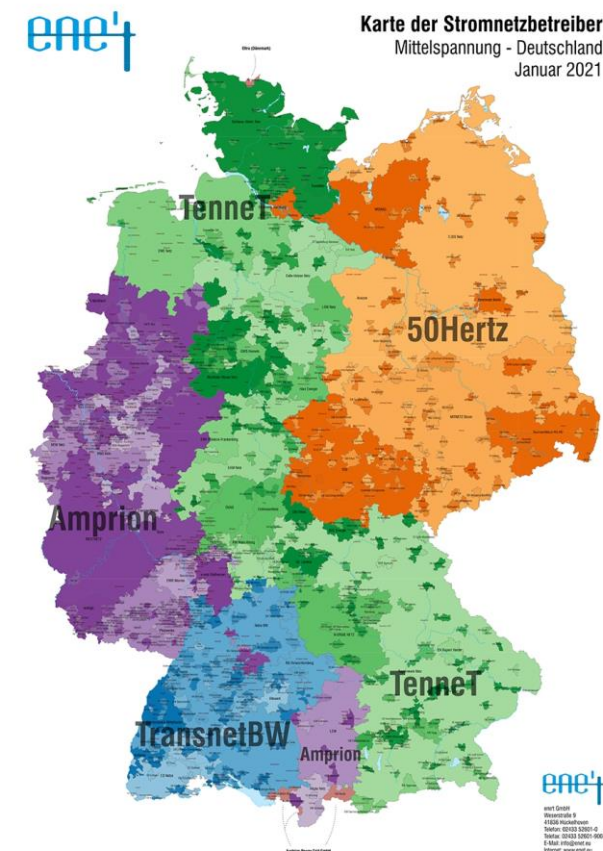
Baden-Württemberg (BW)

- Germany's third most populous state
- BIP: 500.790 MEUR (2020)
- Home for strong "Mittelstand" and market leaders within the automotive industry
- BW spends more than 5 percent of its GDP on R&D



The German energy market

- 90 electricity companies
 - 4 TSOs
 - 903 grid operators
 - 1350 electricity suppliers
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- North Rhine-Westphalia
 - Ca. 90 DSOs
 - Baden-Württemberg
 - Ca. 120 DSOs

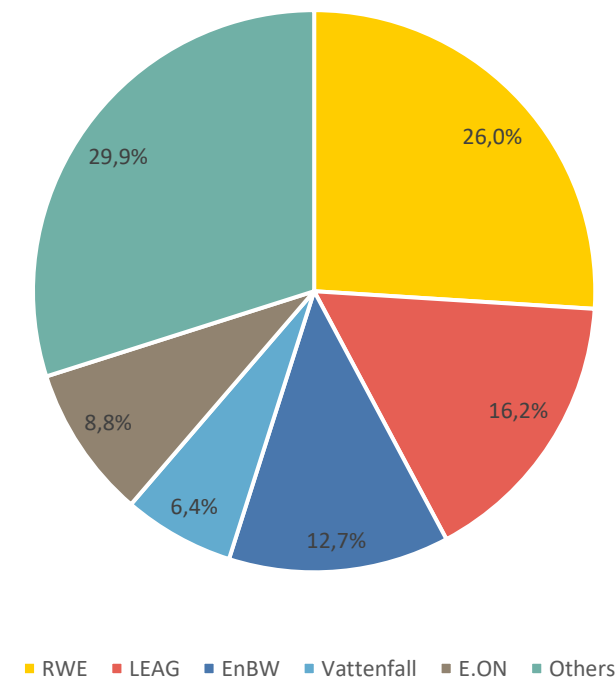




The big 5

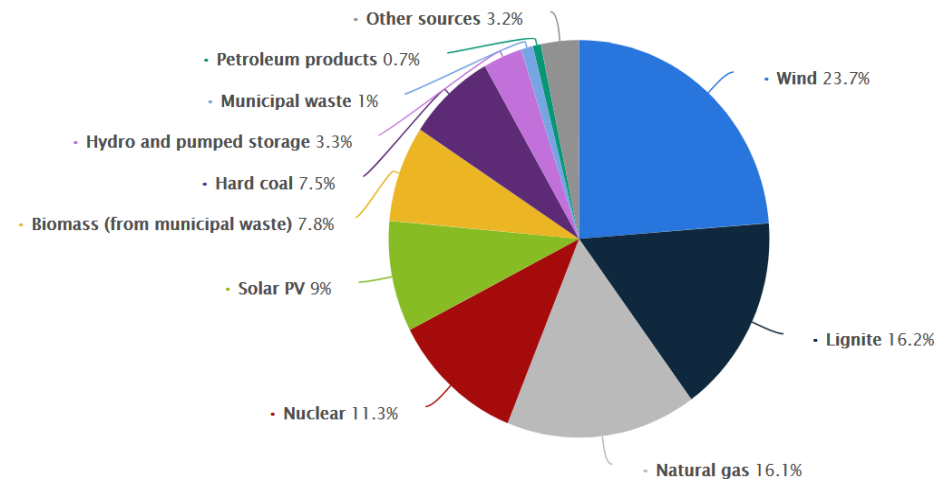
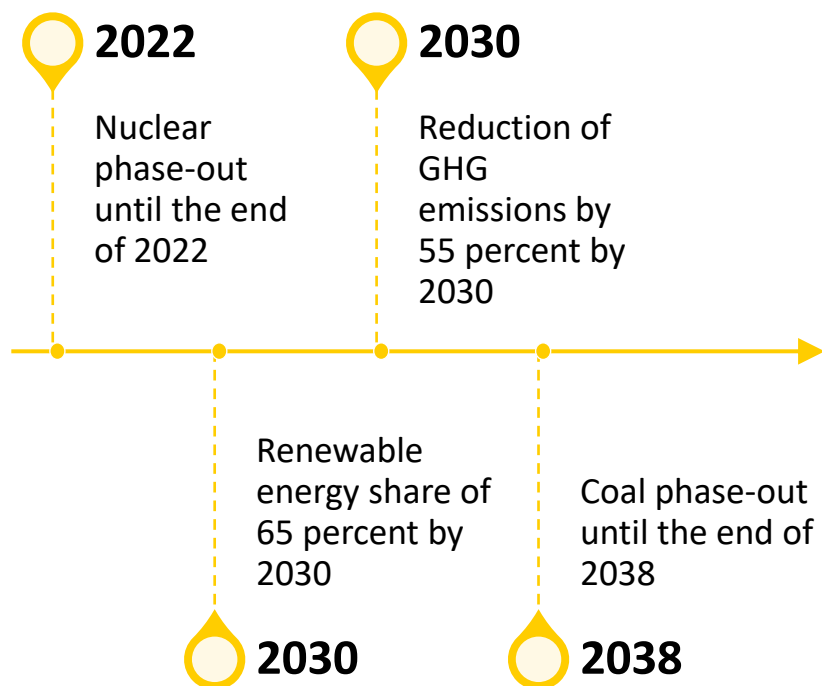
- E.ON, RWE, EnBW, LEAG and Vattenfall have a market share of 70 percent in total net electricity generation
- Stadtwerke (public utilities)
- EnBW is the most dominant player in BW
- RWE and E.ON have their headquarters in NRW

Market share of electricity generation
2019





The German energy transition "Energiewende"



Energy sources used for gross electricity generation in Germany 2020



Energiewende in NRW and BW

North Rhine-Westphalia

- Share of renewable energy: around 16 %
- 40% of the electricity used in German industry is consumed in NRW
- Industrial centers mainly supplied with energy from coal
- Electricity imports needed

Baden Württemberg

- Share of renewable energy: around 30 %
- Good conditions for solar power, limited potential for wind power
- Large parts of electricity generated by hard coal and nuclear power plants
- Electricity imports needed



Focus areas

- Smart Grid Technology
- Smart Metering
- E-mobility and Charging infrastructure
- Smart home
- Energy storage



Smart Grid Technology

North Rhine-Westphalia

- Connecting isolated solutions across different grid levels and regions to secure renewable power supply flexible to the large industrial load centers

Baden-Württemberg



- Development of solutions for interconnected regional energy systems with a cellular structure and focus on PV

DESIGNETZ

→ High demand for digitalization of the grid in both states

Business opportunities:

- DSM
- Grid automation
- Data collection and analysis
- Remote-control technology
- Communication technology
- Virtual power plants



Redispatch 2.0

- Generators with minimum capacity of **100 kW** are included in redispatch (so far generators under **10 MW** were excluded)
- Must be implemented by October 1st 2021
- Challenges for grid operators:
 - Generating required data, establishing mechanisms for cooperation between grid operators



Smart Metering

- Smart meter roll-out: started with a 3 year delay in 2020
- Data security as main obstacle
 - 3 smart meter gateways (SMGW) needed to be certified by the Federal Cyber Authority (BSI) before the roll-out could start
- SMGW = communication unit added to the smart meter securing safe data transmission
- In March this year a court in North Rhine-Westphalia preliminary stopped obligation to install SMGW from certain manufacturers
→ Uncertain future of mandatory smart meter roll-out
- Voluntary installations are proceeding, e.g. cheaper tariffs for those who agree having a smart meter

Business opportunities:

- Smart meters for voluntary installations



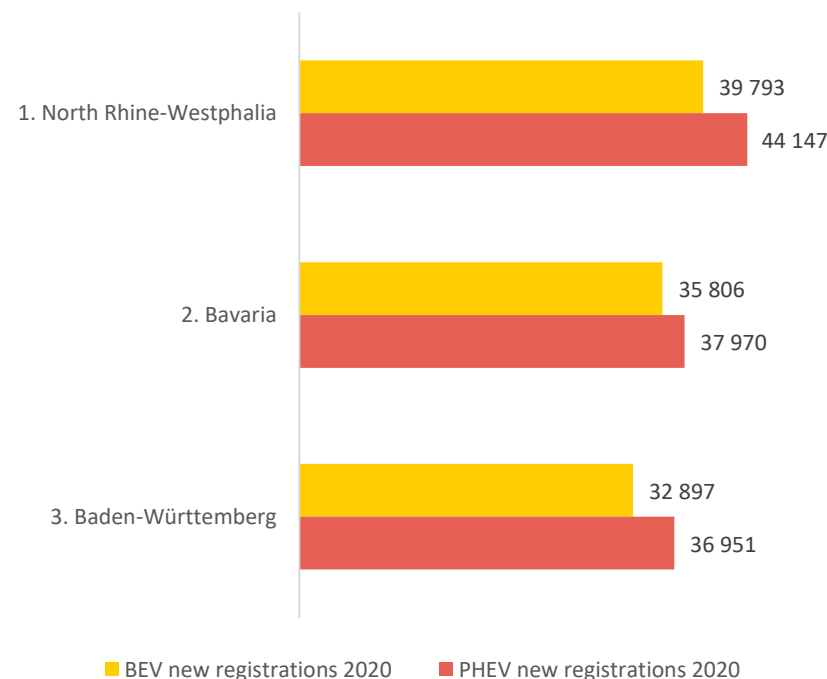
E-mobility and charging infrastructure

- Ongoing e-mobility boom: Number of newly registered BEVs **tripled** in 2020
- Need to extend private and public charging infrastructure
 - Aim: **1 million** public charging points until 2030 (today: 35 076)
 - 85% of charging at home or at work
- **Support programs** for EVs and charging infrastructure both on federal level and at state level
 - Ex: up to 9000 EUR for purchase of BEV, 900 EUR for Wallbox

Business opportunities:

- Charging infrastructure
- Solutions for pricing and billing
- Vehicle-to-grid solutions

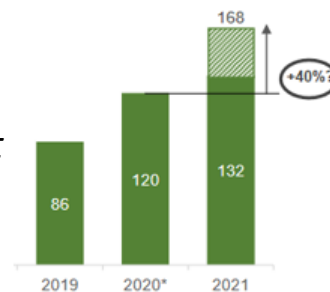
Federal states in Germany with highest number of BEV and PHEV new registrations



Smart home

- Old heating systems that need to be updated
- 4 of 10 Germans use smart home applications
- Planned investments in smart home applications mainly regard energy efficiency

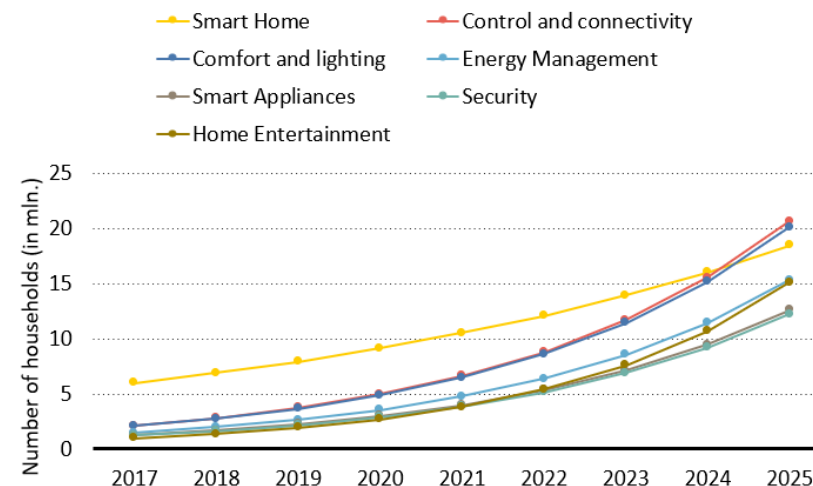
Installations of heat pumps in GER:



Business opportunities:

- Energy management systems
- Heat pumps
- Building automation

Number of smart homes in Germany by segment until 2025



	Gas heating	Oil heating	Average age of heating systems	Number of apartments
North Rhine-Westphalia	54,8%	23,9%	15,6 years	8,7 million
Baden-Württemberg	37,1%	33,3%	18,8 years	5,1 million

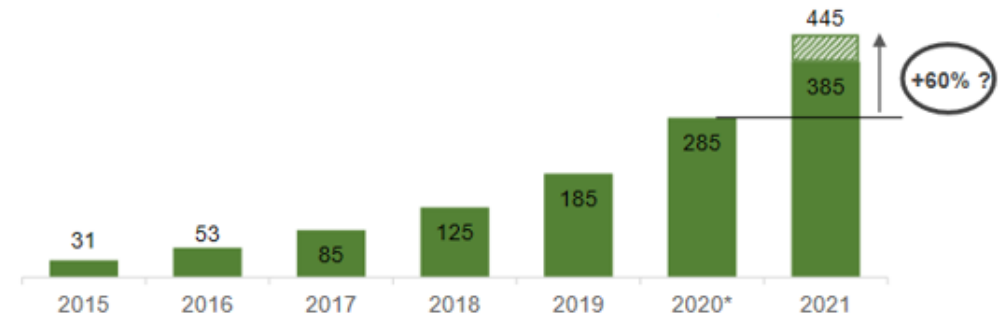
Energy storage

Home storage

- 70% of PV systems installed together with home storage systems
- High potential for PV in BW and NRW
 - Aim to double installed capacity to 11 GW until 2030 in both states each
- Subsidies for battery storage systems in combination with new PV system

Large-scale storage

- Rather limited demand in large-scale batteries
- High potential for hydrogen storage
 - German Hydrogen Strategy: 5GW installed capacity in 2030
 - Hydrogen roadmaps and public funding in BW and NRW
 - NRW: Decommissioned power plants provide infrastructure needed for large storage facilities



Number (thousands) of home storage systems, cumulative per year

Business opportunities:

- Home storage systems
- Retrofit market for storage systems
- Hydrogen storage



To sum-up: SWOT

STRENGTHS

- Stable political conditions
- Free and open market
- Strong and various networks in the energy sector
- Excellent research and development
- Europe's largest market
- Well-established trade relationships between Sweden and Germany

WEAKNESSES

- Time consuming bureaucratic processes
- Rather slow adaption of digital technologies
- Hierarchical structure in organizations
- Rather conservative attitude as regards modernization of grids
- Regulatory incentives as regards modernization of the grid

OPPORTUNITIES

- Promotion programs in various fields of the energy transition both at federal and state level
- Need to extend charging infrastructure
- Old building stock that needs to become more energy efficient
- Increase in installations of PV-systems and home storage systems
- Need for large-scale storage
- Need for digitalizing the grid

THREATS

- High requirements on data security
- Many emerging local competitors
- Unsecure future of mandatory smart meter roll-out
- Intercultural misunderstandings



Next steps

- Delegation trip of German corporates to SE to explore the innovation ecosystem and meet innovative SME
- Potential verticals
 - Smart grid technology
 - E-mobility and charging infrastructure
 - Energy storage
- Potential date: september / october 2021
- Format: Three individual programs focusing on one topic, ½ day
- Interested in presenting your company? Get in touch!





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