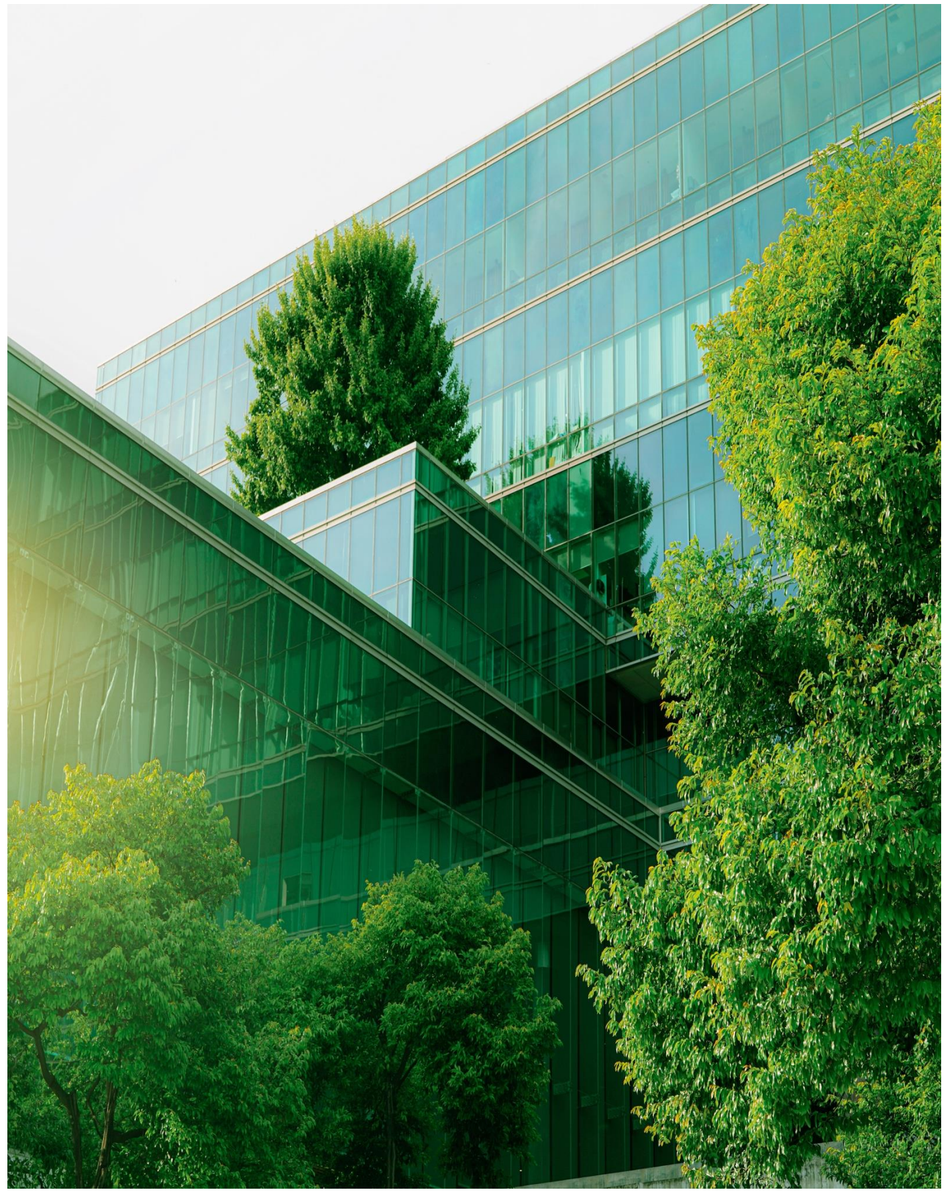
Resilient & Secure: *A Future-Proof Germany*



Prepared by Care Consultants

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Background

2000-2020: Economic Boom and Energy Stability

- Germany as global leader in green energy
- *Energiewende* (Energy Transition)
- Energy supply: heavy reliance on Russian natural gas

2020-2023: Geopolitical and Energy Crisis

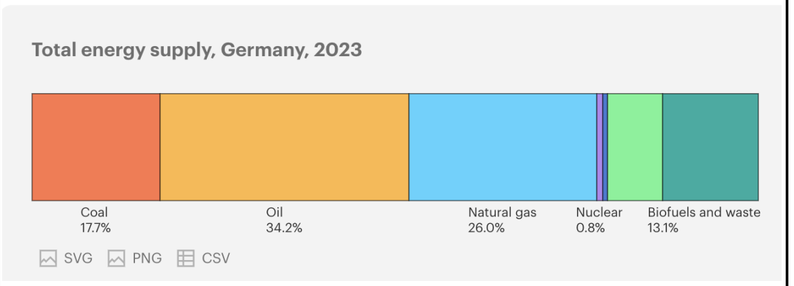
- Changes in energy supply (Russian natural gas, nuclear, coal phase-outs)
  - Energy shortages, price hikes and economic instability
- Germany's 2023 economic recession

2024: Current Context

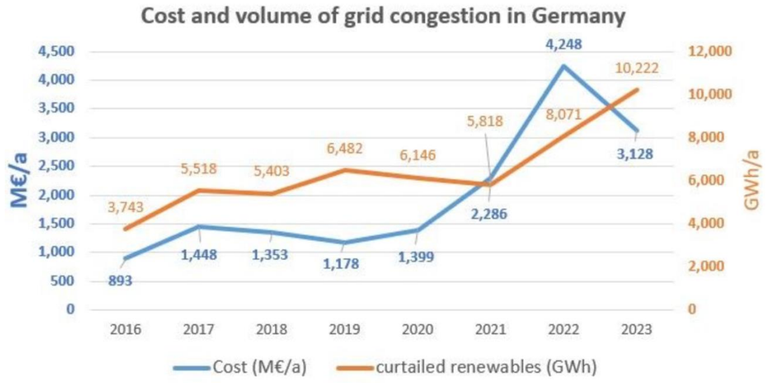
- Struggling energy transition
  - Despite 52% power generation by renewables in 2023
  - Outdated grid infrastucture + replacement capacity issues
  - Bureaucratic lags in the permitting process
  - NIMBYism

Key Considerations

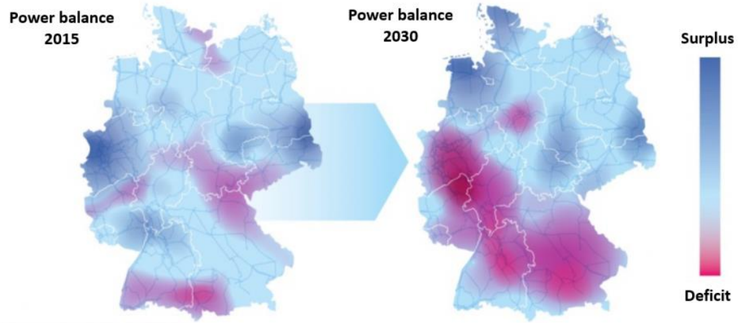
Status of Electricity System & Transition in Germany



Impacts of Grid Congestion



Regional Imbalances

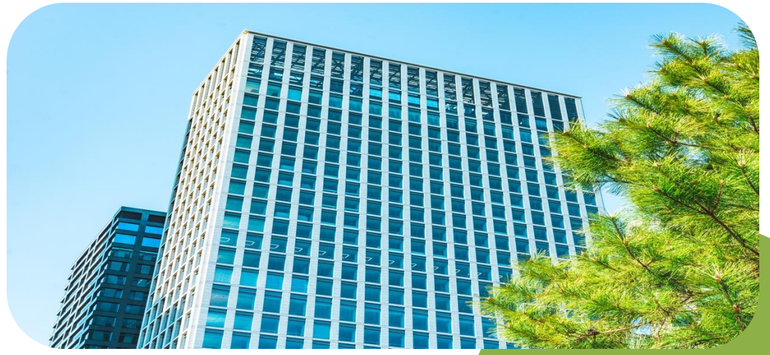


Schematical overview

Source: Amprion.

Electricity Prices and Equity Concerns

Bureaucratic and Community Challenges



The Challenge

Germany must accelerate its energy transition within its electricity system to meet ambitious decarbonization targets, while ensuring security, affordability, and resilience.

Objectives

1. **Ensure an Affordable and Inclusive Energy Transition**
2. **Achieve Climate Targets through a Decarbonized Electricity System**
3. **Build a Secure, Resilient, and Future-Proof Electricity Grid**
4. **Align Electricity Supply with Evolving Demand Needs**

Proposed Policy Package

Targeted Zonal Bidding to Drive Renewable Growth in Key Regions

CO2 Pricing for a Smooth Transition to ETS II

Virtual Power Plant (VPP) Integration Incentive Scheme

Targeted Zonal Bidding to Drive Renewable Growth in Key Regions

Key Components

1. Multi-Zone Bidding Model
   - Separating the north and south

2. Intra-Zonal Congestion Management
   - Wholesale prices reflect price signals while consumers still face a single national price
   - Protects consumers from volatility

3. Transparency and Stakeholder Engagement
   - Public support for renewable projects
   - Developers will have clear price signals

Anticipated Impact

- Targeted Renewable Growth in High-Demand Areas
- Enhanced Grid Stability and Resilience
- Boosted Market Confidence and Public Support

CO2 Pricing for a Smooth Transition to ETS II

Key Components

- More ambitious BEH price corridor to fulfill emission reduction targets
  - Larger carbon prices increases in 2025 (up to 75€) and 2026 (up to 100€) determined by the market
- Discretionary government price increase if environmental targets are missed
  - Increase carbon price by X€ above market price based on gap from target
- Set minimum carbon price post ETS II implementation from 2027 onwards
  - Set price of at least 125€ regardless of European market price

Current Carbon Prices under BEH Framework

Source: Axpo Deutschland and Heuking Kühn Lüer Wojtek

Anticipated Impact

- Early emission reductions dampen the starting price in ETS II
- CO_2 price increases are more gradual, enhancing acceptance, increasing planning certainty, and helping avoid unexpected price jumps from 2027

Virtual Power Plant (VPP) Integration Incentive Scheme

Key Components

- Grants covering 30% of integration costs
  - Capped at €10,000 for households and SMEs; €500,000 for large-scale DERs
  - Eligibility: small-scale producers and commercial operators
- Bonuses for VPP operators achieving measurable grid stabilization metrics (e.g., reducing curtailment or balancing supply)
- Must meet technical standards for grid-interactive capabilities

Anticipated Impact

- Increased decentralized energy generation, reducing reliance on centralized fossil fuel plants and enhancing grid reliability
- Broader access to energy markets for households and SMEs, reducing energy costs and promoting inclusivity
- Enhanced grid stability and faster recovery during extreme weather events
- Reductions in grid-related emissions by optimizing renewable energy use

Rationale

	Targeted Zonal Bidding to Drive Renewable Growth in Key Regions	CO2 Pricing for a Smooth Transition to ETS II	VPP Integration Incentive Scheme (VIIS)
Ensure an Affordable and Inclusive Energy Transition	Low	High	Low
Achieve Climate Targets through a Decarbonized Electricity System	Medium	Medium	Medium
Build a Secure, Resilient, and Future-Proof Electricity Grid	High	Low	High
Align Electricity Supply with Evolving Demand Needs	High	Medium	Medium

Risks and Tradeoffs

Risk	Severity	Mitigation
Price Volatility in High-Demand Zones	Moderate	Consumer prices are leveled under a national model
Stakeholder Resistance to Zone Redefinition	Moderate	Italian model has not yet been trialed, but appeases some of the stakeholder concerns from previous attempts
Political blocks to the price signals	Low	Maintaining existing project approval procedure including environmental impact assessments
Social discontent from rising prices	High	The added revenue from extra price increase should be redistributed to low-income individuals
Sudden price volatility after ETS II implementation	Moderate	Minimum carbon price
Carbon leakage	Low	BEHG Carbon Leakage Ordinance – BECV: Protects companies from emission-intensive sectors that face international competition
Lack of interoperability between DERs and VPP platforms	Low	Mandate adherence to national technical standards
Low participation by small-scale producers due to lack of awareness or perceived complexity	Low	Conduct public outreach and education campaigns and Simplify application and interconnection processes.
Sudden influx of DERs into the grid may cause operational instability	Moderate	Roll out the program gradually, starting with pilot regions and use real-time data platforms to monitor and manage grid impacts

Implementation Plan

	Short Term (0-24 months)		Medium Term (24-48 months)		Long Term (2027 +)	
Targeted Zonal Bidding	Feasibility and Design Study Stakeholder Engagement and Regulatory Alignment	Pilot Program	Full Implementation and Adaptation (24–36 months): ➢ Expand the zonal model based on pilot feedback, introduce potential sub-zones ➢ If needed, adjust real-time price mechanisms to meet evolving energy and resilience needs.			
CO2 Pricing	Stakeholder Engagement and Regulatory Alignment Initiate consultations stakeholders to align goals and set up the administrative framework	Implement 2025 Carbon Prices and Financial Support Measures	Implementing 2026 carbon prices: Adjust BEH price corridor to 80-100 euros per ton in 2026		Implementation of EU-wide ETS II with a national minimum CO_2 price of 125 euros per ton	Continuous monitoring and adjustment of policies to ensure compliance with both German and EU climate targets
VPP Integration Incentive Scheme	Establish federal task force to form technical standards for VPPs and DER integration	Launch pilot programs in 3–5 regions to test the incentive structure and technical interoperability.	Analyze pilot results and refine subsidy amounts, eligibility criteria, and technical standards.	Expand VPP incentives to additional regions, targeting 20% of eligible DERs	Implement full-scale program nationwide, with annual M&E reports on grid stability, emissions reductions, and economic impacts .	Evaluate the program's impact and propose refinements to ensure long-term sustainability.

Targeted Zonal Bidding to Drive Renewable Growth in Key Regions

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CO2 Pricing for a Smooth Transition to ETS II

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✓ **Ensures an Affordable and Inclusive Energy Transition**

✓ **Aligns Electricity Supply with Evolving Demand Needs**

✓ **Builds a Secure, Resilient, and Future-Proof Electricity Grid**

✓ **Achieves Climate Targets through a Decarbonized Electricity System**

Thank you! Questions?