I Federal Ministry of
Economic Affairs and
Energy

Implementation plan for Germany under Article 20 Internal Electricity Market Regulation (BMVO) ('Market Reform Plan')

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Table of contents

I. Introduction

Article 20 (3) to (8) of Regulation (EU) 2019/943 on the internal market in electricity (BMVO) requires Member States to develop an implementation plan ('market reform plan') in the event of concerns about the need for resource adequacy in the electricity market.
The national implementation plan aims to identify existing regulatory distortions in the electricity market and potential market failures that have led to these concerns and to propose concrete solutions to address them.Under Article 20 (5) of the BMVO, the European Commission must issue a formal opinion on the national implementation plan, in which it may, inter alia, request the Member State to make amendments to its plan.Member States are also required to publish an annual report on the state of implementation of market reforms.

The European Commission's guideline on drawing up an implementation plan states that functioning electricity markets and a sufficiently developed electricity grid are prerequisites for sufficient capacity to be available in the electricity system at the right time and place.According to the European Commission, market reforms and a dense electricity grid can thus minimise and ultimately reduce electricity adequacy concerns.Accordingly, according to the guideline, capacity mechanisms should only be introduced as long as existing problems cannot be addressed by market reforms and network congestion resolution.

In principle, Germany sees no concerns about the adequacy of resources in the German electricity market, as described in detail in the following chapters.Nevertheless, the Capacity Reserve is needed to secure the comprehensive transformation of the electricity system in the context of the energy transition.It serves as an additional reserve in extreme situations for which the electricity market is not prepared or is not adequately prepared, once all available market and network measures have been exhausted.The Capacity Reserve thus contributes to the high reliability of German and European electricity supply and is activated when demand on the electricity markets cannot be met by supply.Although the Capacity Reserve is not a response to a market failure due to these specific characteristics, Germany complies with its commitments and hereby submits its implementation plan in accordance with Article 20 (3) to (8) of the BMVO in order to comply with the formal requirements for the implementation of the next round of tenders of the Capacity Reserve on 1.December 2021.

Chapter I provides an overview of the German electricity system and the current state of security of supply in Germany.Chapter II details the German Capacity Reserve and highlights its importance for German and European electricity supply.Chapter III analyses existing and corrected regulatory barriers and market failures and possible measures to further improve the electricity market.Chapter IV contains a list of measures, including a timetable, for the implementation of the market reforms planned for Germany.Chapter V contains the European Commission's questionnaire reply from Germany.

I.1. Overview of the German electricity system

In order to meet the climate targets, renewable energy will in future take on the largest share of electricity supply in Germany.In order to achieve this objective, conventional energy sources need to be increasingly replaced by renewable energy sources in the electricity system.The legal and regulatory framework needs to manage the transformation process in a smart way, while ensuring a high level of supply at affordable and competitive prices for final consumers.To this end, Germany focuses on the impact of supply and demand on the electricity market, accelerating the expansion of electricity grids and renewable energy sources, combined heat and power(CHP) and the preservation of the German-Luxembourg bidding zone.

Germany is in the midst of a connected European electricity system and, due to its geographical location, is an important partner in the European electricity market and a hub of European electricity flows.The transformation of the electricity system can therefore only succeed if it is conceived at European level and shared by all EU Member States.Germany therefore explicitly supports the Clean Energy Package and energy policy measures in the European Commission's Green Deal and the objective of achieving climate neutrality in the EU by 2050 at the latest.Germany also sets out, through its integrated National Energy and Climate Plan (NECP)1, how the Federal Government intends to contribute to achieving the EU's 2030 climate and energy targets and what measures it intends to take in the decade to 2030.The NECP thus provides an overview of Germany's energy and climate policy and the current and constantly evolving state of planning;in particular in the areas of decarbonisation, renewable energy development, energy efficiency, security of supply, internal market and energy research — the so-called 5 dimensions of the European Energy Union.

The Federal Government is working very hard on the implementation and, where necessary, the necessary clarification of the measures adopted, and has launched various legislative procedures to this end and in some cases has already completed it.The content of the Federal Government's energy concept with a target of 30 % renewable energy in gross final energy consumption by 2030 as a contribution to the EU target for renewables, the 2050 energy efficiency strategy with the German energy efficiency target for 2030 (30 % reduction in primary energy consumption by 2030 compared to 2008) as a contribution to achieving the EU energy efficiency target, and the German government's long-term renovation strategy under the EU Energy Performance of Buildings Directive are also already taken into account in the German NECP.At European level, the European Emissions Trading Scheme (ETS) since 2005 and the EU Effort Sharing Regulation have also made an important contribution in the non-ETS sectors as key EU-wide measures to reduce greenhouse gas emissions and are therefore the main instruments for implementing the European Union's climate objectives.

With the fundamental amendment of the Renewable Energy Act in 2020, the Federal Government also laid down in law both the objective of net-zero greenhouse gas emissions of electricity produced and consumed in Germany before 2050 and ambitious development pathways for renewable energy by 2030.In May, the Federal Government also:

1Germany NECP 2020:Https://www.bmwi.de/Redaktion/DE/Downloads/I/integrierter-nationaler-energie-Klimaplan.pdf? blob = publicationFile & v = 4

In 2021, it adopted a draft amendment to the Federal Climate Protection Act (KSG), which sets the objective of net-zero greenhouse gas emissions by 2045.With the energy transition, Germany has set itself an important objective:a fundamental shift in energy supply — moving away from nuclear and fossil fuels to renewable energy sources.Germany is therefore one of the few countries in the world that is mandatory to phase out both from nuclear energy (by the end of 2022] and from coal (by 2038 at the latest).At the same time, electricity production from renewable energy sources continues to grow massively.The share of electricity produced from coal and nuclear energy is thus steadily decreasing, while the share of renewable energy continues to increase (see Figure 1).

In Germany's view, large-scale European electricity exchanges, organised via the European internal electricity market, contribute to a better integration of renewable energy into the electricity system.In addition, security of supply in larger geographical areas can be ensured more efficiently and at a lower cost.A large and liquid European market area is therefore important for implementing a European energy transition in a cost-effective and secure manner and thus achieving climate objectives.For this reason, it is also important that Germany receives its single bidding zone with Luxembourg.

The long-standing increase in electricity consumption in Germany since 1990 in the industrial, commercial, commercial and services sectors as well as in households has not continued in recent years, mainly due to efficiency gains.Since 2018, gross electricity consumption (including pumped electricity generation — PSE) in Germany has fallen back to 551,9 TWh in 2020, also due to the ongoing COVID-19 pandemic (comparison 2019:576,7 TWh].Electricity consumption was therefore 4.3 % lower than in the previous year (see Figure 1).

Gross electricity production

		1990	1995	2000	2005	2015	2016	2017	2018	2019	2020 *	A%	%shares
Lignite		170.9	142.6	140.3	154.1	154.5	149.5	140.4	145.6	114,0	91,7	— 19,5	16,0
Hard coal		140,8	147,1	143,1	134,1	117,7	112,2	92,9	82.6	57,5	43,1	— 25,0	7.5
Nuclear energy		152,5	154,1	169,6	163,0	91,8	84,8	78,3	76,0	75,1	64,4	— 14,3	11.3
Natural gas		35,9	41,1	49,2	72,2	61,5	80,6	36.0	81.6	90,0	91,9	2,1	16,1
Mineral oil		10.0	9.1	5.9	11.9	6,1	5,7	5.5	5,1	4.8	4,3	— 9,9	0.8
Renewable, of which:[5,1]		19,7	25,1	37,9	63,4	108,6	189,7	216,3	224,5	242,4	251,0	3,5	43,9
— Wind onshore	KR		1,5	9,5	27, B	72.3	67,7	88.0	90.5	101,2	103,7	2,5	18,1
— Wind offshore		0	0,0	0,0	0.0	8,3	12,3	17,7	19.5	24,7	27,3	10,3	4.8
— hydropower[1],		19,7	21,6	24,9	19,6	19,0	20,5	20,2	17,7	19,7	18,6	— 5,6	3,3
— biomass	KR		0.7	1.0	11,5	44.6	45.0	45.0	44.7	44.4	44,9	1,0	7,8
— PhotovoKaik	KR		0.0	0,0	1.3	30.7	38,1	39,4	45,8	46,4	50,6	9,1	8,8
— Household waste[21]	KR		1,3	1,0	3,3	5,6	5,9	6.0	6.2	5,8	5,7	— 1,3	1,0
— Geothermal		0	0.0	0.0	0.0	0,1	0,2	0,2	0.2	0,2	0,2	10,2	0.0
Other, of which:		19,3	17,7	22,6	23,9	27,3	27,3	27,5	27,6	25,7	25,5	— 0,8	4,5
— Pumped storage (PSE)[1]*	KR		5,5	4,5	6,0	5,9	5.6	6,0	6.7	5,9	6,6	11,1	12.
— Household waste[21]	CA.		1.3	1,6	3,3	5,8	5,9	8,0	6.2	5,8	5,7	— 1,3	1.0
• Induslhew waste		□	0,0	0,0	0,0	1.3	1,4	1,3	0.9	0,9	0,8	— 13,2	0.1
Transformation output (gross electricity generation incl. RSE)[r]		549,9	536,8	576,6	622,5	647.6	649,7	652,9	642,9	609,4	571,9	— 6,2	100,0
Gross electricity generation (excluding PSE)[11]		549,9	531,4	572,0	615,7	G41,7	644,1	646,9	636,2	603,5	565,3		
*Share of **RES** in gross production of electricity (excluding PSE) i%]*		3,5	*4,7*	*6,6*	10,3	*29,4*	29,4	33,4	35,3	*40,2*	*44.4*		
Electricity[imports 4*]		31,9	39,7	45,1	58,9	37,0	28,3	27,8	31,7	40,1	47.1		
Electricity export[41]		31,1	34,9	42.1	61.4	85,3	78,9	80,3	80,5	72,8	67,1		
Electricity import alüo		0,8	4,8	3,1	— 4,6	— 48,3	— 50,5	— 52,5	— 48.7	— 32,7	— 20,0		
Gross mains (excluding PSE)[61]		550,7	536,2	575,1	611,1	593,4	593,6	594,5	587,5	570,8	545,3		
post-mortem													
Gross electricity consumption (incl. PSE)[B]		550,7	541,6	579,6	617,9	599,3	599,1	600,5	594,2	576,7	551,9		
Share of RES in gross electricity consumption (incl. PSE) (%]		3,6	*4,6*	6,5	*10,3*	*31,5*	317	*36,0*	*37,8*	*42,0*	45.5		
Percentage change		*X*	*+ 2,0*	*+ 4,0*	*+ 0,5*	*+ 1,0*	*— 0,0*	*+ 0,2*	— 11	— 2,9	*— 4,3*		
Pump work (storage supply, own consumption)		5,0	5,9	8,0	9,5	8,1	7,5	0,3	8.3	8,1	8,8		
Pumped electricity generation (PSE)		CA.	5,5	4,5	6.8	5,9	5,8	8,0	6.7	5,9	6,6		
Self-consumption of pumped storage			— 0,4	— 1,5	— 2,7	— 2,1	— 1,9	— 2,2	— 1,7	— 2,1	— 2,2		

Figure 1:Gross electricity generation and consumption Germany.WG Energy Balance Sheets February 2021

Gross electricity generation (including PSE) fell to 571,9 TWh in 2020 (comparison in 2019:609,4 TWh).Renewable energy contributed 251 TWh, a share of 43,9 per cent.Wind accounted for the largest share on land with 103,7 TWh followed by photovoltaics with 50,6 TWh.Conventional electricity production declined for the seventh consecutive year.

The Federal Network Agency (BNetzA)'s list of power2 3 plants represents the electricity generation market in Germany.Accordingly, generation installations with a total net rated output of 229,2 GW have been installed in Germany (as at 19.01.2021).Of these, 214,1 GW participate in the electricity market.Of this, around 127,7 GW is accounted for by renewable energy sources.The phase-out of nuclear energy means that by the end of 2022 all remaining nuclear power plants with a gross output of 8,5 GW will be removed from the grid.With the aim of phasing out coal-fired power generation gradually by 2038 at the latest, an additional 34 GW will leave the electricity market.Germany replaces this capacity mainly with the expansion of renewable energy sources and with gas CHP plants.

BNetzA2 2021 list of power plants:
Https://www.bundesnetzagentur.de/cln 1911/DE/subject/Electricity, gas/Instit company decisions/security of supply/generation capacity itaetes/list of power plants/power plant liste-node.html
3Power plants in the electricity market.BNetzA 2021:
Https://www.bundesnetzagentur.de/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen Institutions/V security of supply/generation capacity/list of power plants/power plant liste-node.html

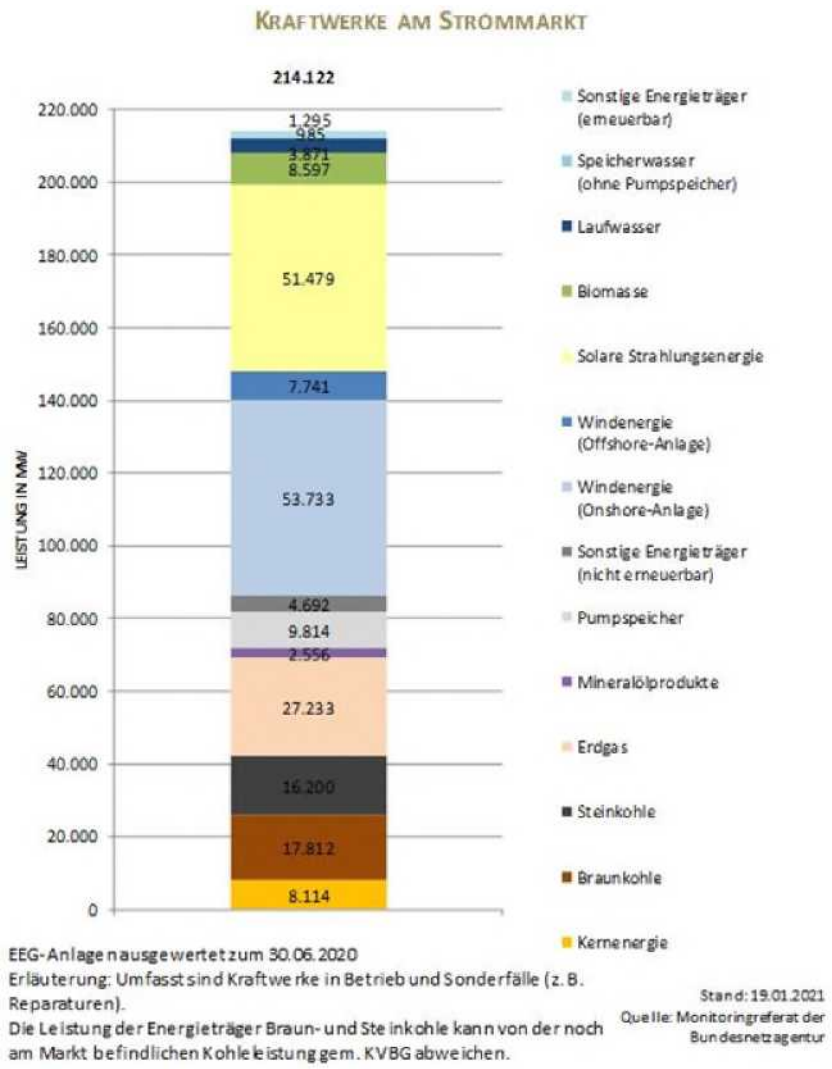

Figure 2:Power plants in the electricity market.BNetzA [3] 2021

Germany was again a net exporter of electricity in 2020, totalling 20 TWh.Exports accounted for 67,1 TWh (2019:72,8 TWh) and imports 47,1 TWh (2019:40,1 TWh).The export surplus (physical flows) thus decreased by 38.7 % in 2020 compared to 2019, from 32,7 to 20 TWh.The main customers of German electricity in 2020 were:Austria with a net import from Germany of 18.427 GWh (-6,1 % on the previous year), Luxembourg with 3.787 GWh (-9.7 % on the previous year) and the Czech Republic with 3.769 GWh (+ 94.5 % on the previous year).The net importer in 2020 was Germany:Denmark with 6.941 GWh (change from Germany's net exports to net imports), Sweden with 2.141 GWh (+ 188.7 % on the previous year) and the Netherlands with 1.603 GWh (change from net German exports to net imports).However, physical flows do not provide information on whether the electricity was actually consumed in the country concerned or whether it was transferred to neighbouring countries.Germany's physical electricity exchange with its European electricity neighbourhoods has for many years been above 100 TWh.The physical exchange of electricity takes place with eleven neighbouring countries — Austria, Denmark, the Netherlands, Belgium, Luxembourg, France, Switzerland, the Czech Republic, Poland, and via submarine cables also Sweden and Norway.Germany is therefore an important hub in the European internal electricity market.In addition, European market coupling means that in 2019, for example, in 46 % of hours electricity prices were the same in the day-ahead market in the CWE region (Central- Western-Europe)[4][5].

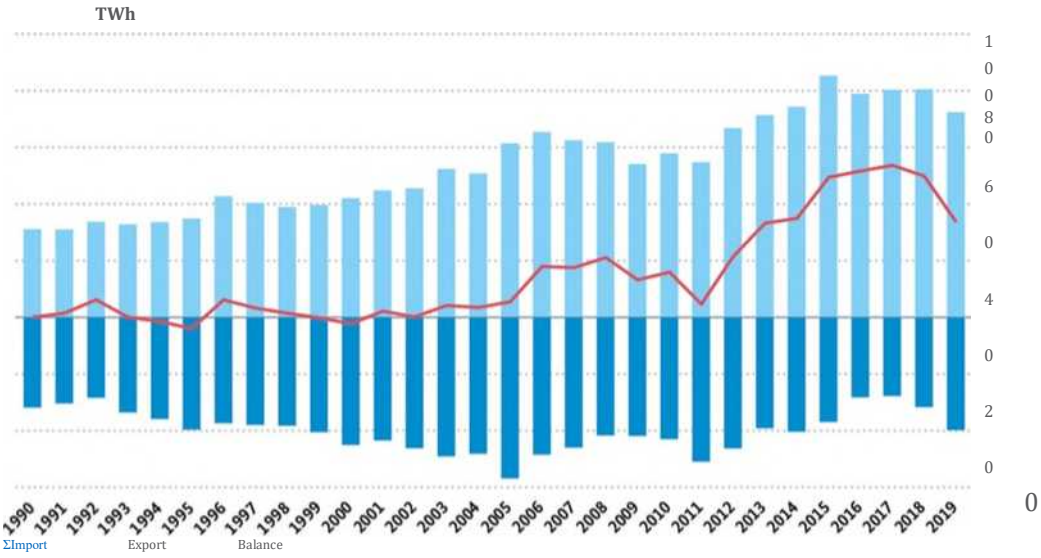

Figure 3:Electricity exchange with neighbouring countries.Federal Statistical Office, Federal Association of Energy and Water Management 2020 [5]

The available transmission capacity at national borders also plays a role in this respect.In October 2020, the two northern sections of the so-called central axis went to the grid.It connects Schleswig-Holstein and Denmark.The first direct connection

4 ACER Market Monitoring Report 2019 — Electricity Wholesale Markets Volume:https://www.ceer.eu/documents/104400/7065288/ACER+Market+Monitoring+Report+2019+-+Electricity+Wholesale+Markets+Volume/60bd97a2-7724-369a-8fe9-57f097340124

5 Federal Statistical Office, Federal Association of Energy and Water Management 2020:https://www.bmwi.de/Redaktion/DE/Infografiken/Energie/stromaustausch-mit-nachbarlaendern.html

between Germany and Belgium, Aachen Liège Electricity Grid Overlay (ALEGrü) has been created and offers a maximum transmission capacity of 1.000 MW.Commercial trading began with day-ahead capacity in November 2020.The first direct interconnector between Germany and Norway became operational with NordLink in April 2021.It offers a transmission capacity of 1.400 MW and connects Germany's electricity system, which is based more on renewable energy every year, to Norwegian storage hydropower plants.

Wholesale prices on national power exchanges are the driving force behind import and export flows between Germany and its neighbouring countries.The electricity market thus acts as a coordinator of electricity flows.The average wholesale electricity price in Germany in 2020 was EUR 30,47/MWh (2019:EUR 37,67/MWh).As a result, prices on the German wholesale market are comparatively low in Europe (see Figure 4).

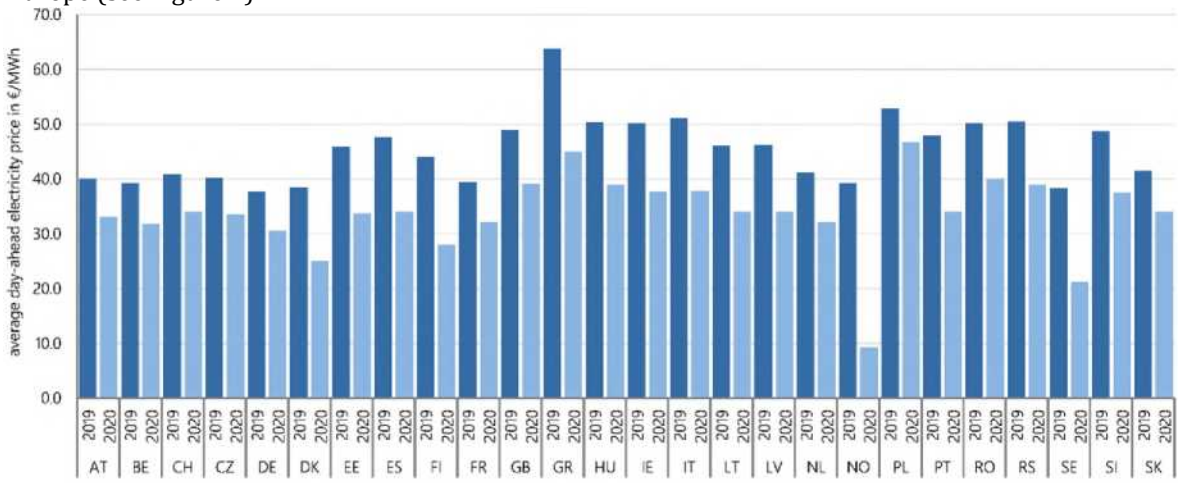

Abbildung 4: Day-Ahead Strompreise in 2020. Daten: ENTSO-E, FFE GmbH 2021 [6]

The diversity of actors in Germany and the use of dynamic trading and forecasting techniques allow for a relatively liquid electricity market.The German electricity market is characterised not only by its high liquidity and low prices, but also by its reliability and functioning very well both in European and worldwide comparison (see also sub-chapter I.2.).

I.2. Electricity adequacy in Germany

Reliable electricity supply is particularly important for a highly developed industrial site such as Germany.In Germany, the transmission system operators (TSOs) are responsible for ensuring the secure operation of the network (Section 12 of the Energy Industry Act, EnWG).They plan and maintain the high-voltage grid, regulate system operation and coordinate generation and demand. 6
The 'SAIDI' (System Average Interruption Duration Index) is often used as a measure of the reliability of electricity supply for end users.This index represents the average supply disruption per connected end consumer and voltage level within a calendar year.Germany has traditionally a comparatively low SAIDI value.The average interruption time per connected end consumer in Germany in 2019 decreased by 1,71 minutes to 12,20 minutes compared to the previous year.This is the lowest downtime ever since the first publication in 2006.The SAIDI for Germany has thus steadily improved since the start of the survey

[6] Day-ahead electricity prices in 2020.Data:ENTSO-E, FFE GmbH 2021
https://www.ffegmbh.de/kompetenzen/wissenschaftliche-analysen-system-und-energy scoreboard/strommarkt/1041-european-day-ahead-electricity-prices-in-2020

(21,53 minutes on average per consumer in 2006).

In accordance with Section 51 (1) of the Energy Industry Act (Energiewirtschaftsgesetz — EnWG), the Federal Ministry of Economic Affairs and Energy carried out every two years a monitoring7 of security of supply in the field of electricity supply.This task was delegated to BNetzA on 1 January 2021.The report assesses the existing supply situation and examines its future development.The underlying scientific studies also take into account situations of low input from wind and solar installations and the phasing-out of nuclear and coal-fired power generation.The studies carried out so far8 show that electricity market demand in Germany can be met by 2030 in all scenarios examined.

The monitoring report presents the existing supply situation and its evolution, taking into account the national and international market realities for Germany.The report does not examine risks with unpredictable or very low probability, as the electricity market itself cannot prepare for this.The coverage of these risks falls within the scope of public crisis preparedness, which is available in addition to the electricity market in extreme situations (see Chapter II).

II. The Capacity Reserve — Germany's Contingency Security

The profound transformation of the electricity production landscape in Germany and Europe towards CO2-neutral production leads to a system in which flexible producers, consumers and storage increasingly have to respond to fluctuating renewable energy production.This transformation, leading to a reduction of controllable conventional power plants, poses a particular challenge to the European electricity market.Although the European internal market in principle ensures security of electricity supply, extreme situations requiring additional capacity can never be completely excluded9.

The electricity market players assess different but possible developments in the markets on which they are active.What matters in this respect is whether or not the market players are able to assess the likelihood of the events on the basis of which they take their decisions and whether the likelihood of occurrence is sufficiently high.Risks that are known to occur may be assessed and taken into account in investment decisions.These include e.g.:"dark frog", i.e. longer periods of low electricity input from wind and solar installations.Such situations have already occurred in the past and are therefore, in principle, taken into account economically by market participants for the future.However, if they are too low The probability of occurrence is unlikely to have a significant positive impact in the assessment of the profitability of an investment.Thus, in order to assess whether an efficient level of security of supply can be maintained in the electricity market, the events, the occurrence of which can be estimated and which are sufficiently likely to occur are crucial.

Accordingly, completely unforeseeable or very infrequent risks, the probability of which cannot be reasonably estimated or are very low, must be distinguished from this.However, despite a low or

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7 BMWi Monitoring Report 2019:
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% 20Development% 20 analysed% 2 QWs

8 BMWi study "Definition and monitoring of security of supply in European electricity markets" 2019:Https://www.bmwi.de/Redaktion/DE/Publikationen/Studien/definition-und- Monitoring-der-supply-security-to-den-europeischen-strommaerkten.html

9 BMWi Monitoring Report on Security of Supply in Electricity Connected Supply (2019):Https://www.bmwi.de/Redaktion/DE/Publikationen/Energie/monitoringbericht- Security of supply —
2019.pdf? blob = publicationFile & v = 18 #: ~: text = According to% 20 % C2 % A7 % 2063 % 20Abs.. their% 20k% C3 % BCnf
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unpredictable probability of occurrence, it is important to be prepared in principle for these extreme situations, as their consequences can be severe, possibly with a high potential for damage.Relevant to the electricity market are, for example, multiple faults, i.e. the simultaneous failure of several components in the system, such as several power plants or pipelines.Market players will hardly take any measures to prepare for the event because of the unknown or low probability of doing so, and will therefore refrain from constructing new power plants, for example for reasons of economic viability.

Therefore, the electricity market itself cannot anticipate risks with a low or unforeseeable likelihood of occurrence.On the contrary, the coverage of these risks falls within the scope of State provision.This state preparedness can be provided, for example, through reserves available in addition to the electricity market in extreme situations.In this sense, the Capacity Reserve has been introduced in Germany.It also secures the power system and serves in extreme situations when all available
Market mechanisms have been exhausted, as an additional reserve, even before a crisis occurs.
For example, under Paragraph 13e of the EnWG, the Capacity Reserve may prevent the occurrence of disruptions and disruptions to the electricity supply, which could ultimately lead to electricity supply crises.TSOs shall maintain the reserve capacity to compensate for current account deficits in the event of a threat or disruption of the security or reliability of the electricity supply system as a result of the failure to fully balance supply and demand on the electricity markets in the German network of rules.In addition, the Capacity Reserve can also contribute to this in some crisis scenarios, as formulated in ENTSO-E methodology on regional crisis scenarios, thereby helping to overcome some electricity crises more quickly.In doing so, the Capacity Reserve also helps to safeguard market-based mechanisms of a functioning electricity market before a crisis occurs.The need for crisis preparedness has also been recognised by the European legislator, which has created a separate legal framework with the Risk Preparedness Regulation.

The need for the Capacity Reserve is not due to a market failure, but covers events for which the market does not anticipate.The Capacity Reserve will only be activated when demand in the electricity markets cannot be met by supply.Even in the very unlikely case of activation, this does not lead to any distortion of the market, as the balancing energy price from the Capacity Reserve is charged to balance responsible parties twice the technical price limit in the day-ahead market.In doing so, the Capacity Reserve also takes into account the requirements of Article 16 of the Risk Preparedness Regulation, according to which non-market-based measures are to be used only *as a last* resort and after all market-based measures have been exhausted.

The Capacity Reserve Regulation (KapResV) regulates in principle the use of the Capacity Reserve and its procurement in accordance with the applicable European requirements of the EU Regulation on the internal electricity market (EU Regulation 2019/943)10, the ACER Decision on technical guidelines for cross-border participation in capacity mechanisms and the EU notification for the approval of the Capacity Reserve under State aid rules11.The Capacity Reserve is maintained outside the electricity markets and is designed in such a way as not to distort investment incentives and competition in the electricity sector.For example, generating installations are prohibited from returning to the electricity and balancing markets once they have been locked in the capacity reserve.

Capacity reserve facilities shall be activated by TSOs if there is no market clearance in the day-ahead electricity trade, i.e. demand in day-ahead trading on the electricity market is not fully met by supply.The

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The10 Capacity Reserve constitutes a capacity mechanism within the meaning of Article 2 (22) of Regulation 2019/943 and must therefore comply with the requirements laid down therein, irrespective of its use.

11 BMWi report on Capacity and Network Reserve 2020: https://www.bmwi.de/Redaktion/DE/Publikationen/Energie/bericht-zur-netz-und-capacitaetsreserve.pdf? blob = publicationFile & v = 10

call takes place in the event that the secure and reliable operation of the German transmission system is at risk and all market related measures (e.g..Intraday trading or use of balancing energy).This concept of deployment ensures that the Capacity Reserve has almost no impact on European electricity and balancing markets.
A study commissioned by the BMWi12 examined the impact of the Capacity Reserve on the supply potential of generating installations on the electricity and balancing markets in Germany and Europe and confirmed the limited impact.Therefore, in principle, the impact on competitive electricity markets and investment incentives is very limited, as the spare capacity is maintained outside the markets.At the same time, the Capacity Reserve contributes to secure and reliable electricity supply:First, the existence of the Capacity Reserve provides additional security of electricity supply by maintaining capacity outside the markets.Second, the Capacity Reserve indirectly increases the adequacy of resources in the German and European electricity markets, as the credible threat of high imbalance prices in the event of imbalance shortfall can incentivise individual provision during a call on the Capacity Reserve.Third, the Capacity Reserve can mitigate the consequences of certain unforeseen extreme situations against which the risks of the electricity market cannot be hedged due to the lack of data.

Unlike a capacity market, the Capacity Reserve does not provide an economic incentive to operate fossil market power plants longer and more often than necessary in the electricity market.In addition, the so-called Emission Performance Standard (EPS), which sets the limit values for CO2 emissions in the Capacity Reserve, ensures that the capacity reserve installations that are expected to have low maturities and only rarely used do not cause substantial CO2 emissions.Overall, the Capacity Reserve thus increases security of supply in Germany and Europe, without any negative impact on climate protection and with the least possible impact of all capacity mechanisms on the electricity and balancing markets.

12 BMWi-report 2021 on the impact of the Capacity Reserve on neighbouring countries https://www.bmwi.de/Redaktion/DE/Publikationen/Energie/auswirkungen-der-deutschen-capacity reserve toneighbouring Member States.html

III. Regulatory barriers and market failures in the German electricity market

The following chapter deals in detail with the functioning of the German electricity market and possible market barriers in the five thematic areas defined by the European Commission's guideline:Wholesale market, balancing market, demand side response, retail market and interconnectors/congestion management.

III.1Wholesale market

III.1.1 Pricing on the wholesale market

Functioning wholesale markets are essential for competition in the electricity sector.Spot markets where quantities of electricity needed or offered in the short term can be procured or sold equally play an important role, as do futures markets that allow, inter alia, mediumand long-term hedging of price risks and against speculation.Sufficient liquidity, i.e. a sufficient volume on the supply and demand side, improves the opportunities for new entrants to enter the market.Market participants will be able to diversify their choice of trading partners and products, as well as trade forms and processes.In addition to over-the-counter wholesale (OTC) trading, power exchanges create a reliable trading venue and at the same time provide important price signals to market participants in other sectors of the electricity industry.Free pricing in the German electricity market was enshrined in the Energy Industry Act (Energiewirtschaftsgesetz — EnWG).In order to allow scarcity prices, there are no administrative technical bidding limits.In accordance with Article 10 of the Electricity Market Regulation (EU 2019/943), the technical bid cap of currently EUR 3.000/MWh applied by the exchange venues in the day-ahead spot market and EUR 9.999/MWh in the intraday market are automatically adjusted as soon as they are expected to be reached.

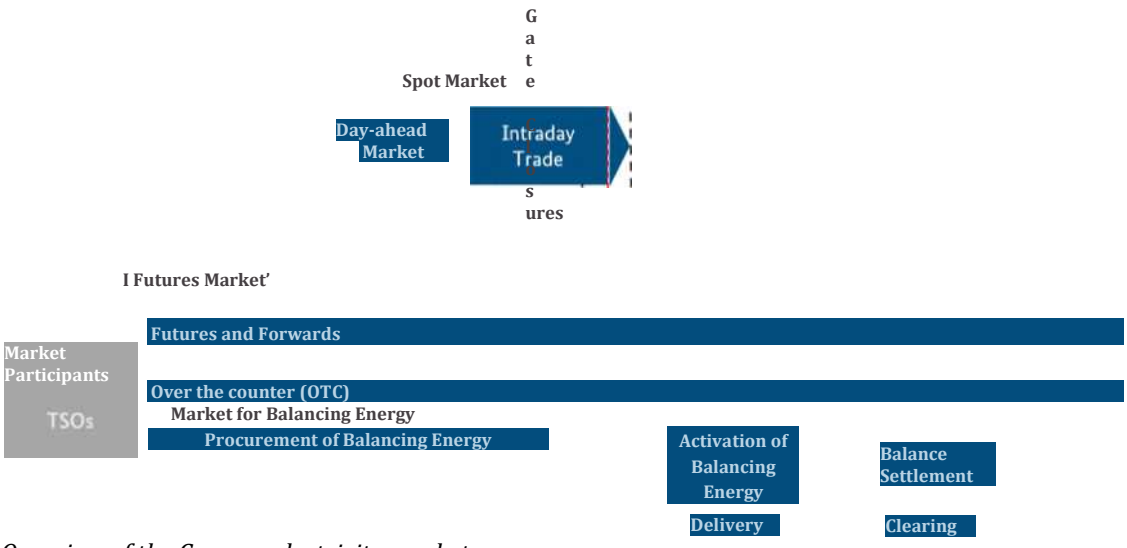


Figure 5:Overview of the German electricity market

In order to ensure secure and cost-effective electricity supply while integrating increasing shares of renewable energy into the electricity system, Germany opted for the Energy Only market and the single German-Luxembourg bidding zone.Germany has a well-functioning electricity market where electricity can be purchased and sold until just before delivery.This will make it possible to efficiently integrate the increasing amounts of electricity from weatherdependent energy sources such as wind and sun into the electricity system.The large market area makes it possible to exploit geographical balancing effects in terms of production and consumption and the high liquidity of the electricity market helps to combine supply and demand in a flexible and efficient way, even in the case of intermittent electricity generation from renewable energy sources.It also reduces the power of large suppliers over market outcomes and enables innovative players to enter the market.

Uniform wholesale prices ensure that in the electricity mix the cheapest generation technologies prevail regardless of location within Germany.The equipment with the lowest operating costs is used on a supra-regional basis.This reduces the variable costs of the system as a whole.The single German-Luxembourg bidding zone reduces the overall demand for generation capacity, load management and storage.This also reduces the investment and maintenance costs of the system as a whole.

In addition, the exchange of electricity between European countries is becoming increasingly important:Cross-regional synergies between production and consumption can be used to make the electricity system even more flexible.In addition, European capacities can ensure security of supply in a much more efficient way together.Both reduce the overall cost of electricity production in Europe.The increased interconnection of the German electricity market with neighbouring markets is a key step towards achieving the Energy Union and European market integration.The European target model of a harmonised capacity calculation methodology for day-ahead and intraday trading provides guidance on capacity allocation and congestion management.

The Federal Government is convinced that the European internal market for electricity and therefore the development of electricity networks is the best way to ensure cost-effective electricity supply.The development of electricity grids can be accompanied by other key solutions to reduce network congestion.

III.1.2 Forward markets

EEX trades futures, known as futures, with standardised maturities that the Phelix (Physical Electricity Index) is the subject of the contract (underlying) in the market area of Germany/Luxembourg.Since September 2015, trading has been possible in German Intraday Cap-Futures (for weekly contracts) designed to cover price peaks in view of the growing share of renewable energy in the market.Since March 2017, the product range has also been expanded with ‘German Intraday-Floor-Future’.The floor futures are used to protect against low prices.In addition, since October 2016, market participants have been able to trade in wind power futures, thus protecting themselves against the increasing share and resulting volume risks in the production of wind power.The commercial volumes of the Phelix-DE/AT futures and the Phelix-DE for:

Germany, which has replaced it since 1 October 2018.Clearly, there has been a steady increase in trading volumes until the German bidding zoneis separated into two market areas.

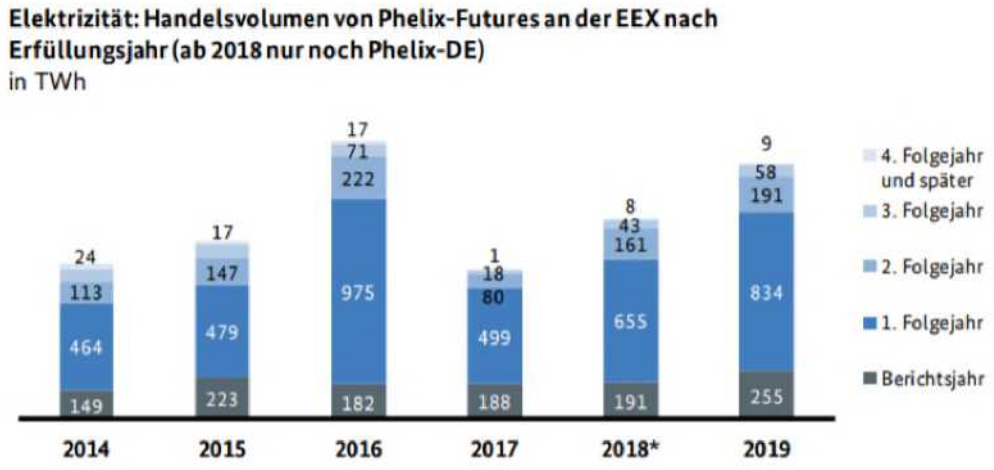
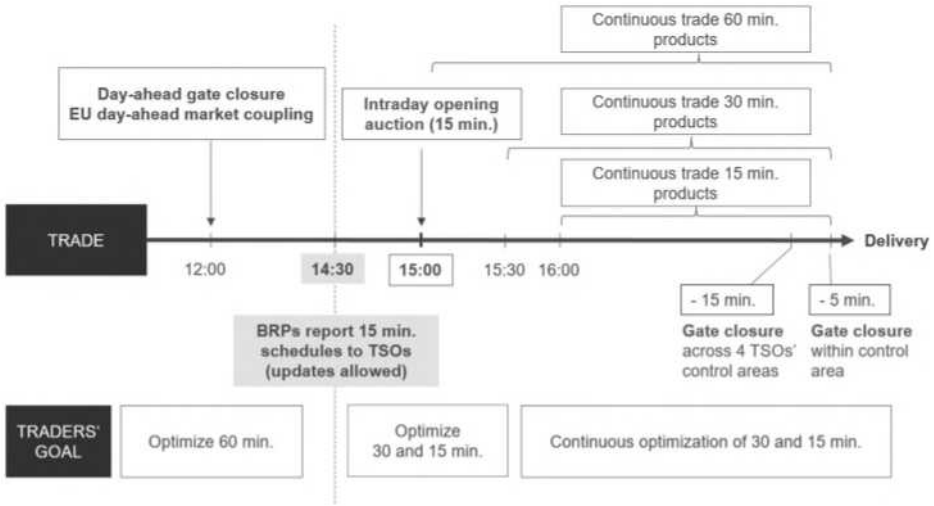


Figure 6:Volume of Phelix futures trading at EEX between 2014 and 2019

III.1.3 Day-ahead and intraday markets

On German spot markets, electricity is traded the previous day (day-ahead) or for the following or the current day (intraday).This means that the quantities of electricity are traded either for the following day or for the same day.Electricity traders can therefore plan their commitments over a longer period of time.Germany has well-functioning intraday and day-ahead electricity markets.They shall be accessible to all market participants on a non-discriminatory basis.Germany therefore fulfils the conditions laid down in Article 12(3) (1) (a) of the EU Electricity Market Regulation.The spot markets EPEX SPOT, Nord Pool and EXAA offer day-ahead trading and EPEX and EXAA also provide continuous intraday trading for Germany.Continuous intraday trading at EPEX SPOT also covers, in addition to individual hours and 15 minutes products, standardised or user-defined blocks.The expansion of trading opportunities to include quarterly contracts and the reduction of minimum lead times have in particular taken into account the increased feed-in of electricity from renewable sources.

Figure 7:Functioning day-ahead and intraday markets



In order to minimise shortfalls or surpluses and to use available generation assets in a cost-efficient manner, market participants in Germany may, after the conclusion of the day-ahead auction on the intraday market, trade in electricity volumes at very short notice for periods ranging from quarter hours to

hourly blocks.On the stock exchange, intraday trading ended 45 minutes before delivery (Gate Closure) until July 2015.After a change to 3 0 minutes, the lead time in Germany is now five minutes when the commercial transaction takes place in the same control area.Trade between bidding zones will continue to be subject to a 30-minute deadline.Beyond the German border, trade must have taken place up to 60 minutes before the start of delivery.In order to respond to short-term fluctuations in renewable energy, capacity needs to be tradable until close to real time.Therefore, in the Federal Government's view, in addition to day-ahead, intra-day trade should be further strengthened as a lead market.There is the greatest competition on the supply and demand side.

Various initiatives aim to improve the integration of the German-Luxembourg bidding zone into European markets.To this end, the German-Luxembourg bidding zone was initially linked in 2010 to the other countries of the region of central western Europe (Netherlands, Belgium, France) on the basis of Net Transfer Capacities.In May 2015, the transition to flow-based market coupling (FBMC) in the region followed.The objective of this flow-based capacity calculation is to better exploit the existing network infrastructure.Market coupling refers first to day-ahead electricity trading (day-ahead).Meanwhile, flow-based market coupling is also defined as a target model for almost all EU Member States in the Network Code Capacity Allocation and Congestion Management (CACM).Therefore, flow-based market coupling will now be extended in a second stage to a common Central and Eastern European Capacity Calculation Region (CORE).This follows a decision of the Agency for the Cooperation of Energy Regulators (ACER) of November 2016.

In addition to the cross-border day-ahead market, the importance of intraday cross-border trading is growing.The Single Intraday Coupling (SIDC) has been connecting intraday markets in Northern, Western and Central Europe since June 2018.Since November 2019, eastern and south-eastern European countries have also participated in market coupling.A third wave of market integration with Italy and Greece is imminent.European market integration helps cross-border electricity markets to exchange flexibility even in the short term, thus jointly responding to short-term changes in production and demand.

In Germany's view, there is a need for coordination and, if necessary, action to be taken with regard to international coordination of market and operational rules in the event of overload.While the European day-ahead Market Coupling currently has a rule on the distribution of load overhang among all countries, the rules for dealing with load overhang in downstream processes (e.g. intraday markets, balancing systems) have not yet been harmonised.On the one hand, it is unclear whether and how an overload would currently be geographically distributed in practice.On the other hand, it is not clear to what extent the rules would be adapted and, if necessary, harmonised following the occurrence of load overhang.It therefore seems advisable that the processes downstream of the day-ahead market should also be regulated prophylactically at international level.European processes of integration and harmonisation of wholesale markets should therefore be pursued at all levels.

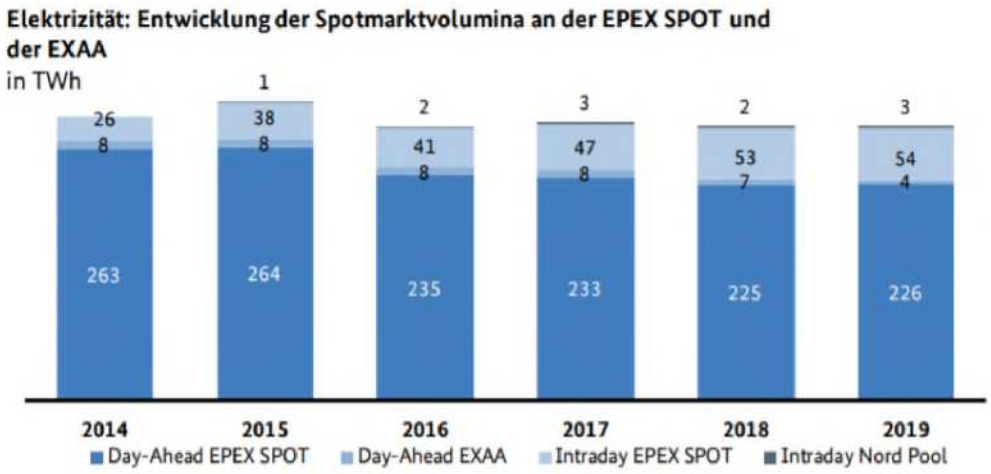


Figure 8:Evolution of spot market volumes at EPEX SPOT, Nordpool and EXAA

III.1.4 Wholesale prices

As part of its monitoring activities under Section 63 (3) EnWG, BNetzA and the Bundeskartellamt report annually on the development dynamics of electricity markets in Germany.The objectives of the monitoring are to provide market transparency and to analyse the development of competition.According to the132020 BNetzA Monitoring Report, trading volumes and/or liquidity on wholesale electricity markets increased in 2019 in both spot and forward markets.For example, the trading volume of Phelix-DE Futures in 2019 was 1.345 TWh, an increase of around 27 % compared to the previous year.The over-the-counter trading volumes brokered via broker platforms also increased significantly.For example, the volume of brokers surveyed increased in 2019 and the volume of OTC clearing of Phelix futures increased in 2019.The average market electricity price on the EPEX spot market for Germany/Luxembourg between January 2020 and January 2021 was around EUR 32,25/MWh.

Wholesale markets and electricity prices in Germany reflect national and European energy and climate policies.This includes, for example, the development of renewable energy sources, but also the European Emissions Trading Scheme (ETS).The ETS is a cornerstone of the EU's climate change policy and covers around 40 % of greenhouse gas emissions in the EU, including the energy sector.The CO2 price in the ETS has a significant influence on the level and pattern of the electricity price.For example, a CO2 price increase directly goes hand in hand with a linear increase in the short-term marginal costs of fossil power plants.The increase in the price of CO2 in recent years therefore increases the cost of fossil fuels with particularly high CO2 emissions.

Germany has also put in place a number of targeted national measures, as well as policy choices that may have an impact on electricity prices.These include, for example, the decision to phase out nuclear energy (by the end of 2022) and the phasing out of coal-fired power generation (by the end of 2038 at the latest).National measures affecting the German electricity market also include the promotion of renewable energy through the Renewable Energy Act (EEG).The Renewable Energy Act has proven to be an effective tool for the promotion of electricity from renewable sources since 2000.It obliges network operators to connect RES installations to their grid as a matter of priority and to purchase and transmit

13BNetzA Monitoring Report 2020: Https://www.bundesnetzagentur.de/SharedDocs/Mediathek/Berichte/2020/Monitoringbericht Energy 2020.pdf? blob = publicationFile & v = 5

the generated electricity as a matter of priority.In addition, RES installations with feed-in tariffs or market premiums are financed by the so-called EEG-surcharge.The EEG-surcharge currently stands at 6,5 cents per kilowatt-hour and is to be reduced in the coming years (see sub-chapter III.4.3).

Combined heat and power (CHP) also plays a special role in reducing CO2 emissions and is therefore supported separately.CHP plants are more efficient than uncoupled generation, as they produce heat in addition to electricity.The heat generated by the production of electricity is used as thermal energy for public and private consumers.The fuel used is therefore used more efficiently and efficiently.Support for CHP plants is based in particular on the Combined Heat and Power Act (KWKG).It provides for pay-as-you-go support for the joint and particularly efficient production of electricity and heat.Under the KWKG, operators of subsidised CHP plants receive temporary surcharges.The CHP Act thus provides incentives for investments in high-efficiency and low CO2 CHP plants in order to increase the share of electricity produced from low CO2 cogeneration.

In principle, the above national and European measures have an impact on price levels and price volatility in the wholesale market.Some of the above measures tend to increase the price of the electricity market, such as the phase-out of coal and nuclear energy through capacity reductions.Other measures, on the other hand, may have a rather downward effect on the wholesale price, such as the development of renewable energy sources producing electricity at marginal costs close to zero.For the EU objective of climate neutrality to become a reality by 2050, a comprehensive structural transformation of the electricity system is essential.These structural changes are accompanied by price effects on the electricity market, mainly due to changes in cost structures and production profiles due to the shift from fuel-based, controllable capacity to volatile renewable generation techniques.

On the other hand, the Network Reserve (see sub-chapter III.5.3), the Capacity Reserve (see Chapter II) and the transfer of lignite power plant units to safety readiness14 (including subsequent closure) operate outside the market and thus have no influence on market developments or electricity pricing.Redispatching with market power plants also operates outside the market.The cost-based reimbursements of all savings and expenses for the operators resulting from the network operator intervention rule out retroactivity on electricity market prices.

III.1.5 Expansion of international trade

The diversity of players in the German wholesale market and the use of dynamic tradingand forecasting techniques lead to a relatively liquid and well-functioning market.
Electricity market.However, there is a need for action on the German side to expand European trade with neighbouring countries.Germany will do so by 31 at the latest.December 2025 gradually extend cross-border market coupling to at least 70 % of the transmission capacity of interconnectors along a linear path.This will lead to more competition through a larger market area, cheaper electricity supply and better market integration of renewable energy sources.It also meets the requirements of Article 16 (8) in conjunction with Article 15 of the Electricity Market Regulation (EU 2019-943) (see also Chapter III.5).

III.2. Balancing markets

111.2.1 Balancing markets in general

14BMWI report 2019 Evaluation of lignite security:https://www.bmwi.de/Redaktion/DE/Publikationen/Industrie/evaluierung-der-braunkohle-safety.html

Balancing energy shall compensate in the short term for unforeseen imbalances between input and off-take in the power system in order to keep the system frequency stable at its target value.The responsibility for this lies with the German Transmission System Operators (TSOs).Balancing energy must be procured through a non-discriminatory and transparent tendering system.Balancing energy can offer electricity producers, electricity consumers or storage operators that are technically pre-qualified.There are three qualities of balancing energy that differ in how and when they are activated from the occurrence of the frequency deviation and how long they can be used:The Frequency Containment Reserve (FCR) shall be activated automatically and decentrally in the entire interconnected system within 30 seconds as soon as the system frequency deviates from the target value.After 5 minutes at the latest, it shall be replaced by the automatic frequency restoration reserve (aFRR), which is also activated automatically but selectively in the affected bidding zones.The secondary regulating power shall fully compensate for the variability of the system frequency within five minutes.At the latest after 15 minutes, the manual frequency restoration reserve (mFRR) shall replace the secondary standard power.It shall not be activated automatically but by the system responsible TSOs and shall be available for longer periods.

111.2.2 Current design:Balancing labour market

Balancing energy is put out to tender in Germany on a cross-regulary-wide basis and procured on a market-based basis via an internet platform.If the balancing capacity and balancing energy for aFRR and mFRR were previously procured in a single procedure, performance and work have been tendered separately since 2 November 2020.Germany has thus implemented the requirements for the establishment of national balancing energy markets (RAMs) from Regulation (EU) 2017/2195 establishing a guideline on balancing the electricity supply system (GLEB).In the FCR there is no split between balancing capacity and balancing energy, therefore procurement for both items will continue to take place in a joint tender.In 2022, it is planned to merge national balancing energy markets into a European balancing energy market through European platforms for the exchange of balancing energy (PICASSO for aFRR, MARI for mFRR).

Since 2018, the German Transmission System Operators (TSOs) have written off the total demand for FCR, aFRR and mFRR on a calendar basis, with procurement in six product windows for four hours each day.Since then, a minimum supply volume of 1 MW has also been applied.With the change to the RAM on 2 November 2020, lead times for the procurement of balancing energy of the types aFRR and mFRR were further reduced:Balancing energy bids may be set in the six daily auctions up to one hour before the start of a four-hour block.What is new is that pre-qualified balancing service providers that have not previously been awarded or have not participated in the balancing power market (RLM) may also participate in the RAM (free bids).Procured balancing service providers are required to set a bid for the same amount of power in the RAM and can freely adjust it up to the Gate Closure.The remuneration in the RLM and RAM is based on the pay-as-bid principle.The RAM shall apply a technical bid limit of EUR 9.999/MWh.

For European platforms, GLEB provides that the product durations for balancing energy for aFRR and mFRR are 15 minutes.This means that in future balancing energy will be tendered 96 times a day.In addition, remuneration is provided for on the basis of the principle of marginal pricing.

Balancing energy is already procured across borders today.Germany, Switzerland, the Netherlands, Austria, Belgium, France, Denmark and Slovenia have coupled their markets for FCR.In the case of aFRR and mFRR, there is a cross-border market for balancing capacity between Germany and Austria.

III.2.3 Imbalance prices, balancing responsibility and market price coupling

The costs of activated balancing energy of aFRR and mFRR shall be accounted for in accordance with the polluter pays principle.Those responsible for balancing imbalances in the grid must pay an imbalance price

(AEP) to the TSOs.Balance responsible parties (BKV) who have stabilised the system frequency with imbalances receive the AEP as remuneration.Germany therefore applies the principle of symmetrical AEPs.The balancing costs of all types of reserve (FCR, aFRR and mFRR) are charged to the network use charges.They are therefore not included in the calculation of the AEP.

The calculation rules for the cross-zonal, quarterly balancing energy price in Germany are designed in such a way that AEP is always at least as expensive as a defined intraday price index.The aim is to ensure that BKV has an economic incentive to manage imbalances known to them in their own balance sheets through electricity trading on the intraday market.In 2020, this incentive component of the AEP was adjusted.Since then, the intraday price index "ID-AEP" has been used.The ID-AEP shall be calculated by the TSOs for each quarter hour and shall be equal to the volume weighted average price of the last electricity trading transactions with a total trading volume of 500 MW in continuous intraday trading before the close of trading.In addition, a discount of 25 % or at least EUR 10/MWh is applied to the ID-AEP in order to exclude arbitrage against the AEP in the vast majority of cases.In addition, a scarcity component will be added to the ID AEP as soon as the balance of the German network of network regulators reaches 80 % of the installed balancing capacity.The rule on the scarcity component was revised in May 2021 so that the surcharge no longer takes the form of a predefined amount, as its predictability has proved to be problematic.The surcharge is now determined by means of a specific exponential function, i.e. the higher the balance of the network over the 80 %, the more the amount of the scarcity component increases.In situations with a high systemic imbalance, this is intended to further strengthen the incentives for BKV to manage their balance bands in balance, so as to avoid systemic situations from the outset.

III.2.4 Current challenges

Contrary to general expectations, following the introduction of the national RAM on 2 November 2020, no increase in the level of competition was observed, but on the contrary, a significant decrease in liquidity and a sharp increase in prices.While balancing prices stabilised soon after the changeover, the cost of balancing energy remained very high.To date, suppliers have managed to place bids in mid-segments of the Merit Order with high five-digit prices.In November, TSOs had to bid repeatedly at the level of the then applicable technical bid cap of EUR 99.999/MWh.These appear to be symptoms of lack of liquidity:A market investigation for November showed that the bidding overhang in the balancing energy markets for aFRR and mFRR was rarely above 10 % of the required maintenance.In addition, four large suppliers combine almost all the shares of the markets considered.This is particularly true for the positive aFRR markets, where market concentration is very high.It is particularly noteworthy that no "free bids" could be observed.As expected, only those bidders who have already participated in the capacity auctions (RLMs) have so far participated in the RAM's tender process, although labour markets are in principle open to all pre-qualified participants.Despite historically high balancing energy prices, it had to be observed that neither free bids nor new competitors are currently stimulating the RAM and increasing competition.So far, there are no visible effects on low prices.

The expensive bids lead to sometimes extremely high on-demand costs.These must ultimately be borne by the balance responsible parties (BKV) in the form of high AEPs.On 2 November to Sofia, Bulgaria, with the Conference of Presidents, in view of preparations for the Bulgarian Presidency of the Council:In December 2020, there were already individual, expensive calls for secondary regulatory work, leading to an extreme imbalance price of more than EUR 16,000/MWh.This can lead to high economic damage for BKVs, even in the case of small, unjustifiable forecasting errors.Given the current dysfunctional competition and the sometimes very high on-demand costs, BNetzA introduced a temporary bidding cap for all RAMs of EUR 9.999/MWh on 19 January 2021.As a precaution, this has effectively reduced the working price.No negative effect on participation in RAMs as a result of the bidding cap was observed.

The Federal Government, together with the TSOs, is investigating possible reasons for the low level of competition in balancing energy markets.One hypothesis is based on the new decoupling of RLM and RAM and suggests that participants participating in the RAM only have to charge for the cost of maintenance due to the low likelihood of calls.This would place tenderers who only participate in the RAM at a structural competitive disadvantage compared to tenderers who have already been awarded a performance premium in the RLM.This explains why no bids have so far been submitted to the RAM which were not previously awarded to the RLM.In view of these — in the first assessment — fundamental competition problems, the Federal Government is concerned about further design adjustments to be applied to the European platforms PICASSO and MARI in line with the GAEB target model, including the transition to the pay-as-clean remuneration principle.Design changes that are in themselves welcome can lead to high additional costs in a poorly functioning market.

The interaction between balancing energy market and intraday trading is also under discussion.In Germany, electricity can be traded in liquid continuous intraday trading for up to 30 minutes or within a control area until 5 minutes before real time.One hypothesis under discussion is that, given the (comparatively) secure opportunities in the intraday market, participation in the RAM with uncertain activation would be unattractive, at least very high working prices.Potential barriers to entry, such as IT migration costs, costs of switching to more frequent tenders, demanding prequalification conditions or waiting for the launch of the European platforms would contribute to unattractiveness.When switching to quarterly calls for tenders and product durations, the Federal Government hopes that this will reduce (at least in part subjective) opportunity costs from alternative intraday marketing and thus make participation in the RAM more attractive.The Federal Government continues the analyses of potential causes that have begun and develops solutions.However, short-term design changes prior to the implementation of the European platforms are not intended.Moreover, the scope for manoeuvre with the EULegal requirements from the GLEB is very narrow.

III.3. Demand side response

III.3.1 Demand side response and aggregators' participation in the electricity market

Demand side response (DSR) is becoming increasingly important with an increasing share of renewable energy in electricity generation in Germany, while phasing out coal-fired power generation and nuclear energy use.Nowadays, all types of DSR are in principle permitted in Germany.In the case of DSR suppliers' participation in different existing markets, for example, no distinction is made between direct participation or participation through aggregators.In order to participate in the relevant markets, market participants must comply with the terms of the contract.This includes, for example, the TSOs' prequalification requirements for participation in balancing markets.

In principle, DSR should compete with other flexibility options such as electricity storage facilities or peak-load power plants.The incentives for DSR in the electricity market are created by corresponding price signals.However, these price signals have not yet been sufficiently available in the past, as flexibility has so far been almost entirely provided by medium and peak-load power plants and pumped storage facilities.However, this should change as the energy transition progresses.

Germany has already set the course for a proactive development of DSR at an early stage in order to unlock its potential.As early as 2012, the Regulation on:
Agreements on interruptible loads (AbLaV), the 2016 amended version of which is currently limited to mid-2022.It lays down the obligations of transmission system operators when tendering for the purchase of interruptible load.

When using DSR, conflicting interests need to be balanced if the consumer provides his flexibility not to his supplier but to a third party (e.g. an aggregator).If, because of a contractual obligation to a third party (e.g. an aggregator), a consumer reduces his consumption, for example in order to market these quantities of energy on the electricity markets, the final amount of energy purchased by the supplier for the consumer is marketed by the consumer.In addition, changes in consumption may cause problems in the supplier's balance sheet for which the supplier is not responsible.In order to balance these interests, Section 26a of the Electricity Network Access Regulation (Stromnetzzugangsverordnung) established in 2018 that consumers may provide per-minute reserve or secondary balancing power through a different balancing system from that of the supplier if they place the supplier and balance responsible parties economically in the same way as they would have been without providing the balancing energy by paying an appropriate fee.

With the ongoing amendment of the Energy Industry Act and in implementation of Directive (EU) 2019/944, this provision is planned to be incorporated and extended in Section 41d of the Energy Industry Act.According to that provision, each consumer should be able to provide a service to third parties (e.g. an aggregator) by means of a consumption adjustment if he places wholesalers and suppliers and the balance responsible party of the consumer collection point economically, by paying an appropriate fee, in the same way as he would have been in the absence of the adjustment.This clear framework for the integration of flexibility from customer facilities creates a level-playing field for the participation of all flexible consumers in electricity markets.Flexible consumers are free to take over this marketing independently or to use an aggregator to do so.

III.3.2 Financial incentives for demand side response

Compared to professional suppliers, consumers may be subject to differentiated obligations to finance system costs through levies, surcharges or charges when purchasing electricity.As a rule, however, there are no specific barriers to their participation in the electricity market.The transposition of Directive (EU) 2019/944 will lay the foundations for end-consumers in Germany to offer dynamic electricity price contracts throughout the country.End consumers who have a smart metering system within the meaning of the Messstelle Betriebsgesetz are entitled to an electricity supply contract with dynamic electricity tariffs.A dynamic tariff supply contract is an electricity supply contract with an end consumer in which price fluctuations in spot markets, including day-ahead and intraday markets, are reflected in intervals at least equal to the settlement intervals of the relevant market.The possibility of concluding such contracts encourages final consumers to adapt their electricity purchasing behaviour to the market situation due to possible savings.
In addition, in the context of the transposition of Article 15 of Directive (EU) 2019/944, energy storage facilities are to be exempted from existing double loads.This will prevent electricity stored and stored from being taxed twice with levies and levies.

Commercial and industrial consumers can also benefit from reduced network charges.This requires behaviour that is useful to the network.Section 19 (2) (1) and (2) of the Electricity Network Charges Regulation (StromNEV) regulates the conditions under which network charges can be reduced in return for behaviour that serves the network.Under Section 19 (2) (1) of the StromNEV, a final consumer may benefit from reduced individual network charges if his maximum load contribution is foreseeable to deviate significantly from the simultaneous maximum annual load of all withdrawals from this level of network or conversion.

III.3.3 Smart metering systems

Smart meters enable secure and standardised communication between energy network and market actors and support the digitalisation of the energy transition.They increase consumer transparency for

consumers and businesses, and can provide network useful information from distributed producers and flexible consumers, such as PV and heat pumps, and also facilitate and harmonise the management of these facilities as a central communication platform.Smart meters will allow the electricity distribution network to be used more fully and the additional network expansion will be limited to what is necessary and efficient.Smart meters also support the introduction of dynamic tariff electricity supply contracts, which in turn are a prerequisite for a more flexible demand and DSR.

With the transformation of the electricity system towards more renewable energy, the requirements for secure and efficient grid operation are increasing.In the future, electricity producers and consumers will interconnect and communicate digitally via a smart grid.In August 2016, the German Bundestag adopted the Act on the Digitalisation of the Energy Transition (GDEW).The roll-out of smart metering systems and modern measuring equipment is regulated in Germany by the Measurement Station Operating Act (MsbG).Under Paragraph 29 of the MsbG, consumers must become consumers with an average consumption of 6.000 kWh/a, renewable energy and CHP installations from 7 kWpeak with an intelligent metering system as soon as this is technically possible under Paragraph 30 of the MsbG and is economically justifiable under Paragraph 31 of the MsbG.

On 24 February 2020, the Federal Office for Information Security (Bundesamt für Sicherheit in der Informationstechnik (Federal Office for Information Security) (BSI) imposed comprehensive and mandatory roll-out of smart metering systems for end consumers with an average annual consumption of between 6.000 and 100.000 kWh by determining the technical possibility under Paragraph 30 of the MsbG, known as the market declaration.

Base competent metering point operators, usually distribution system operators, shall equip 10 % within three years and 100 % within eight years of the market declaration in the released installers with smart metering systems.The installation of smart metering systems was in principle already possible with the certification of a first smart metre gateway by the BSI on 12.Launched in December 2018.However, before the market investigation, smart metering systems were only installed on a small scale, with the result that BNetzA:

Monitoring report for the 2019 reporting year covered only around 1000 smart metering systems across Germany.

The scope of application of smart metering systems is not limited to metering and transmission for billing purposes, but has been designed as a central component of the smart energy system and is intended to serve as a platform for a variety of services and added value in the areas of smart metering/sub-metering, smart grid, smart mobility, smart home/smart building and smart services.In a step-by-step approach, all energy-related use cases will be eliminated throughout the next few years.

III.4. Retail

III.4.1 Liberalisation of the electricity market and abolition of regulated prices

In the late 1990s, electricity supply in Germany was gradually opened up to competition and the electricity market started with the first EU liberalisation directives (including 1).Internal energy market package), increasingly liberalised in recent years.Accordingly, there is no electricity price regulation in Germany.Since then, competition in electricity markets has continuously increased and the situation for final customers has improved significantly.One of the prerequisites for this was the requirements for unbundling of network operations from other energy supply activities in the course of the 2th and 3.Internal energy market package, as energy supply networks are a natural monopoly.Therefore, transparency and non-discriminatory design of network operations are prerequisites to foster

competition in the upstream and downstream parts of the value chain, to generate trust among market participants and to ensure affordable electricity prices for final customers.On the basis of the Regulations adopted in Germany, including the Electricity Network Access Regulation and the Electricity Network Charges Regulation, contain corresponding requirements.

Today, at the various stages of the market for electricity generation, trading and distribution, there is generally a competitive environment in Germany which benefits the final customer to a large extent.In the context of energy monitoring, the Bundeskartellamt (Federal Cartel Office), together with BNetzA,15 monitors developments in the electricity markets.Pursuant to Section 48 (3) of the Act against Restraints of Competition, the monitoring tasks of the Bundeskartellamt include in particular the degree of transparency, including wholesale prices, and the degree and effectiveness of market opening and competition at wholesale, retail and energy exchanges.The results of the monitoring shall be published annually by BNetzA and the Bundeskartellamt in a report.The source of the indicators below is the corresponding "Monitoring Report 2020".
Final customers in Germany are free to choose their energy supplier from a wide range of offers.In the electricity sector, a total of at least 1.430 companies were active as electricity suppliers in Germany in 2019.There are both nationwide and regional electricity suppliers, the second group being the majority.On a national average, a final consumer could choose between 156 suppliers in its network area in 2019.
for 138 suppliers.In turn, each supplier can offer different tariffs, thus increasing the choice for final customers.

The option for final customers to switch suppliers or tariffs allows final customers to reduce their electricity costs and stimulates competition in the retail market.Switching rates and switching processes are therefore key indicators of the intensity of competition.Between 2016 and 2020, around 10 per cent of all household customers (4,5 to 4,7 million in absolute terms) switched their electricity suppliers each year.In 2019, a further 1,8 million household customers switched to another contract with their electricity supplier.

111.4.2 Dynamic retail tariffs

As explained above, final customers are generally able to choose not only between different electricity suppliers, but also between different tariffs for each supplier.For example, a total of 30 per cent of all suppliers offer a pure online tariff that can be concluded online (e.g. on the company's homepage or via a price comparison portal) and where invoices are available online.When looking at the largest suppliers, i.e. those supplying 80 per cent of household customers by volume, it can be seen that 77 per cent offer an online tariff.

Under Paragraph 40 (5) of the Energiewirtschaftsgesetz, suppliers must offer load variable or daily rates to end consumers of electricity where this is technically and economically feasible.In 2019, around nine per cent of suppliers offered load variable tariffs.The proportion of suppliers, of which day-time tariffs were offered in 2019, such as a reduced overnight electricity tariff for the so-called 'recharging' of night storage heaters, was approximately 62 %.

Dynamic electricity price contracts that reflect price fluctuations in the day-ahead market at intervals were already possible in Germany but were rarely offered.The transposition of Directive (EU) 2019/944 creates a comprehensive offer of dynamic electricity price contracts to end consumers in Germany.End consumers

15BNetzA, BKartA 2020:Energy monitoring report 2020: Https://www.bundesnetzagentur.de/SharedDocs/Mediathek/Berichte/2020/Monitoringbericht Energy 2020.pdf? blob = publicationFile & v = 5

who have a smart metering system within the meaning of the Messstelle Betriebsgesetz are entitled to an electricity supply contract with dynamic electricity tariffs.With the further rollout of smart metering systems in Germany, this may lead to an increase in the number of such contracts in the future, thus giving more customers the incentive to adapt their electricity purchasing behaviour to the market situation due to possible savings.

111.4.3 Network charges, levies, taxes and levies

In Germany, around a quarter of the electricity price of household customers can be influenced by the supplier.The remaining three quarters consist of network usage and measurement charges, levies, levies and taxes.These cannot be influenced by the suppliers.They are either fixed per unit of consumption or vary according to the current reference profile and location.In particular, the electricity price components fixed per unit of consumption may include:
Distort competition between electricity-based and other technologies and hamper sector coupling.

The attractiveness of many climate-friendly technologies, such as electro-mobility, the use of heat pumps in buildings or the electrification of process steps in industry, is closely linked to the level of electricity prices.The production of hydrogen by means of electrolysis, for example used for largely climate-neutral steel production, also requires the availability of low-cost electricity.Only in this way, for example, steel produced with hydrogen can compete on the world market.Germany therefore aims to further reduce the specific burden of grid useand metering charges, surcharges, levies and taxes on electricity in the future.

In order to reduce the competitive disadvantages of electro-based climate change technologies and to alleviate the burden on electricity consumers, the Federal Government decided last year to finance part of the EEG support costs through budgetary resources and thus to relieve the electricity price.From 2021 onwards, part of the revenue from the national CO2 pricing in the heating and transport sector (Fuel Emissions Trading Act — BEHG) will be used to finance the EEG and will be returned to citizens and businesses through a reduction of the EEG-surcharge.As a result, the surcharge for 2021 was reliably reduced to 6,5 cents per kilowatt-hour.In 2022, the EEG surcharge is expected to decrease further to 6,0, 2023 and 2024 to below 5 cents per kilowatt-hour.

In addition to reducing distortions in competition in sector coupling technologies, the reduction of the EEG-surcharge also serves to reduce distortions under the special compensation scheme (e.g. 'threshold problems' and distortions in competition with consumers who pay a reduced surcharge) and between self-consumers and network users.The use of flexible or dynamic electricity supply tariffs is also encouraged by the reduction of the EEG-surcharge.

Despite the aforementioned refinancing of parts of the EEG-surcharge from federal budget resources, it is to be expected that the competitive disadvantage of electricity-based applications in the heating and transport sectors will persist.Against this background, the debate on further reforms of taxes, levies and levies in the energy sector in Germany will also continue.It is the Federal Government's ambition to further reduce the specific burden on electricity with price components initiated by public authorities.The relevant regulatory proposals are currently at an early stage of processing and not yet agreed within the Federal Government.

III.5. Interconnectors and congestion management

It is a key concern for Germany to strengthen the European internal market for electricity.Large-scale European electricity exchanges are important for implementing a European energy transition in a cost-

effective and secure manner.For this reason, it is also important that Germany receives its single bidding zone with Luxembourg.In order to be able to trade electricity at any time between all EU Member States, grid development is central.Germany therefore invests substantially in national and cross-border network development.With the amendment of the

Germany plans to invest around EUR 80 billion in transmission networks by 2030, which entered into force in March 2021.In order to manage remaining bottlenecks more efficiently, Germany is improving its congestion management.From October 2021, the scope of generation and storage that can be used for redispatching will be significantly increased.Renewable energy and CHP installations are also integrated into the redispatching process, while maintaining their feed-in priority.Germany is considering ways to use loads for the grid as well.

III.5.1 Interconnectors

Article 4 (d) of the Governance Regulation (EU) 2018/1999 defines the level of electricity interconnectivity between Member States for the year 2030.The measures included in the integrated national energy and climate plans shall encourage this.

Germany supports the European requirements on interconnectivity and the development of interconnectors in the interests of a functioning European internal market for electricity.Germany assumes that the criteria set out in the Governance Regulation for achieving the level of electricity interconnection in 2030 can be met only by implementing the interconnectors under concrete planning or construction.This applies in particular to the required shares of transmission capacity in peak load and installed renewable energy generation capacity.

In order to meet the requirements, the Federal Republic of Germany has laid down 14 interconnector projects in the Energy Network Development Act (EnLAG) and the Federal Requirement Plan Act (BBPlG, last amended in 2021), some of which have already been implemented in the meantime.Most of these projects are also European Projects of Common Interest (PCIs).As a result, Germany will significantly increase its cross-border transport capacity by 2030.The current state of play of the pipeline projectscan be found at www.netzausbau.de.

Germany has adopted an action16 plan in accordance with Article 15 of the Electricity Market Regulation and is therefore implementing the requirements for opening up interconnectors to international trade along a linear upward path.This means that by the end of 2025 all interconnectors will be gradually opened up to at least 70 % to trade.For this purpose, corresponding MinRAM values for interconnectors and internal lines are used at the borders with flow-based calculation of trading capacity (Flow based market coupling).The road from 2020 to the end of 2025 shows border-specific linear pathways, the processes of which are described in the Action Plan.

The monitoring report of the German TSOs on compliance with the linear upward path (pursuant to Article 15 (4) of the Electricity Market Regulation) shows that the legal requirements were complied with in 2020 on all cross-border lines.

III.5.2 Grid development

Germany is aware of the importance of grid expansion in this area for the European internal market for electricity.The Federal Government is therefore firmly committed to the expansion of the network.

On the basis of the Energy Network Development Act (EnLAG) and the Federal Requirement Plan Act (BBPlG), since the penultimate amendment of the Federal Requirements Act 65 projects have been

Bidding zone 202016 action plan:https://www.bmwi.de/Redaktion/DE/Downloads/A/aktionsplan-

planned, approved and implemented on land with approximately 7.500 kilometres of line.In addition, the offshore connection lines in the North Sea and the Baltic Sea account for a total of approximately 4.450 km.As at Q4/2020, electricity routes are authorised on land with a total length of 2.345 km, of which approximately:
1.110 km in operation.Approximately 2.600 km of offshore connections are approved, of which approximately 2.150 km are in operation.By the end of 2023, authorisation procedures for approximately 6.900 line kilometres on land are expected to be completed.The large HVDC lines from northern to southern Germany will then be under construction.By the end of 2023, a further 3.500 km of network upgrades are expected to be operational on land.

With the recent amendment of the BBPlG, which entered into force in March 2021, Germany has also created conditions for an electricity transmission network to integrate 65 % renewable energy into the electricity grid by 2030 and to expand European electricity trade in line with European requirements.The amendment to the BBPlG added 35 new projects to the list of statutory expansion projects.Most of these are reinforcements of existing AC connections.There is a new HVDC corridor from the North Sea coast to North Rhine-Westphalia.Translated in kilometres, the latest legislative amendment means that a further 3.500 km is added to the 7.500 km previously foreseen in the BBPlG and the EnLAG.

State of play of projects under the Federal Needs Plan Act (BBPIG) and the Energy Network Development Act (EnLAG)

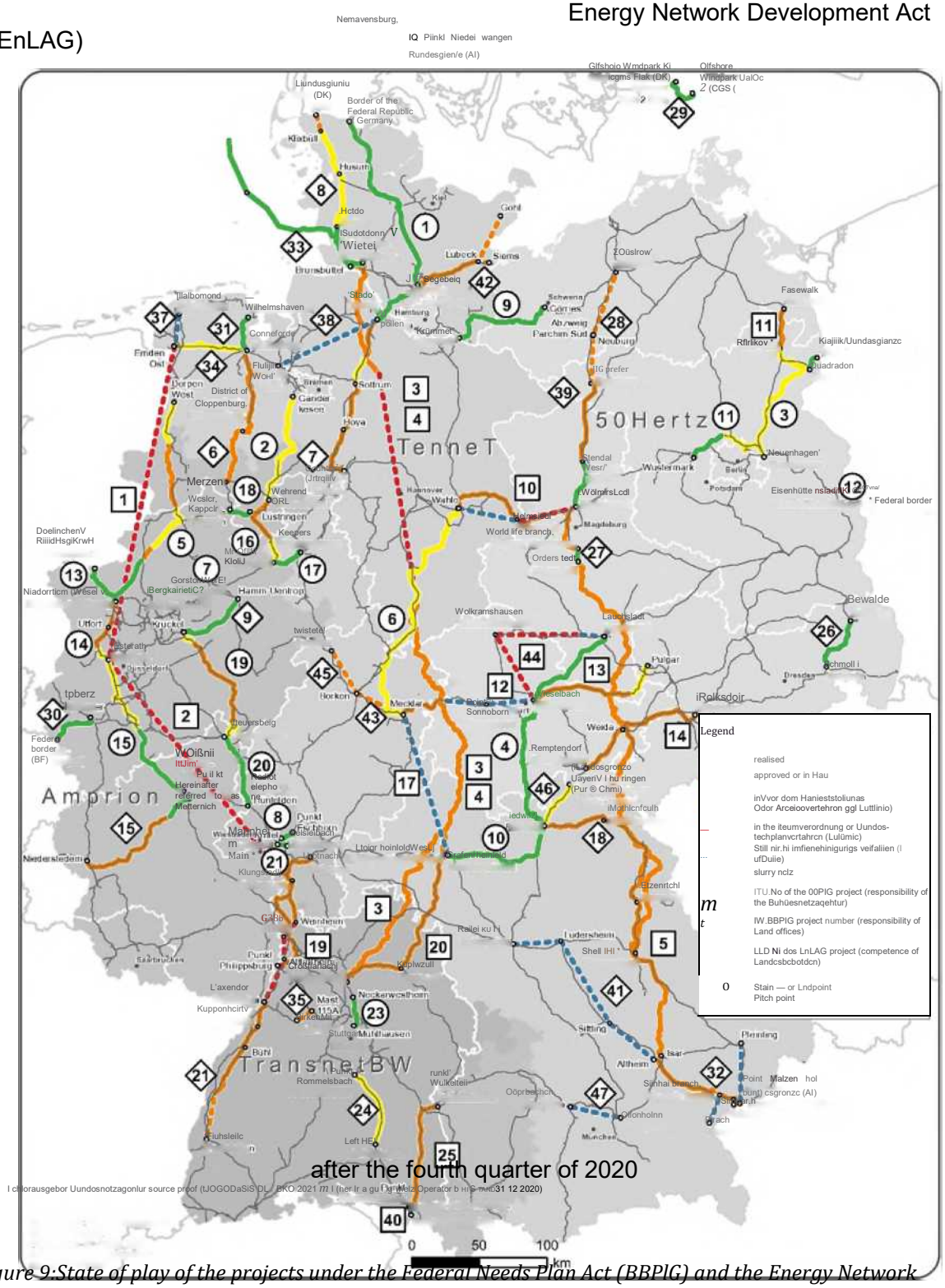


Figure 9:State of play of the projects under the Federal Needs Plan Act (BBPlG) and the Energy Network Development Act (EnLAG) after the fourth quarter of 2020;in green:implemented projects.

In addition to the extension of the list of projects in the BBPlG, various adjustments were made in March 2021 to the Energy Industry Act (EnWG) and the Grid Acceleration Act on Transmission Network (NABEG) in order to promote the swift implementation of planning and approval procedures.Simplifications have been established for the planning of ducts and embedded earth cables, for post-participation procedures, for confidentiality, data protection and accessibility, and for jurisdiction.

The completion of the list of operations in the BBPlG was based on the network development plan 2019-2030 endorsed by BNetzA.The network development plan is the central tool for planning the development of electricity networks at transmission system level.Every two years, transmission system operators shall jointly draw up such a plan, which shall be assessed and confirmed by BNetzA.For this purpose, at least three scenarios confirmed by BNetzA reflect the likely energy developments over the next 10 to 15 years (scenario framework).On this basis, the necessary network development needs are then determined after market modelling.BNetzA is currently assessing the network calculations submitted by the Transmission System Operators (TSOs) in the framework of the Network Development Plan 2020-2035.
Network development planning in Germany involves a wide range of public involvement and is most transparent in all its steps.BNetzA publishes all information and documents relating to the current network development plan and past network development plans at www.netzausbau.de.

However, the power grid will not only become more efficient through reinforcement and expansion.Optimised network utilisation in network operation can also lead to higher transport capacity.The network development plan 2019-2030 confirmed or based on measures to significantly increase the transport capacity of the network and to be implemented well before 2030.These include more active control of flows using so-called phase shifting transformers and extensive weatherdependent overhead line operation.At the level of the 380 kV network, the four TSOs with control area responsibility shall already carry out local or regional overhead line monitoring on at least 33 % of all overhead line sections.The figures vary between the four companies.The share is expected to increase to at least 60 % over the next five years.In addition, in the future, innovative
Operational management concepts, such as reactive network operation using 'net boats', further optimisation potential.The network development plan 2019-2030 takes into account 3 pilot network boat plants, which are also expected to be operational well before 2030.Measures to activate such optimisation potentials are set out in the Bid-zone Action Plan.Two pilot N network boats with a total capacity of 350 MW are currently being planned.

III.5.3 Congestion Management

In a bidding zone, more electricity is traded than the electricity grid can transport.If trade exceeds the transport capability of the networks, there is a risk of network congestion that the network driver has to resolve by redispatching.If the German TSOs carry out redispatching, the operators concerned will be reimbursed for the costs incurred.The Energy Act (Energiewirtschaftsgesetz — EnWG) provides for a no-cost reimbursement:Operators shall not be placed in a better or worse position than without participation in the
Redispatching.This is done by reimbursing all savings and expenses generated by redispatching operations by operators in a cost-neutral manner.In this way, repercussions on the functioning of the market are excluded.Redispatching takes place strictly outside the market and therefore has no impact on the level of electricity prices on the wholesale market.

A certain level of redispatching within a bidding zone is efficient.It is common practice that, within a bidding zone, the transport capacity of the network is not sufficient in every conceivable market situation.An electricity grid that would also be developed for the last kilowatt hour and for rare hours per year would be prohibitively expensive.For this reason, grid development plans already take into account a

3 *% cut in electricity generation from renewable* installations.In 2019, around 6,5 TWh of renewable electricity were regulated in Germany.This is about 2.8 % of the total volume of RES-E marketed (228,9 TWh).The renewables scheme thus falls within the framework of the legal interpretation of the electricity grid.Electricity from conventional generation had to be downloaded and restarted at one point in 2019, amounting to 13,3 TWh.For a total of 332,4 TWh of marketed electricity from domestic conventional generation, this means that approximately 4 % could not be transported from the electricity grid.The following figure describes the evolution of network and system security measures due to network congestion between 2015 and 2020.

Network and system security measures from 2015 to 2020

	Redispatching (including countertrading)		Grid reserve	EinsMan	Power supply adjustments
	Increase GWh	Reduction GWh	Increase GWh	Reduction GWh	Reduction GWh
2015	7.455	–7.994	551	–4.722	–26,5
2016	5.219	–6.256	1.209	–3.743	–4,1
2017	8.256	–10.200	2.129	–5.518	–34,5
2018	6.956	–7.919	904	–5.403	–8,3
2019	6.365	–6.958	430	–6.482	–9,3
2020	7.891	–8.522	635	–6.146	–16,0

Figure 10:Network and System Security Measures 2015-2020 (BNetzA 2021)

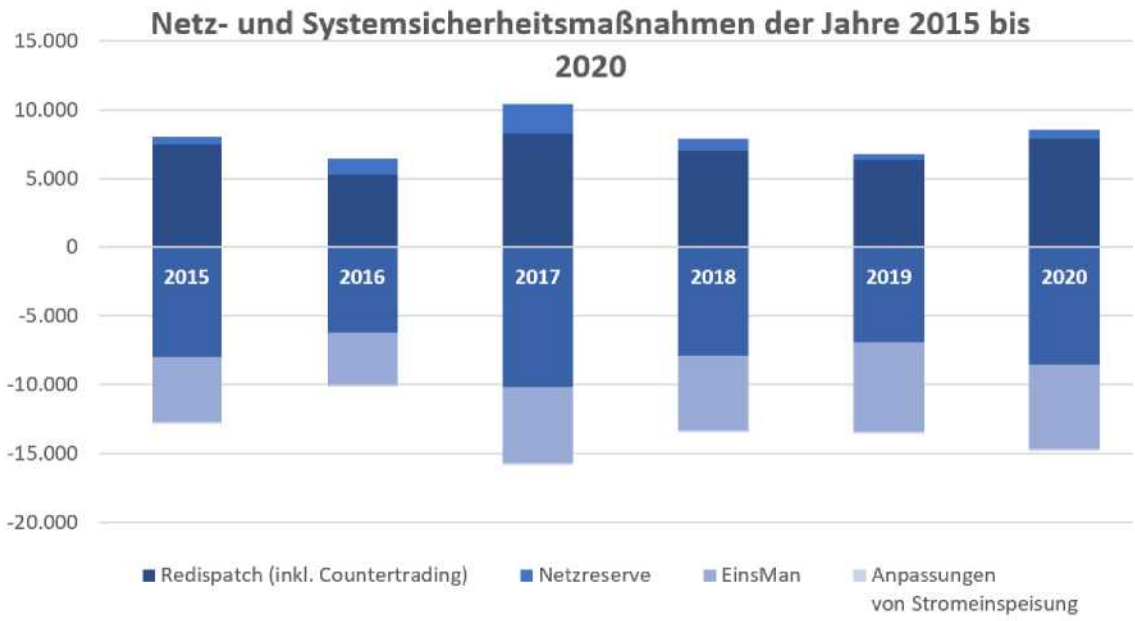


Figure 11:Network and System Security Measures 2015-2020 (BNetzA 2021)

The management of network congestion in the transmission system is not only necessary for domestic electricity generation.It is also necessary to increase cross-border trade in the European internal electricity market.This is demonstrated not least by17 the TSO congestion report published by BNetzA in November 2019.It shows that immediate application of the 70 % CEP target would have led to structural bottlenecks in the German network.This evidence also paved the way for the German Bidotszone Action Plan and for the linearly increasing interconnector opening in accordance with Article

17BNetzA congestion report 2019:
Https://www.bundesnetzagentur.de/DE/Beschlusskammern/BK04/BK4 91 Further/Engpassbericht/1 90704 4 UENB congestion report final BA.pdf? blob = publicationFile & v = 3

15 of the Electricity Market Regulation.

However, the current large-scale redispatching in Germany is a transitional phenomenon which Germany is trying to reduce decisively and quickly by means of various measures.In particular, the legally decided network expansion under planning and construction will lead to a significant reduction in the necessary network congestion management.In addition, numerous measures have been taken which in the meantime increase the transport capacity of the existing transmission system and minimise the use of redispatching.These measures were described in detail in the Biotszone Action Plan published by Germany in December 2019.

In order to optimise congestion management itself, Germany has also adapted the legal framework and further measures to optimise costs and processes are being examined.The main innovation is the introduction of the so-called redispatching 2.0 as of 1.10.2021.This new, extended redispatching scheme integrates the previous feed-in management (§ 14 EEG) into the redispatching procedure for conventional producers (§ § 13 and 13a EnWG as amended).The regularisation of renewable installations that is useful to the network will be carried out in a predictable process with balance sheet and energy compensation.Redispatching 2.0 also allows for an optimised selection decision across networks based on the effectiveness of installations.

congestion relief and the costs borne by electricity customers.All electricity generation and storage installations above an installed capacity of 100 kW (now:10 MW) and also smaller installations if they are taxable by the network operator.The prioritised feed-in priority in favour of RES-E and CHP electricity is safeguarded by minimum factors.The minimum factors determine how much better the regulation of priority electricity from RES and CHP must have over conventional generation in order to intervene in the driving of this priority generation.

An incentive mechanism for network-oriented management of flexible loads in the low voltage grids has been established in § 14a EnWG since 2011.The current version of Section 14a of the EnWG depends on an agreement between distribution system operators and end consumers.This network-oriented control of controllable consumables such as electric heating, heat pumps and charging devices regulates specific network use and is charged with specific network charges.

The BMWi is in dialogue with vehicle manufacturers and network operators on how to quickly and reliably lead to electromobility for all actors and ensure network stability.The number of electric cars and heat pumps will continue to increase in the coming years.Millions of new producers and consumers must therefore be integrated into the energy system.For this to happen, networks must continue to be managed in a smart way, while ensuring the stability of the networks.The energy transition and electromobility play to a large extent on distribution networks.Fast and cost-efficient network integration of new consumers requires increased digital connectivity and communication between all actors and forward-looking network deployment planning.

One of the drawbacks of cost-based redispatching is that this burden cannot be integrated.This is because the network operator cannot determine the costs of demand response or increase for the participating installation.As a solution, redispatching markets with free pricing are discussed.EU law also provides, in principle, for market procurement of redispatching, both at the transmission system level (Article 13 of the Electricity Market Regulation) and at the distribution network level (Article 32 of the Electricity Market Directive).However, national derogations are permitted, which Germany currently makes use of.Germany has explained in detail the reasons for this in the Bidotszone Action Plan (Chapter 3.1.4):The interplay between the wholesale zonal electricity market and the local redispatching market with on-demand remuneration would lead to strategic bidding behaviour.Redispatching volumes and costs would increase many times.At the heart of this so-called “Inc Dec-problem” is the coincidence in time between two markets with different geographic resolution.The Federal Government is currently exploring different

approaches to decouple this synchronisation and to be able to generate burdens in a system-compatible way for redispatching.

In order to increase further potential for optimisation in redispatching, the Federal Government intends to specify and strengthen incentives to limit congestion management costs as part of the forthcoming revision of the Incentivised Regulation (ARegV).At the level of transmission systems, the incentive instrument to reduce congestion management costs of transmission system operators introduces a new bonus/malus model affecting congestion management costs.This is a collective incentive for the four transmission system operators to avoid that individual TSOs optimise investments and congestion management at the expense of the system as a whole.At distribution system level, in the medium term, by classifying congestion management costs more appropriately as volatile cost components of the existing efficiency comparison, it should be used to strengthen incentives already established in the system of incentive regulation.The existing incentive to keep overall costs as low and efficient as possible will be reinforced for distribution system operators by including congestion management costs as volatile cost components in the efficiency comparison in the future.In addition, this also prevents efficiency imbalances, which would burden network operators who invest in order to avoid or reduce congestion management costs rather than pass on the costs incurred only to network users.However, it should only be taken into account in the efficiency comparison once BNetzA has clarified how a possible time shift between the expansion of renewable energy installations and the necessary network expansion can be adequately taken into account, so that distribution system operators do not suffer undue and unjustified disadvantages.

With an accelerated expansion of renewable energy sources, the requirements for electricity grids will increase, on the one hand, by national RES development and, on the other hand, by increasing demand for cross-border trade in order to balance as widely as possible the fluctuations and differences in production of increasing RES-E generation in Germany and all other European countries.However, the speed at which transmission networks can be developed is limited, not least by provisions of European law.Authorisation procedures and construction cannot be speeded up as they wish.The German Federal Government attaches great value to the legitimate interest of citizens to participate in the planning of infrastructure projects.In the Federal Government's view, this is an essential basis for the acceptance of grid expansion and the energy transition in general.Complementary solutions are needed in the meantime until the network roll-out is completed.Germany therefore relies on a large number of measures in the short and medium term, which are fully presented in the BidotsZone Action Plan.One important building block mentioned therein is to better synchronise the development of renewable energy and high-efficiency and long-term climate-neutral CHP plants with the development of electricity grids.For example, the locations for further expansion of climate-friendly generation installations should be more compatible with the grid, while the electricity grid will be developed and optimised in parallel.For this reason, regional incentives for RES and CHP plants under the support programmes are an important and transitional building block in the transformation phase ahead of us.

Alternatively, local investment incentives may also be provided, for example, through locally differentiated grid connection charges.Support for construction costs for grid connection can guide the demand for grid connection capacity.A building cost subsidy is a payment to be made by the subscriber (connection capacity over 30 kW) to the network operator for the extension of the general network in connection with the connection.The tool allows the network operator to control that it does not need to expand its networks beyond actual needs.The financial contribution will encourage the subscriber to base the level of the connection capacity on its actual needs.In addition to this instrument, other incentive instruments are theoretically conceivable, such as:

for example, the levying, where appropriate, of local differentiated network charges for generators (G component].These are currently not applied;their advantages and disadvantages in terms of their incentive effect will be further examined.

The Network Reserve will continue as a transitional tool.The network reserve contains power plants that can be used by transmission system operators to maintain (n-1) network security whenever the remaining redispatching potentials have been exhausted.In other words, the network reserve is designed for those particularly critical situations in which the redispatching potential from power plants in the German electricity market, power plants from German-Austrian cooperation and also power plants from cross-border redispatching with other neighbouring countries are not sufficient to safely manage the transport task in the transmission system.The network reserve only includes power plants which have left the market as a result of a commercial decision, but whose closure has been prohibited by the transmission system operators.This is based on the fact that the transmission system operators have identified these power plants as systemically important and BNetzA has confirmed this.This is done on the basis of an annual needs assessment by the transmission system operators and a power plant specific system relevance assessment.Network reserve power plants have a neutral effect on the wholesale price of electricity because you are not allowed to participate in the electricity market.Return to the electricity market after closure of the grid reserve is also prohibited unless the power plants have been temporarily shut down.Operators shall be reimbursed for standby in the network reserve.The network reserve currently contains power plants with an installed capacity of 5,6 GW.Current forecasts show that the need for the Network Reserve will continue to exist in the coming years.

In the latest report on the identification of network reserve needs for the winter of 2021/2022 and the year 2023/2024, the TSOs18 conclude that the network reserve needs fall to 4,9 GW in winter 2021/22 (previous year:5,8 GW].For this purpose, power stations in the grid reserve with an installed capacity of 5,7 GW must be available.In winter 2023/24, the grid reserve requirement is 3,9 GW, which is covered by power stations of 4,2 GW.In addition, TSOs calculate that the maximum redispatching demand (from market and reserve power plants) will decrease from 14,8 GW (2021/22) to 11 to 12 GW (2023/24).The volume of redispatching decreases from 11,6 TWh to 5 to 8 TWh in the same period.The need could be significantly reduced if, on the one hand, German network expansion progressed and, on the other hand, potential abroad could be securely accessed in the relevant situations.The full implementation of cross-border redispatching will take several years to complete.In the meantime, the Network Reserve will continue as a transitional tool.

18BGriA report on the assessment of network reserve needs for winter 2021/2022 and the year 2023/2024:
Https://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Energie/Unternehmen institutions/security of supply/reports case analyses/finding reserve power plant needs 2021.p DF? blob = publicationFile & v = 3

IV. Action plan for Germany

Topic	Action	Explanation	Justification	Timetable
Wholesale market	Extension of the international trade	Gradual extension of cross-border market coupling to at least 70 % of Transmission capacity of the Interconnectors along a linear Paths by 31 at the latest.December 2025.	More competition through bigger Market area, cheaper Power supply and better Market integration of renewables Energy;Compliance with the requirements of Article 16 (8) in conjunction with Article 15 the Electricity Market Regulation (EU 2019-	Until 31.12.2025
Balancing market	Implementation of the European Target Model when procuring balancing energy in accordance with the Guideline on balancing in electricity supply system (Guideline for Electricity Balancing — GLEB)	National balancing energy markets, through European platforms for the exchange of balancing energy (PICASSO for secondary balancing power (aFRR), MARI for the per-minute reserve (mFRR)), will become a European balancing energy market merged.The product lifespan reduced to 15 minutes.	More efficient competition through bigger competition Market area and more market opportunities for flexible and environmentally friendly producers.Cheaper procurement and use of balancing energy.	February 2022

	Increase in the Competition on the Balancing markets	The current competition problems in the German balancing energy markets are analysed in terms of their reasons and proposed solutions.	Low liquidity prevents cost-efficient procurement of balancing energy and creates unnecessary economic risks for balance responsible parties.	Until February 2022
Demand side response	Implementation of the requirements of the Directive (EU) 2019/944 with a view to on energy storage	Exemption of energy reservoirs from existing double loads.	Transposition of Article 15 of the Directive (EU) 2019/944	Draft law amending the EnWG 10 February 2021 from Federal Cabinet agreedThe The legislative-procedure is: approaching Close.
	Transposition of the requirements of Directive (EU) 2019/944 by adapting § 41d EnWG with regard to flexible end consumers and provision of services	Each end consumer should, by means of a consumption adjustment, provide a service to third parties (e.g.: Aggregators) where, by paying an appropriate fee, it provides wholesalers and suppliers and the balance responsible party of the consumer collection point:	By including flexibility from: Customer facilities will be a 'level-playing' field' for the participation of all flexible Consumers in electricity markets created.Flexible consumers is it free to decide whether or not they: Take over marketing on a self-employed	Draft law amending the EnWG 10 February 2021 from Federal Cabinet agreedThe

	outside existing Delivery or Purchase contracts	that is how it would be in the absence of the consumption adjustment.	or want to use an aggregator to do so.	The legislative-procedure is: approaching Close.
	Smart Meter Rollout	On 24 February 2020, the establishment of the technical possibility provided for in Paragraph 30 of the MsbG, known as: Market investigation, by the Federal Office for Information Technology Security (BSI), the ubiquitous and mandatory step-by-step roll-out of smart metering systems for end users with average annual consumption between 6.000 and 100.000 kWh compulsory.	Smart meters are a technical Pre-condition for incentives for the situation Demand response.They can be used to: End consumers manage their electricity consumption or feed their electricity better and comfortably and benefit from new tariffs. Smart meters also make it possible to: better use of the electricity grid.	As of 24.02.2020. Basic Responsible Monitoring station betrei ber, must: 10 % within three years; eight years after the Market intelligence 100 % in the equip flush-mounted devices with smart metering systems.
Retail	Reduction of the EEG- from the budget of the Federal Budget	From parts of the revenue of the Fuel Emission Trading Act; and additional budget appropriations have been introduced in the second Supplementary Budget 2020	On reducing competitive disadvantages of electro-based Climate change technologies including heat; and the transport sector:	Surcharge reduction done at 1.1.2021, next

		Budget earmarked for the EEG — Surcharge in 2021 to 6.5 ct/kWh or in 2022 to 6.0 ct/kWh.	At the same time as the Fuel Emissions Trading Act was introduced, the Federal Government decided to reduce the EEG-surcharge from federal budget resources.The consequent reduction of the specific electricity costs will also support flexibility applications in the retail sector.	Reduction step as of 1.1.2022.
	Implementation of the requirements of the Directive (EU) 2019/944 as regards dynamic contracts Electricity tariffs	Legal anchorage of the entitlement from final customers with a smart Measurement system on offer of a dynamic electricity tariff contract.	Transposition of Article 11 of the Directive (EU) 2019/944	Draft law amending the EnWG 10 February Adopted by the Federal Cabinet in 2021.The legislative-procedure is: approaching Close.

Interconnectors and congestion management	Introduction of redispatching 2.0	Extension of cost-based redispatching to all controllable generation and storage facilities and all installations with installed capacity of 100 kW or more.Integration of the previous feed-in management (§ 14 EEG) and the call for CHP plants into the redispatching procedure for conventional producers (§ § 13 and 13a EnWG as amended) while maintaining the feed-in preference.Optimisation of redispatching calls across all network levels.	Redispatching 2.0 allows regulation relevant to the network Generation and storage facilities; and EE and CHP plants in a planned Process with balance sheet and energetic compensation.Moreover allows for a cross-network optimised selection decision according to the effectiveness of installations for the purpose of: Congestion relief and costs that: this is done at the expense of electricity customers. The introduction of redispatching in 2.0 will be accompanied by upcoming amendments to the ARegV (introduction of an incentive instrument to reduce congestion management costs of transmission system operators and reorganisation of the management costs of distribution system operators).	for 1 October 2021
	Network development measures	Extension of the list of projects in the Federal Needs Plan Act (BBPlG) and various adjustments to the Energy Industry Act (EnWG);	Adaptation of national network development needs, including interconnector deployment needs, to the current 2030 target of 65 %	Since March 2021

		Grid Acceleration Act on Transmission System (NABEG) in order to promote the swift implementation of planning and authorisation procedures for network development projects.	Renewable energy and the better functioning of the European internal market for electricity.	
	Implementation of Measures taken by the Bidding zone action plan	Securing the linear path 70 % minRAM adopted in the Action Plan Measures (increase electricity transmission capacity, allow for more cross-border trade and regional Strengthen cooperation).	Gradual reduction of domestic structural grid bottlenecks to strengthen German and intra-European electricity trade	By end 2025

V. Reply to the European Commission's questionnaire

ANNEX:QUESTIONNAIRE ON POSSIBLE REGULATORY DISTORTIONS AND MARKET FAILURES

Section 1 — General Wholesale market conditions

1. With regard to day-ahead and intraday electricity prices, are there any formal or informal price limits other than those applied within European single day-ahead and intraday charging as set out in Article 41 (1) and 54 (1) of Regulation 2015/1222 (CACM)?

No, there are no rules or requirements on the German wholesale electricity market that prevent free pricing.This is also the case for BNetzA, together with the Bundeskartellamt, in a guidance document for the monitoring of abuse under antitrust and wholesale energy law in the field of electricity generation/wholesale trade. (https://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Energie/Unterne Hmen Institutions/Trade and Distribution/Market Monitoring REMIT/Guide to Abuse Cht.pdf? blob = publicationFile & v = 2) of 27.09.2019.It is explicitly mentioned here that price peaks reflecting a fair and competitive interplay between supply and demand as a result of free pricing are part of normal market developments in the short term wholesale of electricity (see paragraph 79 of the Guidelines).However, artificially excessive prices, which are not the result of free pricing and the actual competitive situation, but have been caused by market manipulation, are prohibited under Regulation (EU) No 1227/2011 (REMIT).

2. Are there any formal or informal rules or requirements that limit generators' ability to freely price their offers in Wholesale markets?

No, there are no rules or requirements on the German wholesale electricity market that would restrict electricity producers with regard to the price levy.The BNetzA and Bundeskartellamt guidelines referred to in question 1 explicitly state that neither REMIT nor the German market rules or regulatory requirements lay down specific requirements regarding bidding in auctions or continuous trading.Nor is there an obligation to sell in a particular market segment (see paragraph 82 of the Guidelines).

3. Are there any rules or provisions which require the TSO to release generation reserves to the market when market prices are about certain threats?

There are no such rules in Germany.The Capacity Reserve may only be used when there is no market evacuation on the power exchange.The use of the network reserve is also subject to the principle that all market measures must have been taken before the reserve can be used.

4. Are there any capacity mechanisms (i.e. in the form of reserves)?If yes, please elaborate on how they work?

The German Capacity Reserve started operating on 1 October 2020 with an initial size of around 1 Gigawatt (GW).It is strictly separate from the electricity market and provides a safety net for unpredictable or rare and exceptional extreme events.It is therefore used only where, despite free pricing on the power exchange, there is insufficient supply to balance supply with demand.To this end, generation capacity in addition to existing generation installations outside the electricity market will be retained and used when needed.Thus, unlike a 'capacity market', such a reserve includes only power plants which do not participate in the electricity market.This ensures that competition and price formation in the electricity market are not affected.

In detail, under Section 13e of the Energy Industry Act (EnWG) and the Capacity Reserve Regulation,

transmission system operators are obliged to maintain reserve capacity in order to compensate for current account deficits in the German network in the event of a threat or disruption to the security or reliability of the electricity supply system.The capacity reserve assets feed only at the request of transmission system operators, provided that there was no market clearance on the day-ahead and intra-day trading, i.e. no balancing of supply and demand on the electricity markets.The Capacity Reserve shall be used secondary to measures pursuant to Section 13 (1).This means that all network and market related measures must be exhausted before the Capacity Reserve can be called.This does not affect free price formation in electricity markets, balancing markets, as well as OTC transactions.

The capacity reserve is always established through a competitive tendering procedure, which determines the annual remuneration for the maintenance of the installations.Operators of installations bound in the Capacity Reserve may not sell all or part of their performance or work on the electricity markets (marketing ban).In addition, these facilities will have to be permanently decommissioned as soon as they are no longer tied in the capacity reserve (prohibition of return to the electricity market).The European Commission has approved the Capacity Reserve under State aid rules by decision of 7.2.2018 (SA.45852) for three consecutive delivery periods until 30 September 2025.

Section 2 — Balancing markets

5. What incentives do balancing responsible parties have to reduce their balances (or help the overall system to be in balance)?

The BNetzA decisions (BK6-12-024 of 25.10.2012 BK6-19-217 of 11.12.2019, BK6-19-552 of 11.05.2020 and BK6-20-345 of 11.05.2021) lay down the basis for the calculation of the German standard balancing energy price (reBAP).The imbalance price is always at least as expensive as the intraday price index.This ensures that balance responsible parties have an economic incentive to manage imbalances you are aware of, even through electricity trading transactions on the intraday market, and not to run into balancing energy with an unbalanced balance sheet, i.e. to use balancing energy.In 2020, this incentive component of the imbalance price was adjusted.Since then, the Intraday:
Price index “ID-AEP”.The ID-AEP shall be calculated by the TSOs for each quarter hour and shall be equal to the volume weighted average price of the last electricity trading transactions with a total trading volume of 500 MW in continuous intraday trading before the close of trading.In addition, an increase or reduction of 25 % or at least EUR 10/MWh is applied to the ID-AEP in order to exclude arbitrage against the imbalance price in the vast majority of cases.In addition, a scarcity component will be added to the ID-AEP as soon as the balance of the German Network Regulation Network (NRV) reaches 80 % of the installed balancing capacity.The rule on the scarcity component was revised in May 2021 so that the surcharge no longer takes the form of a predefined amount, as its predictability has proved to be problematic.The surcharge is now determined by means of a specific exponential function, i.e. the higher the balance of the network over the 80 %, the more the amount of the scarcity component increases.In this function, in addition to the balancing capacity maintained, the contracted interruptible loads and the contracted capacity reserve are also taken into account.The purpose of this revised scarcity component is to further strengthen the incentive for the BKV to manage its balance bands in a balanced way, even in times of high intraday prices.

6. Are all market participants exposed to the TSO’s imbalance settlement rules?Are the terms/rules of the imbalance settlement the same for all balance responsible parties?

Each balance responsible party with an imbalance contract with the TSOs shall be subject to the same imbalance settlement rules.In exceptional cases, TSOs shall take over the marketing of RES feed-in of installations in the feed-in tariff — in such cases, the TSO shall assume the role of balance responsible party and shall also be subject to the same imbalance settlement rules.

7. How are the costs for Procuring balancing services translated in imbalance settlement prices?

The costs of activated balancing energy (costs of secondary and per-minute reserve work and any additional measures taken by TSOs) shall be settled in accordance with the polluter pays principle.Those responsible for balancing imbalances in the system must pay the imbalance price to the TSOs.Balance responsible parties who have settled imbalances in the grid shall receive compensation in the form of the imbalance price from the TSO (symmetrical imbalance price).Balancing costs shall be charged to the network use charges and shall not be included in the imbalance price.

8. Are the full costs of balancing actions attributed to the balance responsible parties at the imbalance settlement price?

With the exception of balancing costs, which are charged through network use charges, all system balance balancing costs shall be charged to the balance responsible parties via the imbalance price.

9. Has the Member State considered an administrative scarcity pricing mechanism as referred to in Article 44 (3) of EBGL?

No, Germany is not considering such a mechanism.
Irrespective of this, in Germany there is an additional incentive component (stock exchange price coupling) for the imbalance price and a scarcity component based on:

ACER Decision 18/2020 on the harmonisation of the main characteristics of imbalance settlement, according to which TSOs may propose additional components for the calculation of the imbalance price.See also answer to question 5.

10. How is the imbalance settlement price calculated for a balancing period in which the TSO has to disconnect one or more consumers involved?

Specific rules for balancing energy for settlement periods during which market activities have been suspended have been developed by the TSOs in accordance with Article 39 (1) of Regulation (EU) 2017/2196 (E & R Regulation) and approved by BNetzA under Decision BK6-18-289 of 04.08.2020.The provisions on billing stipulate, inter alia, that all inputs which, in the event of a suspension of market activities, are supplied by the system operators at the request of the TSOs are to be regarded as balancing energy within the meaning of Section 8 (2) of the StromNZV.It also regulates, inter alia, the rights to remuneration of the affected operators instructed by the TSOs and the obligation of system operators to balance and allocate the relevant quantities of energy to balance groups.BNetzA's decision also includes the conditions and procedures for the suspension and resumption of market activities and related communication procedures for the stakeholders concerned.

11. What is the estimated value of lost load in the Member State?Please provide a copy of any study providing a basis for this estimate.

The latest available Values of Lost Load (VoLL) for Germany are as follows:

a. Calculation under the quality element — VoLL for 2019 (BNetzA):EUR 12.380/MWh
b. ACER study 201819, Values for Germany:EUR 12.410/MWh for household customers, 330-EUR

19Study on the Estimation of the Value of Lost Load of Electricity Supply in Europe, CEPA commissioned by ACER, Final Report, 6 July 2018:
https://www.acer.europa.eu/en/Electricity/Infrastructure and network% 20development/Infrastructure/Documents/CEPA% 20study% 20on% 20the% 20value% 20of% 20Lost% 20Load% 20in% 20the% 20electr
iCity% 20supply.pdf

8.550/MWh for industrial customers (lowest value metal, highest value services)

VoLL will also be identified with Luxembourg in the course of 2021 in order to establish the reliability standard in accordance with Article 25 of Regulation (EC) No 2019/943 on the internal electricity market.

12. Are balancing reserves procured through a competitive process?Does the TSO procure (a portion of) its balancing reserves close to real time (day-ahead)?

Yes, there are balancing markets in Germany for the FCR, secondary balancing capacity (aFRR) and per-minute reserve capacity (mFRR), in which TSOs can tender their balancing requirements and all pre-qualified balancing service providers with their bids can participate in these tenders.Tenders shall end one day before the delivery date, i.e. D-1.Since November 2020, the balancing energy market in Germany also offers an additional possibility for balancing service providers not included in the balancing power tender to bid for balancing energy.
(secondary and per-minute reserve work).In the balancing energy market, six product discs are put out to tender for four hours a day.The market closes one hour before the start of the product disc.

13. Can demand side participants provide balancing services?

If a supplier has successfully passed the pre-qualification of a balancing product on the demand side, it may participate in balancing markets.

14. Are there any formal or informal rules or requirements that limit generators' ability to make their offers in balancing markets?

There is currently a technical bidding cap of EUR 9.999,99/MWh for balancing energy.In addition, there are no further restrictions.

Section 3 — Demand side response

15. Are all types of demand-side response eligible to participate in the Wholesale electricity markets (including day-ahead and intraday) as well as the balancing/ancillary services markets?

Yes, provided that demand side response providers meet the requirements of the relevant market (e.g. TSOs' prequalification requirements for participation in balancing markets), they can participate in the markets.

16. Can demand side response participants in markets via individual players and via aggregators?

The rules governing the participation of demand side response in different existing markets do not distinguish between direct participation or participation through aggregators.Participation is therefore possible directly and by aggregators if the DSR provider fulfils the prequalification conditions of the relevant market or of the market participants concerned.With the transposition of the Electricity Internal Market Directive (BMRL) into German law, the possibilities for aggregators are broadened.

17. Are there any exemptions from network or energy-related costs as well as as surcharges (RES, CHP, capacity mechanisms, etc.) for specific classes of consumers which do so require response?

Consumers may be subject to differentiated obligations to pay system costs through surcharges or charges

when purchasing electricity.This usually does not create specific barriers to activity in the electricity market.A special case is commercial and industrial consumers:they may agree reduced network charges in the event of network behaviour.The relevant network behaviour may lead these consumers to focus their consumption primarily on maintaining the reduction of network charges by means of network-friendly behaviour.

The reduced network charges are governed by Section 19 (2) (1) and (2) of the Electricity Network Charges Regulation (StromNEV).In order to receive an individual network charge pursuant to § 19 (2) sentence 1 of the StromNEV, the final consumer's maximum load contribution must, in a foreseeable way, deviate significantly from the simultaneous maximum annual load of all withdrawals from this network or conversion level.In order to receive an individual network charge pursuant to Section 19 (2) sentence 2 of the StromNEV, the final consumer's electricity consumption from the network of general supply for his own consumption at a point of consumption per calendar year must reach both the number of hours of use of at least 7000 hours per year and the electricity consumption at that point of supply exceeds 10 GWh per calendar year.

18. What percentage of customers is provided with smart meters (please specify it separately for the following groups of customers:(a) households, (b) business customers, (c) industrial users)

In Germany, the roll-out of smart metering systems (smart meters) and modern measuring equipment is regulated by the MsbG.Under Paragraph 29 of the MsbG, consumers must be equipped with an intelligent metering system from an average consumption of 6.000 kWh/a, renewable energy and CHP installations from 7 kWpeak, as soon as this is technically possible under Paragraph 30 of the MsbG and is economically justifiable under Paragraph 31 of the MsbG.
On 24 February 2020, the determination of the technical possibility under Paragraph 30 of the MsbG, known as the market declaration by the Bundesamt für Sicherheit in der Informationstechnik (Federal Office for Information Security, 'BSI'), made it compulsory for end-consumers with an average annual consumption of between 6.000 and 100.000 kWh to roll-out of smart metering systems.In this group, approximately 2,1 million metering sites are affected, representing around 5 % of all consumption points.

Base competent metering point operators, usually distribution system operators, shall equip 10 % of the approved assemblies with smart metering systems within three years and 100 % within eight years of the market declaration.The installation of smart metering systems was in principle already possible with the certification of a first smart metre gateway by the BSI on 12.Launched in December 2018.

Before the market investigation, smart metering systems were only installed on a small scale, with the result that in the monitoring report for the 2019 reporting year only around 1.000 smart metering systems across Germany were recorded by BNetzA.As a result, the percentage is well below 20 % in all of the aforesaid devices (households, business customers, industrial users).
Other installation groups, such as renewable producers or flexible consumers, are also subject to legal installation obligations.However, the release of these assemblies by means of a market investigation has not yet taken place.

A. 90 % + b. 70-90 %
c. 40-70 % d.20-40 %
E. **Less than 20 %**

19. Are all the smart meters capable of metering and transmitting at least hourly metering values and do data management systems available to settle customers on the basis of at least local spot market prices, for the purpose of dynamic pricing?

The scope of application of smart metering systems is not limited to metering and transmission for billing purposes, but has been designed as a central component of the smart energy system and is intended to

serve as a platform for a variety of services and added value in the areas of smart metering/sub-metering, smart grid, smart mobility, smart home/smart building and smart services.In a step-by-step approach, all energy-related use cases will be eliminated throughout the next few years.

The currently certified appliances allow, inter alia, the recording of actual energy consumption and time, consumption visualisation, innovative tariffs, the provision of meter readings at 15 minutes resolution and cross-section measurement for gas, water and heat consumption.Other use cases, such as the current retrieval of the current actual injection of generating installations, the collection and transmission of network condition data and the control of connected installations, are implemented by means of a software update without equipment exchange after successful certification.

Tariffs with dynamic prices reflecting, for example, the price on the day-ahead market are currently available from only two suppliers.Both the ongoing roll-out of smart metering systems and the further promotion of dynamic contracts through, for example, European requirements, will strengthen this market segment in the future.The current state of play of the rollout does not yet suggest any prediction on the development of dynamic tariffs.

20. Do customers in the retail market have access to a dynamic price contract linked to Wholesale spot market prices?

Paragraph 40 (5) of the EnWG provides that, where technically and economically feasible, suppliers must offer final consumers of electricity a tariff which provides an incentive to save energy or control energy consumption.Such tariffs are, in particular, load variable or daily rates.Directive (EU) 2019/944, which is to be transposed, provides in Article 11 for the right of final customers who have a smart meter installed to conclude a dynamic electricity tariff contract.Under Article 2 (15), a 'dynamic electricity tariff contract' means an electricity supply contract between a supplier and a final customer that reflects price fluctuations in spot markets, including day-ahead and intraday markets, at intervals at least equal to the settlement intervals of the relevant market.

Section 4 — Retail Markets:Regulated prices

Does the Member State have a system of regulated electricity prices for final customers?(if yes, see questions 21-29)

No, there is no electricity price regulation in Germany (the answers to questions 21 to 29 are missing).In the late 1990s, energy supply in Germany was liberalised.
Since then, competition in electricity markets has continuously picked up.Today, there is usually a competitive environment at the various stages of the market for energy production, trade and distribution.Consumers can choose from a wide range of offers from different energy suppliers.A total of at least 1.430 companies were active as electricity suppliers in Germany in 2019.The retail switching option allows final customers to reduce their electricity costs and stimulates competition in the retail market.In the context of energy monitoring, the Bundeskartellamt (Federal Cartel Office), together with BNetzA, monitors developments in the electricity markets.Pursuant to Section 48 (3) of the GWB, the monitoring tasks of the Bundeskartellamt include, in particular, the degree of transparency, including wholesale prices, and the degree and effectiveness of market opening and competition at wholesaleand retail level, as well as on energy exchanges.The results of the monitoring shall be published annually by BNetzA and the Bundeskartellamt in a report.

Section 5- Interconnection

30. Has the Member State developed interconnection with the view to reaching at least its interconnection targets as referred in point (d) of Article 4 of Regulation (EU) 2018/1999?

By 2030, the number of cross-border lines in each Member State should be sufficient to meet the criteria set out in the Regulation.In particular, the differences in wholesale prices between Member States must not be too high and the transmission capacity of interconnectors must not be lower than a certain proportion of the peak load and installed renewable generation capacity.Germany already operates interconnectors with all neighbouring countries and will significantly increase its interconnector capacity.Germany will meet the European 2030 target for interconnection if the interconnectors provided for in the Energy Network Development Act and the Federal Demand Plan Act are in operation as planned.Germany will increase its cross-border transport capacity by more than 50 % by 2030 compared to 2019.

31. Please describe the amount of interconnection capabilities available for trading from and to the Member State and their current enforcement

Germany has adopted an action plan, thus implementing the requirements of the Clean Energy for All Europeans package along a linear upward path.Thus, by the end of 2025, at least 70 % of interconnectors will be gradually opened to trade ('linear trajectory' in accordance with Article 15 of Regulation (EU) 2019/943).At the borders with flow-based calculation of trading capacity (Flow based market coupling), corresponding MinRAM values for interconnectors and internal lines shall be used for this purpose.The path from 2020 to the end of 2025 is based on the linear path mentioned above.The Core Region start values for 2020 have been calculated at 11.5 %, but at the same time the CWE region continues to apply the 20 % minRAM target since the start of the linear path.The starting values for the Hansa Region in 2020 were as follows:DE-DK1 24 % (TenneT Commitment still applies) and DE-SE4 41 %.DE-DK2 has already met the requirements before the CEP requirements and therefore this limit is not covered by the Action Plan.The Kriegers Flak Combined Grid Solution link between DE-DK2 is subject to a Commission derogation for the 70 % value.For DE-NO2, a minimum capacity of 12 % will be applied from 2021 onwards.The monitoring of the capacity provided by the TSOs is carried out by BNetzA on an annual basis (in 2021, the first report covering the calendar year 2020 will be produced).

32. Are there regular administrative import and/or export restrictions on interconnectors limiting trade with neighbouring countries?If yes, please explain what is the impact of such restrictions on the market.

No, Germany does not apply import/export restrictions.

33. Are there any internal network congestions?What is the annual cost of re-dispatching/countertrading in the Member State?Are there plated or continuing network reinforcement measures?

As a basis for the action plan pursuant to Article 15 of Regulation (EU) 2019/943, the TSOs submitted a congestion report on 4 July 2019. (https://www.bundesnetzagentur.de/DE/Beschlusskammern/BK04/BK4 91 Further/bottleneck Richt/190704 4 UENB congestion report final BA.pdf? blob = publicationFile & v = 3), approved and published by BNetzA on 28 November 2019.The congestion report shows that the immediate application of the 70 % CEP requirement would have led to structural bottlenecks in accordance with Article 14 (7) of Regulation (EU) 2019/943 on the German network.BNetzA's current quarterly report 'Network and system security — 2020 as a whole' can be found here:https://www.bundesnetzagentur.de/SharedDocs/Mediathek/Berichte/2020/Quartalszahlen GesamtYear 2020. pdf:isessionid=5FE42B3984577A926D626C2935260C9A? blob = publicationFile & v = 3

The following table in the current quarterly report lists the flows related to:
Redispatching measures on the most affected network elements for the year 2020.The numbering of the network elements presented in the table is not to be understood as a ranking, as due to the measures not presented, the ex ante measures of the four German TSOs would lead to a shift in volumes.Rather, the numbering serves to identify network elements in the map which assigns the critical network elements (number of hours per line at least 50) to their geographical location.

Electricity related redispatching measures * on the most affected network elements in 2020

1	Dollern-Sottrum	TenneT	1264	751	746
2	Altheim (Altheim-Sittling, Altheim-Simbach-Sankt Peter (AT))	TenneT	955	420	419
3	Land mountains (Landesbergen-Kaufold — Sottrum)	TenneT	322	163	162
4	Instructor — Multium circuit	TenneT	303	32	31
5	Mecclear — Dipperz	TenneT	246	94	92
6	Daxlanden area (Daxlanden	TransnetBW/Amprion	215	52	53

MaximiliansauGoldgrund, Daxlanden-Weingarten)

7	Dipperz — Großkrotzenburg	TenneT	204	71	71
8	Ovenststädt-Bechterdissen (Ovenststädt-Eickum Keepers)	TenneT	166	44	44
9	Dörpen (Dörpen — Norgen-Meppen — Hemp barrels)	TenneT/amprion	131	35	34
10	KONTEK (DK — Island) Southand)	50Hertz	129	8	8
11	Management of Neuenhagen —	50Hertz	124	34	34
12	Borken — Waldeck — Twistetal circuit	TenneT	116	56	56
13	Bergshausen — Borken electrical circuit	TenneT	109	31	31
14	Pleinting electrical circuit — Sankt Peter/APG	TenneT	97	43	43
15	Stromkreis Landesbergen — Ovenststädt	TenneT	78	43	42
16	B ürstadt- Lambsheim	Amprion	76	20	20
17	Sottrum — Huntorf — Conneforde	TenneT	73	23	21
18	Krümmel pipeline — Hamburg	50Hertz/TenneT	58	23	23
19	Audorf — Flensburg	TenneT	57	17	17

* The allocation to individual network elements is done only for individual congestion measures and not for measures requested by the 4 TSOs optimisation.

Source:Monitoring Energy
Federal Network Agency

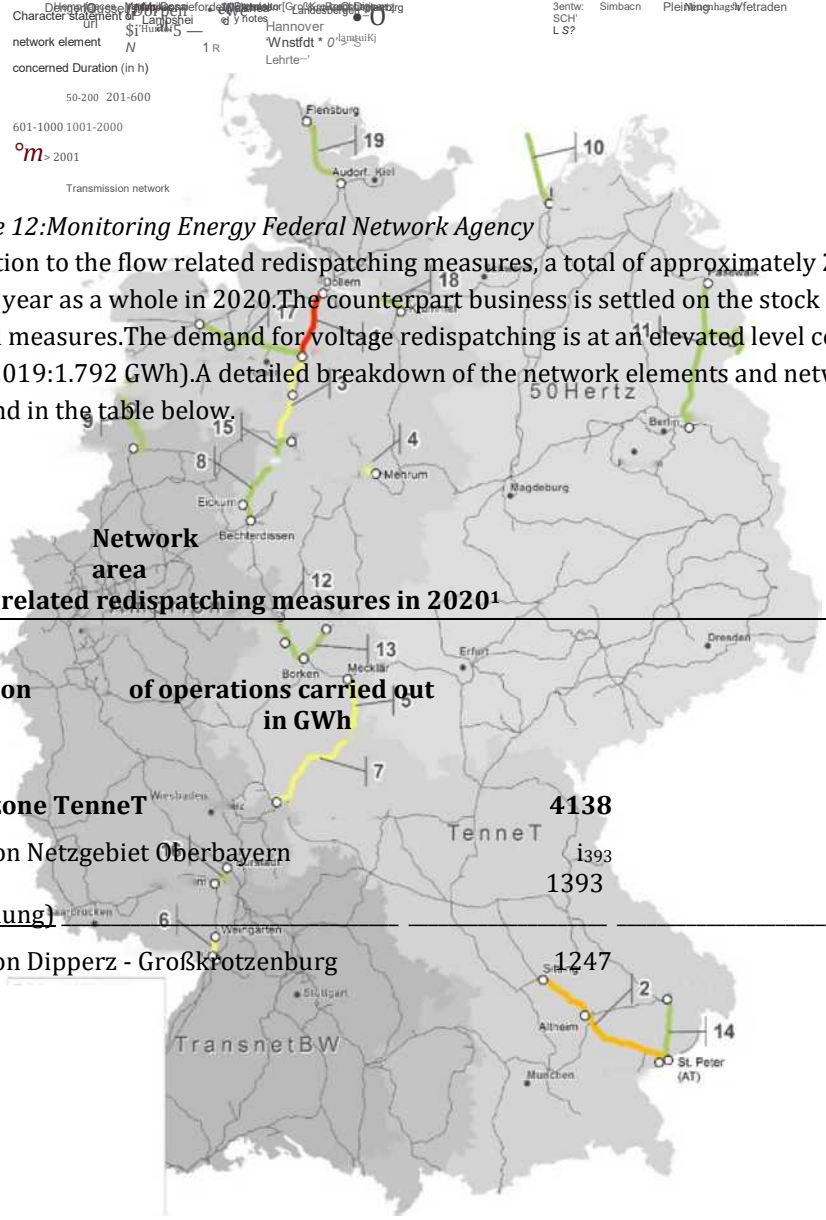


Figure 12:Monitoring Energy Federal Network Agency

Inaddition to the flow related redispatching measures, a total of approximately 2.925 GWh was reported for the year as a whole in 2020.The counterpart business is settled on the stock exchange for stress related measures.The demand for voltage redispatching is at an elevated level compared to the previous year (2019:1.792 GWh).A detailed breakdown of the network elements and network areas concerned can be found in the table below.

Stress related redispatching measures in 2020[1]

Network area	Duration hours	of operations carried out in GWh	
Regelzone TenneT		**4138**	**1.529**
davon Netzgebiet Oberbayern (Spannung)		1393	454
davon Dipperz - Großkrotzenburg		1247	552

Of which Conneforde — Borken/Giessen Of which Chronofstädt — Borken (voltage) | [illegible] | [illegible]

Of which Lehrte-Helmstedt Network Area — Crumble (voltage) | 07 | 690

of which Multiple Grohnde Borken | |

Of which Göttingen-Hardegsen — Erzhausen Teacher | 01 | 132

TransnetBW	**1253 control area**	
Of which network area Altbach Daxlanden	942	
Of which Neckar Intermediator, Obere Rhine rail	310	
Control area 50Hertz	**782**	
Control area Amprion	**313**	
Of which without indicating a network	area 233	104
Of which Mittelbexbach	80	28

[1] Since voltage redispatching measures relate to geographically larger network regions (and not to individual lines or substations), an overview map is not required for presentational purposes.
Source:Monitoring Energy
Federal Network Agency

The following table summarises the costs of the main actions between 2017 and 2020.These are in part provisional cost estimates and compensation claims subject to continuous updates.

Electricity:Network and system security measures

		2017	**2018**	**2019**	**2020**
Redispatching					
Cost estimate [1] Redispatching	in EUR million	392	388	227	221
Cost estimation of countertrading	in EUR million	29	37	64	134
Network reserve power plants					
Cost Estimate Request	in EUR million	184	137	82	88
Annual cost of reserves [2]	in EUR million	296	279	197	195
EinsMan					
Estimate of indemnities	in EUR million	610	635	710	761

[1] TSOs’ cost estimate based on IST measures including costs for Rem.Actions.

[2] plus other non-on-demand costs Source:Monitoring by BNetzA 2020

The network development plan shall identify measures to optimise, reinforce and develop the transmission system necessary to ensure secure and reliable system operation.This will be done taking into account future electricity generation and its spatial distribution, as well as future energy needs.The current network development plan is available at:https://data.netzausbau.de/2030-2019/NEP/NEP2019-2030 Bestaetigung.pdf