Center for Strategy and Scenario Planning

# FUTURE SCENARIOS
## for the German Energy Market

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# 1 Foreword

*"Trying to predict the future is like trying to drive down a country road at night with no lights while looking out the back window." Peter Drucker*

Rarely has the outlook for the German energy market been so bleak and dominated by so much uncertainty as today. What are the economic and political effects of the Ukraine war? How can energy providers deal with the challenges of environmental protection and sustainability? Can they emerge stronger from the crisis? In this study, we try to provide answers to these questions and offer “food for thought” not only for managers of energy providers.

Today’s business environments are becoming more and more complex, volatile, and uncertain. Changes arrive faster than ever and many developments are impossible to forecast. Particularly, linear projections from the past are not helpful. Nevertheless, managers need to take decisions and commit resources. This is only possible if uncertainty is accepted and made an integral part of strategic decisions. Conventional strategic planning tools tend to be inadequate under these conditions because they do not sufficiently take uncertainty into account. Scenario planning differs fundamentally from conventional strategy tools in this respect, as it attempts to capture a broad range of alternative developments, thus encouraging strategic decision makers to consider influence factors they might otherwise ignore.

Our scenario study on the German energy market supports managers in this endeavor. We have developed four scenarios for the industry in 2035 based on several key uncertainties and important industry trends. We hope that these scenarios will inspire you and help you manage the opportunities and threats in this dynamic industry.

We wish you an insightful journey through the current situation and the potential futures of the German energy market.

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## 2 Executive Summary

The situation on the German energy market continues to come to a head. It seems that winter is approaching – meteorologically and economically: Energy prices are rising to unimagined heights, the state is bailing out companies like Uniper, and consumers find themselves confronted with strongly rising prices for natural gas (Bundesregierung, 2022b). Consequently, managers in almost every company as well as private households have pressing questions: To what extent will prices increase? Which measures should we take to reduce energy consumption? How will the energy crisis develop in the future? What are reasonable measures to reduce the exposure? Even though the government has already introduced various countermeasures, Klaus Müller, President of the Bundesnetzagentur, stated at the beginning of July 2022: “Natural gas consumers must be prepared for a tripling of the prices - at the minimum” (Niesmann, 2022, p.1). While the direction of price developments seems clear, its extent tends to be greatly unknown.

Depending on their contractual conditions, market dynamics affect stakeholders differently. While private households still have at least some leeway to react, e.g., by adjusting their consumption behavior, companies are generally bound to inflexible processes and thus vulnerable to unfavorable developments. According to the latest DIHK (2021) business survey, two-thirds of companies’ rate energy and commodity price increases as a significant business risk (Grömling & Bardt, 2022). In the 2022 BDI survey, 88% of SMEs rate energy costs as at least a substantial challenge. As both surveys were conducted before the war in Ukraine, the assessment would certainly be even worse today.

Unlike private households and business customers, energy companies can actively shape the energy market, at least in the long term. Investments for a substantial expansion of renewable energies, an accelerated grid expansion, and a flexibilization in electricity consumption are estimated to amount to EUR 155 bn (BCG, 2021). While these long-term investments with a planning horizon of at least 30 years appear necessary to achieve the goals of the Paris Climate Agreement (PCA), they carry significant risks for energy providers (E.ON, 2022a; E.ON, 2022b; RWE, 2022a; RWE, 2022b). Specifically, these companies need to find answers to the following critical questions: Does natural gas still have a future as a bridging technology? How strong

is the long-term political will to pursue the energy transition? Will consumer behavior undergo further changes? How will energy-intensive companies position themselves?

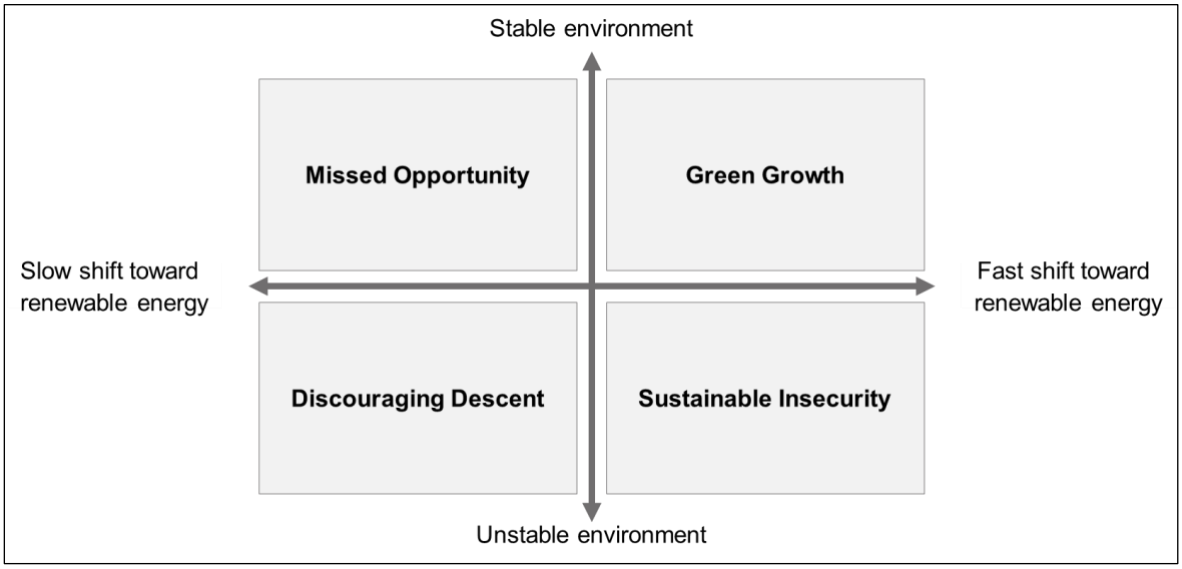
To address these challenges and help managers in the energy industry plan for the future, we created this study using our innovative approach to scenario-based strategic planning, jointly developed by HHL and the strategy consultancy Roland Berger. Our scenarios are based on extensive research and industry-wide surveys considering various stakeholder groups. This has helped us gain a holistic picture of the relevant trends and influence factors in the industry and ensures the quality of the scenarios.

The four scenarios we have created evolve around two critical uncertainties identified in our survey of industry experts. These two critical uncertainties, that form our scenario dimensions, are:

- **Stability of the environment**
- **Shift toward renewable energy**[1]

Based on these critical uncertainties as well as additional trends and influence factors, four plausible scenarios emerge on how the German energy market could fare until 2035. These four scenarios are the following:

**Figure 1: Scenario Matrix for the German Energy Market**




[1] Renewable energies are defined as energy sources that obtain their energy from ongoing flows of energy in the natural environment. While there are also other forms, the three sources mainly used are solar, wind, and biomass (Twidell & Weir, 2021).

**Green Age of Growth** describes a future in which Germany has succeeded in achieving a rapid transition to renewable energies. Benefitting from a stable market environment characterized by political and macroeconomic stability, Germany was able to use its innovative strength to become an emission-neutral country. Climate protection enjoys uppermost priority, and most of the population is actively committed to significantly reducing its carbon footprint. Extensive regulatory reforms promote the expansion of renewable energies and restrict the use of fossil fuels. The German economy is largely based on climate-neutral businesses. Germany is a role model for a successful transformation toward a green economy and is strongly positioned in global markets. Due to new technologies and a modern infrastructure, energy prices have fallen significantly compared to the early 2020s.

**Sustainable Insecurity** describes a future in which Germany faces many political and economic uncertainties. Numerous global military conflicts require Germany's attention and large investments in its security. This situation is aggravated by increasing political disputes in the EU and the NATO, that lead to a lack of unity and constructive cooperation. Unstable market environments cause increased financial risks. Simultaneously, the perceived consequences of climate change strengthen the desire among the German population for climate protection and influence Germany's political course. Reforms promoting the expansion of renewable energies and extensive subsidy programs create incentives for energy transformation despite a high national debt level. Increasing $CO_2$ prices force all industry sectors to try and benefit from the cost advantages of renewable energies. An intense focus on solar and wind energy combined with an expanded storage infrastructure enables Germany to become increasingly independent of other countries in terms of energy supply. However, the successful energy transition comes at a cost – industrialization and prosperity are significantly reduced and the society remains polarized.

**Missed Opportunity** describes a scenario of geopolitical stability. The economy shows strong growth and low inflation. Low interest rates significantly reduce financial risks. After numerous crises, society is thankful for the presently stable situation and does not support further hardships that might come with a transformation of the energy sector. This is reflected in weak societal support for the Green party. Electricity demand has grown slowly – at only 2% per year. This perpetuates dependence on natural gas and oil, while renewables cover a stagnating share of the electricity demand. As a

result, Germany cannot meet the PCA targets. Even though rising $CO_2$ prices are causing energy prices to increase significantly, the economy is just beginning to make the transition to climate neutrality. Ambitious climate protection is not possible due to a lack of knowledge and infrastructure. As Germany fails to invest in innovative energy solutions, players from other countries establish new business models and scale them in the harmonized European market. The dependency on foreign companies further complicates the transformation in the German energy market.

**Discouraging Descent** describes a scenario characterized by substantial political and economic uncertainties. Armed conflicts do not only continue in Eastern Europe, but also in other parts of the world. The German society is divided regarding the goal of climate protection resulting in the inability to make decisions. The German government has repeatedly set up financial support programs for households as well as the corporate sector to ease the effects of the energy crisis. High inflation increases Germany's level of debt in an environment of rising interest rates. As a result, the government lacks the financial means to foster the energy transition. Companies and households do not have the financial resources either to make such investments. Thus, renewable energy generation stagnates. Many companies have gone bankrupt during the ongoing crises and particularly the energy-intensive industries have relocated their operations to Asia and the Americas. As a result, Germany's weight in the political world order is diminishing and its prosperity is declining.

Each of these scenarios describes a realistic picture of the future of the German energy market in the year 2035. They are, however, not intended to predict the future. Rather, they are meant to stimulate reflection on potential developments and important drivers of these developments. This reflection might broaden the field of vision of industry leaders and help them prepare for the opportunities and challenges ahead.

# 3 German Energy Market

## Structure of the German Energy Market

The largest energy suppliers in the German electricity market are RWE, E.ON, EnBW, Vattenfall, and LEAG (Bundesnetzagentur, 2022a). With 175 bn kilowatt hours, these five market players accounted for 65.1% of Germany's electricity generation in 2020. However, their dominance decreases. While the first four players were responsible for over 80% of electricity generation in 2009, they experienced a constant decline in market share (Monopolkommission, 2021). Many smaller electricity producers using renewable energies are pushing into the market (Bundesnetzagentur, 2022a).

The electricity producers supply their energy for a specific price determined by the energy market into the transmission grid (Bundesregierung, 2014). Both, transmission system operators – Amprion, TransnetBW, Tennet TSO, and 50Hertz Transmission – and local institutions receive a fixed fee defined by the Bundesnetzagentur (Bundesnetzagentur, 2022a). The final contract between the distributor and the end customer includes all fees and results in the final electricity price (Bundesnetzagentur, 2022c).

In contrast to electricity, natural gas and oil are storable fossil energy sources (DIN et al., 2021). Due to low national supplies, Germany depends on imports for both energy sources. As a result of regulatory reforms in 2009, trading, infrastructure, storage, and state-regulated networks need to operate independently, but not separately (Monopolkommission, 2009): Natural gas traders purchase the required volumes from abroad. Infrastructure providers use pipeline networks to transport the resources to storage reservoirs. These storage capabilities serve as national reserves and help regulate the supply side of local networks. Increasing alignment of prices throughout the year increases the attractiveness of short-term procurement for natural gas traders to eliminate storage fees and reduce working capital (BDEW, 2022a).

Because of its energy-intensive economy, Germany was the sixth largest global primary energy consumer with an estimated consumption of 12.64 exajoules in 2021 (BP, 2022). The German energy mix consists primarily of mineral oil with a share of 31.8% and natural gas with a share of 26.7%. Hard coal and lignite follow with approximately 9% each, and nuclear power with only 6.2% (AGEB, 2021). Although renewable energy accounts for 47.1% of the German electricity mix, it only makes up 16.1% of the total energy mix (Statistisches Bundesamt, 2022a). According to the

Federal Ministry for Environment, Nature Conservation, Building and Nuclear Safety, Germany imports 95% of natural gas and 100% of mineral oil (BMU, 2022a). Responsible for 55% of the natural gas imports in 2021, Russia was the largest supplier (Bundesregierung, 2022b; Handelsblatt, 2022; DIN, 2021). Even though lignite and renewable energies have a positive export balance, a total import quota of 70% was necessary to secure Germany's energy consumption in 2021 (BMU, 2022a; AGEB, 2022a).

The Renewable Energy Law (EEG) gives priority to solar and wind energy in the electricity grid (BDEW, 2016). Due to the fluctuating electricity production of renewable energy sources, power plants are throttled at supply peaks and run at full capacity during demand peaks to cover the residual load. In recent years, efficiency increases in renewable energy generation caused prices for energy generated from these resources to fall below those from fossil energy resources. While high fixed costs make traditional power plants increasingly unprofitable, they are still necessary to ensure grid stability (McKinsey, 2022b). The German Nuclear power plant phase-out may even aggravate potential fixed cost-supply stability disbalances and calls for more flexibility, combined with intelligent grid usage, consumption, and energy storage (EY, 2020).

### Price Competitiveness

Germany's residential and business customers paid the highest electricity prices in Europe in 2021, averaging at 31.9 cents per kilowatt hour and at 18.3 cents per kilowatt hour, respectively (Eurostat, 2022). At the same time, natural gas prices in Germany are on comparable levels with those in the EU member states but exceed those in other industrialized countries. However, the significant price increase in recent times – even before the war in Ukraine – means a competitive disadvantage for the energy-intensive chemical, steel and glass industries in Germany, which are highly dependent on natural gas in their production processes (DIHK, 2021).

Comparatively high levies and taxes drive the high prices for German end consumers. These include value-added tax, electricity tax, and various levies and surcharges, which account for over 50% of the electricity costs. Since network costs account for another 20%, generation and distribution only make up a minor part of the overall electricity prices that customers have to pay (BDEW, 2022c). Comparable price

structures also prevail for natural gas, although the share of generation costs is significantly higher (BDEW, 2022b).

Unlike business customers, who offer products on global markets, thus at global prices, electricity producers compete mainly with European or domestic players (AGEBb, 2022). The harmonized EU electricity grid enables the import and export of electricity, resulting in the trade of overcapacities within this network (Löschel et al., 2020). German companies achieved a net export surplus in electricity production for years. Facilitated by a few government interventions, German electricity producers appear competitive with other European players, generating margins above the EU market average (AGEB, 2022a; E.ON, 2022a; RWE 2022a, Vattenfall, 2022).

### Technological Trends and Growth Drivers

Diverse technological trends are increasing the pressure on traditional energy providers (McKinsey, 2022b). As many industries strive to reduce their carbon footprint, decarbonization is the primary change driver for electricity producers. At the same time, electricity consumption is projected to double by 2050 (EY, 2020). Today, solar and wind power plants possess significant cost advantages which serve as an incentive for utilities to invest in renewable energy technologies (McKinsey, 2022a). Even fully depreciated conventional power plants cannot compete with power generation based on renewable energy sources in a full cost calculation anymore (BMF, 2022; EY, 2020). The ongoing cost degression of energy generation from renewables and increasing regulation that explicitly internalizes negative externalities through, e.g., $CO_2$ pricing mechanisms will accelerate this trend (Fraunhofer, 2021). The tripling of wholesale electricity prices between 2020 and 2021 creates further financial incentives for energy providers to invest in renewable electricity generation (Bundesnetzagentur, 2022a; Deloitte, 2018). At the same time, EY (2020) sees strong potential in decentralized electricity production. Due to the significantly lower investment costs of wind and solar power plants, municipal utilities can become electricity producers and secure necessary know-how through cooperations (EY, 2020).

Grid operators face stricter regulatory requirements and have to accelerate grid expansion to secure supply (Deloitte, 2018; Bundesnetzagentur, 2012). Here, fixed returns in a highly regulated market might offer a valuable business opportunity (EY,

2020). Therefore, the federal government intends to triple the grid expansion rate (Bundesregierung, 2022a).

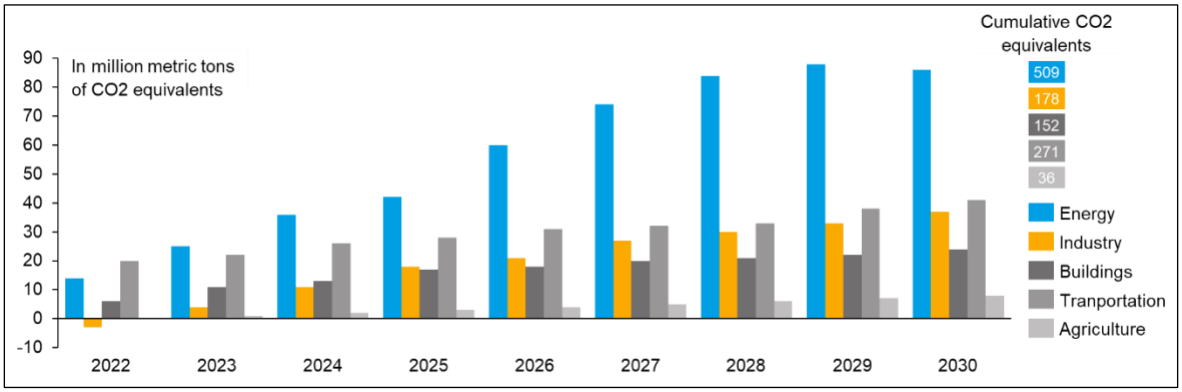
Digitalization might serve as a further key driver for sector-specific innovation. For instance, the introduction of smart meters might create a basis for new business models (Deloitte, 2018; Sensfuss et al., 2021). This development is the prerequisite for the decentralization of the electricity market, as it enables the connection of decentralized solutions to the power grid (EY, 2020). The use of blockchain technology is also conceivable in the context of energy supply democratization (Andoni et al., 2019).

### Sustainability Development

By signing the Paris Climate Agreement (PCA) in 2015, many countries committed themselves to the 1.5-degree target and defined action plans at the national levels to achieve $CO_2$ neutrality by 2050 (Bundesregierung, 2019; EU, 2016). However, forecasts already indicate that this target is exceptionally ambitious at the current stage of development (McKinsey, 2022b).

Germany, the world's fourth largest economy, is responsible for about 2% of global $CO_2$ emissions, while its population share is only 1%. Based on its national Climate Protection Plan for 2050, the federal government derived sector-specific climate targets for 2030 to reduce emissions to 55% of the 1990-level (EU, 2022; BMU, 2016). As the energy sector had accounted for almost 39% of total greenhouse gas emissions in 1990 (Bundesregierung, 2019), the German federal government has decided on regulatory measures, that are specific to this sector, such as the phase out of coal-based electricity generation by 2038 (Hausding, 2020). However, the measures that have been taken so far are regarded as insufficient. Thus, the energy sector is likely to face further regulatory actions (BMU, 2022b).

**Figure 2: Projected Exceedance of Annual Climate Targets per Sector**




Source: BMWK (2022a).

The corporate sector has also acknowledged the necessity to significantly reduce emissions and anticipate regulatory actions. A prominent example is the automotive industry's massive transformation from combustion to electric engines (McKinsey, 2021). International competition and regulation in other countries, such as China, even accelerated this development (GIGA, 2019). For instance, Volkswagen's new strategy, *NEW AUTO - Mobility for Generations to Come,* focuses on electrification of all vehicles by 2040 to contribute to reaching the PCA targets (VW, 2022). Even though the energy sector is less exposed to global competition, the German energy industry increasingly invests in renewable energy production. RWE, for example, plans to invest EUR 50 billion in this subsector by 2030 in Germany alone (RWE, 2021). However, even this might not be enough to restructure the energy system and foster innovation (McKinsey, 2022b).

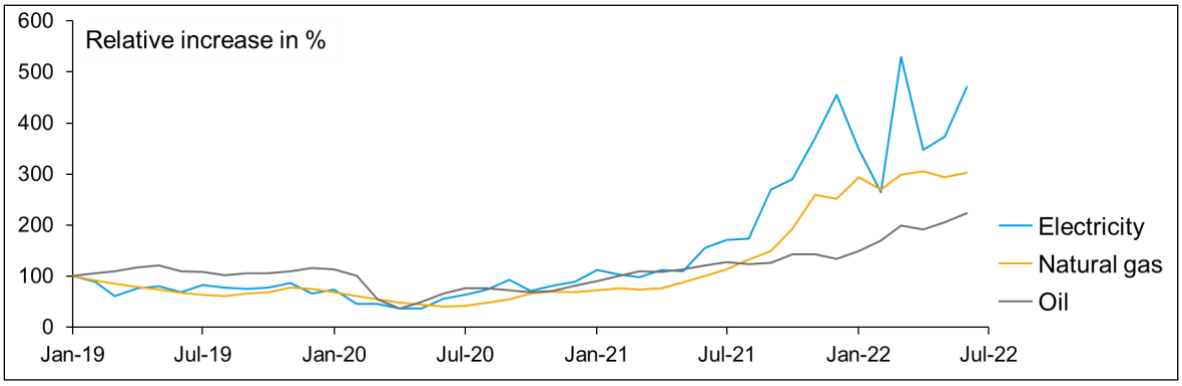
## Developments since the War in Ukraine

Russia's invasion of Ukraine on February 24, 2022, entails enormous consequences for the German energy market (Bundesnetzagentur, 2022c; Bundesregierung, 2022; EWI, 2022). The EU and the United States have responded with sanctions against Russia to weaken the Russian economy (European Council, 2022; White House, 2022). This included sanctions on natural resources such as oil and coal. The German energy market is particularly affected by these sanctions, as 55% of natural gas and 35% of oil had been sourced in Russia via pipelines such as Nordstream 1 (Pfister, 2022; Handelsblatt, 2022). This dependency has been built up over the last decades in order to benefit from cheap supplies and to bring the Russian Federation closer to the “European House”. From 1973 to 2020, the Russian company Gazprom increased

its exports to European Non-CIS states from 6.8 bn cubic meters to 174.9 bn cubic meters annually, representing a compound annual growth rate of 6,9 % (Statista, 2021). Due to favorable import prices, German companies such as BASF had a competitive advantage secured by long-term contracts for high-quality energy sources from Russia (Müller, 2022).

After the Russian aggression, this dependency is proving deceptive (Graw et al., 2022). Russia is increasingly using the supply of energy resources, specifically natural gas, as a weapon. Since the beginning of September 2022, gas supplies to Germany have been completely interrupted, causing an increase in uncertainty (DER SPIEGEL, 2022). At the same time, prices for natural gas, oil, and electricity are skyrocketing (Figure 3)

**Figure 3: Energy Price Development since 2015**




Source: Statistisches Bundesamt (2022b).

Compared to 2015, the price of electricity has risen by almost 500%, and prices for natural gas and oil have at least doubled (Statistisches Bundesamt, 2022b). The high electricity prices are a result of the merit-order-principle of the European electricity market which means that the electricity price is determined on the most expensive power plant contributing to the grid (Zeit, 2022). Due to the high prices for natural gas, these most expensive power plants are currently the gas power plants, which consequently drive-up electricity prices. These price increases threaten companies in almost all industries, but particularly in energy-intensive sectors.

To mitigate the substantial price increases and its effects, national governments in Europe as well as the EU commission have undertaken significant regulatory interventions in the energy market, such as the reduction of the value-added tax on gas in Germany (Bundesregierung, 2022b). Additionally, the German Ministry of Economics examines alternative sources of fossil fuels (BMWK, 2022b;

Bundesregierung, 2022c). However, Germany lacks the necessary infrastructure for alternative sources, such as liquid natural gas (LNG) (BMWK, 2022a; Nationale Plattform Zukunft der Mobilität, 2022). Therefore, energy generation based on lignite and hard coal has been increased in order to lower the share of natural gas in the electricity generation. This situation is further aggravated by the failure of French nuclear power plants (Gouvernement, 2022). As about half of these nuclear power plants are currently under maintenance, Germany has to export electricity to France.

However, increasing the consumption of emission-rich energy sources mined in Germany is not a permanent solution for the ambitious climate protection goals. Therefore, the German government is planning measures to reduce dependencies in the residential sector, such as the energy-efficient renovation of houses or the installation of up to 6 million heat pumps (BMWSB, 2022, BWP, 2021). In addition to these regulatory measures, several other actions, such as the decreased room temperature in public buildings to 19 degrees, aim to reduce energy consumption in the short term (Bundesregierung, 2022d).

### Market Outlook

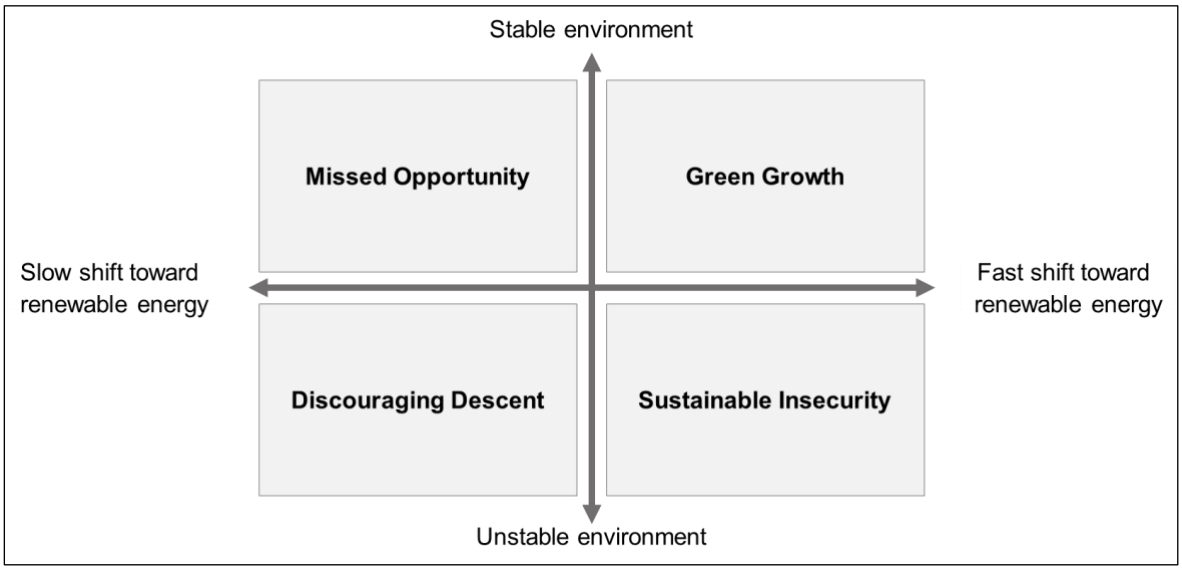
Several studies predict that the acceleration of the climate change further accelerates the transformation of the energy sector in Germany and Europe (McKinsey, 2022b). Due to significantly decreasing costs for renewable energies, global oil consumption is believed to decrease after 2025. In contrast, demand for natural gas is still likely to increase for another 10 to 15 years resulting in a transformation of the energy sector that is not ambitious enough to keep global warming below 1.5 degrees by 2100 (McKinsey, 2022b).

The extent to which the current war in Ukraine will influence the transition in the energy sector is uncertain (Bundesnetzagentur, 2022c). As Europe might face a shortage of natural gas in the winter of 2022/23, an increased use of emission-rich fossil energy sources such as hard coal and lignite appears necessary in the short term. The closure of nuclear power plants by the end of 2022, the slow expansion of renewable energies, and the supply shortages in gas and oil create massive uncertainty in the market, indicated, e.g., by the skyrocketing one-year futures for electricity (AGEB, 2022b; EEX, 2022).

# 4 Scenarios

Based on the market situation and the various trends in the German energy market described above, we have developed four scenarios that present different possible pictures for the future of German energy market in 2035. These scenarios are determined primarily by the two critical uncertainties, that form the dimensions of our scenario matrix – *the stability of the environment* and *the speed of the shift toward renewable energy*. We have named the resulting scenarios "Green Growth", "Sustainable Insecurity", "Missed Opportunity", and "Discouraging Descent" (see Figure 4). They are described in the following, first briefly and then in more detail.

**Figure 4: Scenario Matrix for the German Energy Market**




## Overview

**Green Age of Growth** describes a future in which Germany has succeeded in achieving a rapid transition to renewable energies. Benefitting from a stable market environment characterized by political and macroeconomic stability, Germany was able to use its innovative strength to become an emission-neutral country. Climate protection enjoys uppermost priority, and most of the population is actively committed to significantly reducing its carbon footprint. Extensive regulatory reforms promote the expansion of renewable energies and restrict the use of fossil fuels. The German economy is largely based on climate-neutral businesses. Germany is a role model for a successful transformation toward a green economy and is strongly positioned in global markets. Due to new technologies and a modern infrastructure, energy prices have fallen significantly compared to the early 2020s.

**Sustainable Insecurity** describes a future in which Germany faces many political and economic uncertainties. Numerous global military conflicts require Germany's attention and large investments in its security. This situation is aggravated by increasing political disputes in the EU and the NATO, that lead to a lack of unity and constructive cooperation. Unstable market environments cause increased financial risks. Simultaneously, the perceived consequences of climate change strengthen the desire among the German population for climate protection and influence Germany's political course. Reforms promoting the expansion of renewable energies and extensive subsidy programs create incentives for energy transformation despite a high national debt level. Increasing $CO_2$ prices force all industry sectors to try and benefit from the cost advantages of renewable energies. An intense focus on solar and wind energy combined with an expanded storage infrastructure enables Germany to become increasingly independent of other countries in terms of energy supply. However, the successful energy transition comes at a cost – industrialization and prosperity are significantly reduced and the society remains polarized.

**Missed Opportunity** describes a scenario of geopolitical stability. The economy shows strong growth and low inflation. Low interest rates significantly reduce financial risks. After numerous crises, society is thankful for the presently stable situation and does not support further hardships that might come with a transformation of the energy sector. This is reflected in weak societal support for the Green party. Electricity demand has grown slowly – at only 2% per year. This perpetuates dependence on natural gas and oil, while renewables cover a stagnating share of the electricity demand. As a result, Germany cannot meet the PCA targets. Even though rising $CO_2$ prices are causing energy prices to increase significantly, the economy is just beginning to make the transition to climate neutrality. Ambitious climate protection is not possible due to a lack of knowledge and infrastructure. As Germany fails to invest in innovative energy solutions, players from other countries establish new business models and scale them in the harmonized European market. The dependency on foreign companies further complicates the transformation in the German energy market.

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has repeatedly set up financial support programs for households as well as the corporate sector to ease the effects of the energy crisis. High inflation increases Germany's level of debt in an environment of rising interest rates. As a result, the government lacks the financial means to foster the energy transition. Companies and households do not have the financial resources either to make such investments. Thus, renewable energy generation stagnates. Many companies have gone bankrupt during the ongoing crises and particularly the energy-intensive industries have relocated their operations to Asia and the Americas. As a result, Germany's weight in the political world order is diminishing and its prosperity is declining.

## Scenario 1: Green Growth

### The Germany Energy Market in 2035

September 2, 2035

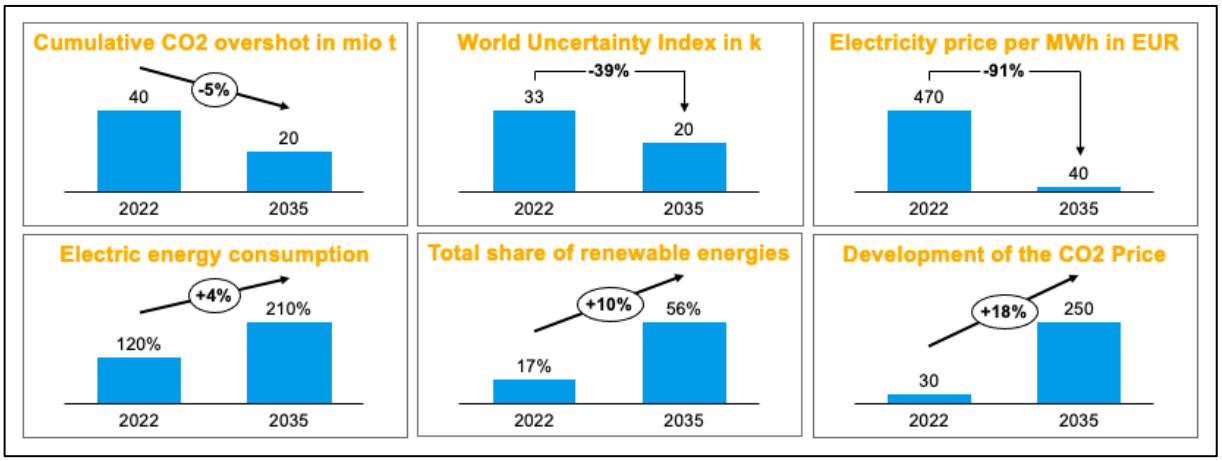
**German energy transition becomes a global hit**

*"As painful as the energy crisis in 2022 was for Germany, it was necessary as an impetus. The government finally initiated reforms whose absence had made it impossible to enter the energy market for years. The stabilizing market environment with long-term investment prospects for renewable energies has enabled us to grow strongly, supported by subsidies and loans. At the same time, many end customers are open to our innovative solutions and contribute to environmental protection by seeking energy from renewable sources. The harmonization of the EU energy market is currently opening up an even larger market for us, in which our know-how and experience give us a significant competitive advantage. Due to the high energy costs, many companies turn to decentralized solutions, resulting in additional business opportunities. We are quite optimistic for the future.",* says the managing director of a SME.

In 2035, the German energy sector has undergone a significant transformation and is now using Germany's innovative strength in its entirety to contribute to emission-neutrality. The sector benefits from a market environment characterized by political and macroeconomic stability. Climate protection enjoys top priority, and the public is actively committed to significantly reducing the country's carbon footprint. Extensive,

new regulations vigorously promote the expansion of renewable energies and restrict the use of fossil fuels. Initial competitive disadvantages caused by high transformation costs have been overcome as rising $CO_2$ prices make the use of fossil fuels comparatively less attractive. With new technologies and a strongly developed infrastructure, energy prices have strongly declined. The German industry has already largely transformed its production plants to climate-neutral operations. The European energy market's cohesion guarantees supply security and offers German SMEs new business opportunities with their knowledge in energy transformation. Germany is a role model for successfully transforming a whole country into a fully green economic nucleus within Europe and is strongly positioned in global markets.

**Figure 5: Simplified Fact Sheet of Scenario 1: Green Growth**




Source CO2 price: BEHG, 2019

## Developments between 2022 and 2035

The German energy sector has benefitted from a rapid easing of the war in Ukraine in the summer of 2024. Likewise, other conflicts such as the one between China and Taiwan have been resolved peacefully. Despite the uncertain political situation in Italy and France, geopolitical developments have strengthened Europe's economic, political, and social unity. Unity and solidarity support productive cooperation and lead to further cohesion on the European energy markets.

Although geopolitical instability and the resulting supply shortages for natural gas have put enormous pressure on the German economy in the winter of 2022/23, political interventions eased its adverse effects. Companies can compensate for supply shortages and the number of insolvencies remains on an acceptable level. The political agreement in Ukraine initiates a decrease of the price for natural gas in spring 2024, reducing the overall price level for energy. After a temporary six-fold increase, one-

year energy futures have fallen to their previous levels, significantly reducing volatility. The reduced inflation rates allow the European Central Bank (ECB) to ease its fiscal policy again. Despite the high debt levels in several eurozone member states, the interest rate of 1.5% reduces the exposure to financial risks. These developments lay the basis for a new era of growth in Europe.

Due to the stabilizing economic situation, the increasingly noticeable consequences of climate change, such as floods and droughts, receive stronger attention again. Extreme weather events, such as the Ahrtal Flood in 2021, and other natural disasters appeared regularly, leading, e.g., to forest dieback in Germany. By 2035, more than 20% of forest areas have burned down, and many smaller rivers and lakes have dried up. These ecological consequences are causing the population to advocate decarbonization with increasing intensity. The federal election in 2025 underscores this endorsement.

Driven by opinion polls, all democratic parties committed to decarbonization and voted for a significant expansion of the EEG law in the summer of 2024. This law significantly simplified bureaucratic efforts and opened new opportunities for infrastructural expansion. Restrictive specifications for the commercial and private sectors combined with expiring subsidies for fossil fuels resulted in two-digit growth rates for renewable energy every year. This development enabled the government to implement the coal phase-out already in 2028. In combination with the increase of the $CO_2$ price to 80 EUR per ton by 2025, the energy and transport sectors partly restricted the use of fossil fuels from 2028, resulting in a ban on combustion vehicles in cities. As a result, the government was able to meet reduction targets for 2030 and double the demand for electricity as a primary energy source by 2035.

The stable regulatory framework served as a driver for innovation. While established companies invested in efficiency, new market players disrupted the industry. Technologies such as smart metering and intelligent grids enabled decentralized energy production. The German government promoted this expansion intensively through high subsidies and infrastructure investments. Substantial progress in the development hydrogen power plants and partnerships in Africa and Canada enabled supply and generation of energy based on hydrogen until 2032.

Such innovations enabled the transformation even in energy-intensive industries, that benefitted from the cost advantages of renewable energies. Many companies met their

energy needs through decentralized power generation on their own premises. The liberalization and decentralization offered new business opportunities for energy producers. Market makers took advantage of the scaling possibilities in the private sector and set new standards for SMEs transforming the energy market all over Europe.

## Scenario 2: Sustainable Insecurity

### The Germany Energy Market in 2035

September 2, 2035

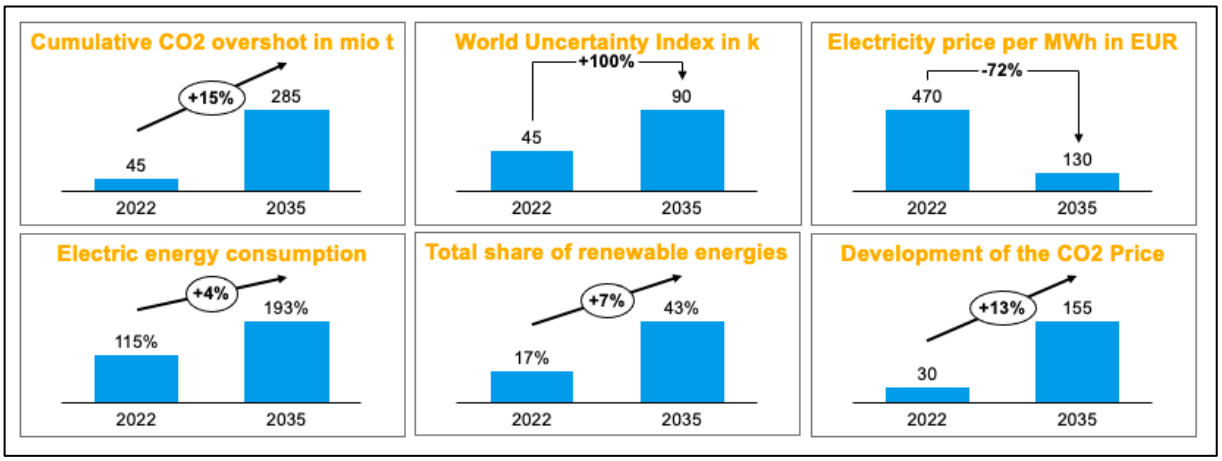
**Germany's isolated path toward climate-neutrality**

"*At the beginning of the energy crisis, we were able to benefit from rising electricity prices. However, today we are facing a much higher cost position. The ongoing energy crisis is putting increasing pressure on us as a producer of energy from fossil fuels. Despite reducing our dependence on Russia, the significant rise in the $CO_2$ price is making our plants increasingly unprofitable. At the same time, the expansion of power generation from renewable energy requires enormous investment. As we were unable to grow in line with market demand for electricity, French nuclear power plants and Polish coal-fired power plants cover parts of Germany's electricity supply. Decentralized solutions are essential to make up for the further increase in electricity consumption. However, we can only provide these solutions to a limited extent due to our high investments in other projects.*", summarizes the CFO of a major energy utility company.

In this scenario Germany faces many political and economic uncertainties in 2035. Numerous military conflicts around the globe require enormous investments in areas such as rearmament and cyber security. This situation is aggravated by increasing political disputes in the EU and the NATO, that lead to unstable majorities and a lack of unity and constructive cooperation. Financial risks are increasing significantly as a result of the unstable market environment. At the same time, the noticeable consequences of climate change are strengthening the desire for climate protection in the German population. Regulations that favor renewable energy generation and extensive subsidy programs create incentives for the energy transformation despite

high debt levels. The energy and transport sectors in particular can drastically reduce emissions to meet Germany's $CO_2$ reduction targets. Rising $CO_2$ prices let many industries benefit from the cost advantages of renewable energies. An intensive focus on solar and wind energy, combined with an expanded storage infrastructure, enables Germany to become increasingly independent of other countries in terms of energy supply. However, an unstable environment and the simultaneous pursuit of the energy transition have led to a significant de-industrialization and loss in prosperity in Germany.

**Figure 6: Simplified Fact Sheet of Scenario 2: Sustainable Insecurity**




Source CO2 price: BEHG, 2019

### Developments between 2022 and 2035

Until 2035, the world faced several geopolitical conflicts. The Ukraine war has spread to other countries, such as Moldova and Georgia. Due to the advancing conflict and the resulting energy crisis, cohesion in the EU has been crumbling. While Germany demanded solidarity from its partners due to its enormous dependence on natural gas, national interests became apparent. The rise of nationalism began with the elections in Italy in 2022. Victories of right-wing parties in national elections in Spain and France have further destabilized the EU. After having finally abandoned its zero-covid-19 strategy, China has taken the military initiative in the Taiwan conflict. The re-election of Donald Trump in the U.S. increased the divide between Europe and North America. This forced European countries, particularly Germany, to invest hundreds of billions into its own military capabilities. By 2035, India has also become a military superpower. Several countries gained influence in Africa through an aggressive military expansion strategy to secure access to natural resources.

Due to the ongoing war in Ukraine, natural gas had become a widely deployed weapon to destabilize Western societies in the early 2020s. Since the German economy had

been highly dependent on supplies of natural gas, its economy particularly suffered from Russia's restrictions. In a difficult market environment, many companies were not able to afford the high energy prices. The cold winter of 2022/23 had even led to the rationing of natural gas. Driven by the energy prices, inflation also remained high until the late 2020s. As the ECB further increased the key interest rate, financing cost increased drastically. This has led to an increasing number of bankruptcies in the corporate sector in the mid-2020s, followed by a severe financial crisis.

Despite the severe economic situation, the majority of the German population remained committed to decarbonization to fight the consequences of the climate change. Regaining independence from fossil fuel imports was an important driver for transforming the energy sector. By rapidly expanding renewable energy generation, the German government hoped to reduce energy costs in the long term. This transformation, however, required behavioral changes and several sacrifices from the German population. By 2025, the gap between rich and poor was widening, causing the middle class to disappear and a further polarization of the society. Nevertheless, political leaders had been able to persuade the majority of Germans of the necessity of sacrifices and prosperity losses. However, Germany remained an island in the EU, and other EU partners were irritated by the actions of the German government.

The energy crisis in the winter of 2022/23 had forced policymakers to support businesses and households. As a result of rising interest rates, the government had stopped subsidies for fossil fuels. Incentives for renewables remained important but require comparatively high personal sacrifices. In order to achieve defined energy targets by 2030, the German government heavily invested in research and infrastructure projects to derive long-term benefits from the investment. Further improvements of the EEG in 2024 liberalized the energy market and reduced bureaucracy. Large companies and citizens with sufficient investment reserves benefitted from the new regulations. Due to the high level of debt, the government was not able to subsidize renewable energies after 2025 anymore. Therefore, politicians used a rapidly rising $CO_2$ price as an instrument to provide economic incentives for renewable energy generation. Restrictions for fossil fuels increased incentives further. Due to the challenging economic situation, however, the ban on the use of fossil fuels was limited to certain sectors only, such as urban transport and new buildings.

The regulatory framework supported research and development activities in renewable energy generation. High profits during the energy crisis allowed large energy producers to invest in new technologies. SMEs relied on government subsidies to drive innovation. Defined standards for smart meters supported the trend toward digitalization, leading to many business opportunities. While governmental investments in infrastructure were insufficient, decentralized solutions enabled SMEs to find a market niche. The application of hydrogen technology was focused on energy-intensive industries due to the still weak private sector infrastructure. This limitation prevented Germany from achieving its 2030 targets. However, achieving emission neutrality by 2050 seems still possible. Germany has successfully managed the energy transition despite the unfavorable geopolitical situation – but at the cost of de-industrialization, reduced prosperity and a polarized society.

### Scenario 3: Missed Opportunity

**The Germany Energy Market in 2035**

September 2, 2035

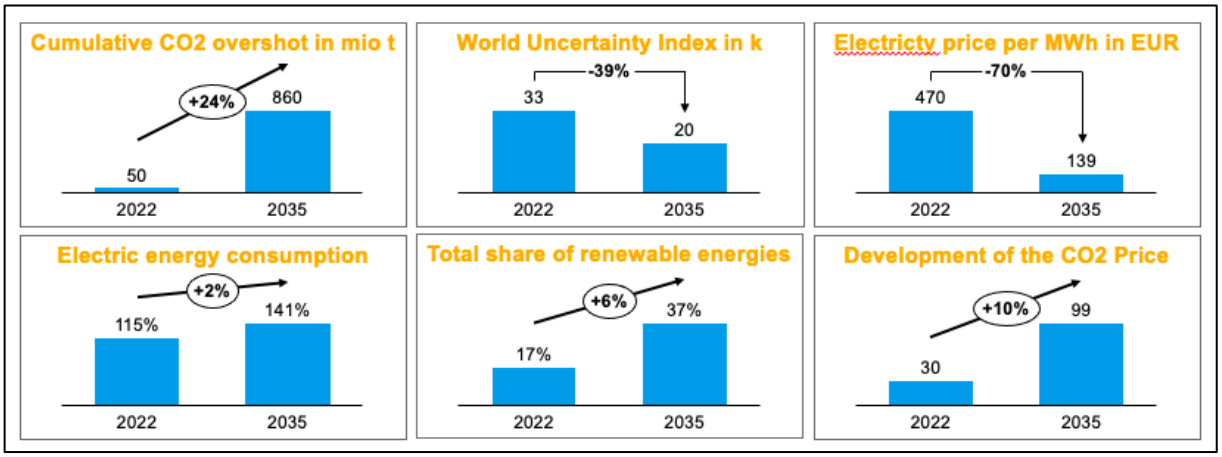
**How human inertia accelerates the climate crisis**

Looking back over the past 13 years, a citizen summarizes the situation in 2035: "*Unfortunately, we did not take advantage of the opportunity that the 2022 energy crisis brought. As a society, it would have been essential to continue to advocate for the transformation of the energy markets despite the ongoing crises. Instead, we put priorities on avoiding losses of prosperity, which resulted in a lack of political pressure for a comprehensive energy transition. As a result, we lost the momentum and are now unable to reach our ambitious transformation goals. While this has helped to secure our prosperity in the short term, the situation is unlikely to last. Ever rising fossil fuel prices are becoming a problem for more and more businesses, and energy-intensive companies are moving abroad. At the same time, we lack companies that turn climate protection into business models; thus, other nations, such as China, have passed by and taken this opportunity."*

In this scenario, Germany faces a stable geopolitical situation. The economy shows strong growth, inflation is low and low interest rates significantly reduce financial risks.

After numerous crises, the Germans are thankful for this new phase of stability and increasing prosperity. The majority rejects additional hardships that might result from a transformation of the energy sector. This attitude is reflected in weak support for parties that advocate sustainability goals. Electricity demand has grown slowly – at 2% per year only. While a large share of the electricity demand is generated by renewable energy sources, natural gas and oil still play an important role – not only as a bridging technology. As a result, Germany cannot meet the PCA targets. Even though rising $CO_2$ prices are causing energy prices to grow significantly, the economy has only just begun the transformation to climate neutrality. Ambitious actions for climate protection are also prevented by a lack of knowledge and infrastructure. As Germany has failed to invest in innovation capabilities in the energy sector, international players have established new business models that they scale in the harmonized European market. Dependence on foreign companies further complicates the transformation of the German energy market.

**Figure 7: Simplified Fact Sheet of Scenario 3: Missed Opportunity**




Source CO2 price: BEHG, 2019

### Developments between 2022 and 2035

The end of the Ukraine war in the summer of 2024 significantly reduced political and economic uncertainty and halted the political shift toward right-wing parties in Europe. Numerous investigations prevented Donald Trump's reelection in 2024, and recurring Covid 19 outbreaks in China destabilized the Chinese government. A strengthened EU was able to forge new partnerships with partners in South America and South East Asia. At the same time, free-trade agreements with Canada (CETA) and the USA (TTIP) were finally signed, which further stabilized the political and economic situation in Europe.

While Germany had gone through a serious recession in 2023, the end of the Ukraine war led to falling energy prices and lower inflation, which allowed the ECB to raise the key interest rate only moderately. After several years of crises, companies had become more risk-averse, which resulted in lower investments and higher financial reserves. The German government returned to a no-debt policy in 2024 to stabilize the financial situation.

The German population was exhausted after the Covid 19 pandemic and the Ukraine war. Although the effects of climate change resulted in hot summers and several natural disasters, the Germans tended to ignore the climate crisis and its effects, but put more emphasis on securing their economic well-being. Falling prices for fossil energy supported the slowing momentum for the transition toward a carbon-neutral society.

Political actors recognized the changing public opinion and refrained from imposing further regulations aimed at transforming the energy sector. In 2024, the German government reversed the heavy regulatory interventions into the energy market that had been taken to prevent an energy crisis in the winter 2022/23. Half-hearted reforms and a paralyzing bureaucracy were slowing down changes in the German energy markets. While some flagship projects created the impression of progress, the lack of structural consensus in Germany’s federal system increased the challenges for energy producers and infrastructure providers. Sharply rising $CO_2$ prices in the early 2030s, which were accompanied by plant relocations and job cuts of German firms, forced policymakers to rethink their position. In the early 2030s the German government introduced new incentives and subsidies for a transition toward renewable energy sources. However, these incentives and subsidies came too late, as many companies had already relocated their operations outside of Germany. To make things worse, in the late 2020s the lack of funding opportunities for basic research in smart grids and hydrogen forced many well-educated engineers to emigrate to the US, China, and the Middle East. Because of the outflow of knowledge, Germany missed the green (energy) technology opportunity and became dependent on technology developed in other countries. Thus, Germany's energy transition relied on energy experts from other countries who tended to focus on their domestic economies first.

Overall, Germany had missed an opportunity. While until about 2028 industrial companies benefitted from falling prices for fossil energy, this comfortable situation

proved fatal in the longer term. A lack of regulatory activities promoting the energy transition combined with the reservation of the private and the corporate sector regarding investments in renewable energy sources and technologies resulted in a situation where Germany was lagging behind the leaders in the energy transition. As a consequence, companies were leaving the country and the Germans faced declines in their prosperity.

### Scenario 4: Discouraging Descent

**The Germany Energy Market in 2035**

September 2, 2035

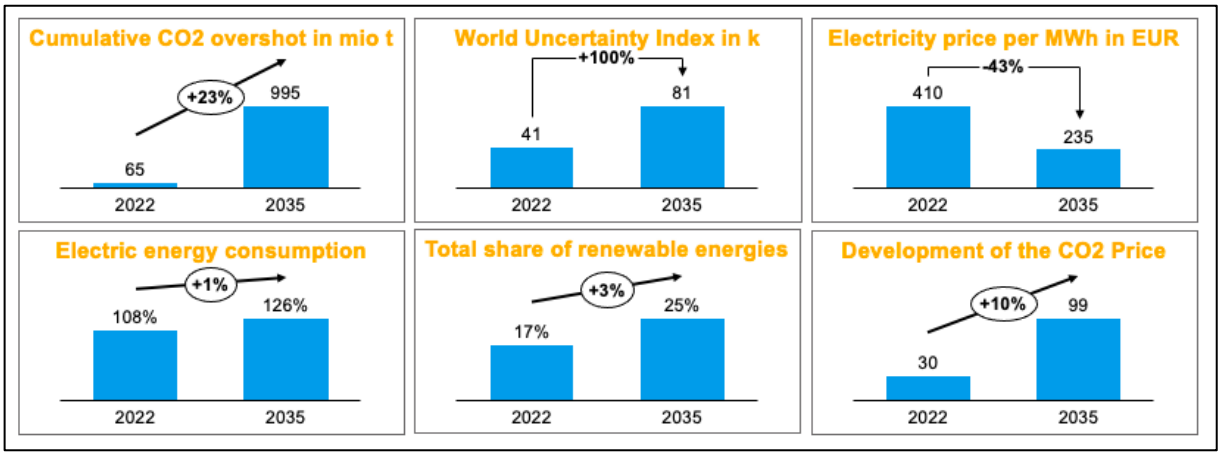
**How Germany lost its competitiveness**

*"If I could go back today to the situation in 2022, I would advocate with all conviction for more support for the expansion of renewable energies. Despite the risk of stagflation, this would have been a tolerable risk compared to heavy energy dependence amid geopolitical and macroeconomic uncertainty. By myopically strengthening the economy and supposedly securing prosperity, we have massively over-indebted ourselves as a state and gambled away Germany's competitive advantage. The necessary transformation has not occurred due to wrong priorities. Politics did not invest in knowledge and the support of innovation and has failed to provide the necessary infrastructure. As a result, Germany has lost its competitive advantage as an industrial nation, and we are already experiencing what actual loss of prosperity means.",* a politician assesses the situation.

Substantial political and economic uncertainties characterize the geopolitical landscape in 2035. Armed conflicts do not only continue in Eastern Europe, but also in other parts of the world. The German society is divided regarding the goal of climate protection resulting in an inability to make decisions. The German government has repeatedly set up financial support programs for households as well as the corporate sector to ease the effects of the enormous prosperity losses during the energy crisis. High inflation increases Germany's debt level in an environment of increasing interest rates. As a result, the government lacks the financial means to foster the energy transition. Companies and households do not have the financial resources either to

make such investments. Thus, renewable energy generation stagnates. Many companies have gone bankrupt during the ongoing crises and particularly the energy-intensive industries have relocated their operations to Asia and the Americas. As a result, Germany's weight in the political world order is diminishing and its prosperity is declining.

**Figure 8: Simplified Fact Sheet of Scenario 4: Discouraging Descent**




Source CO2 price: BEHG, 2019

### Developments between 2022 and 2035

The 2020s and early 2030s were bound to go down in history as a decade of constant crises. The Ukraine war had spread to other countries, particularly Moldova and Georgia. As a consequence of the conflict and the resulting energy crisis, cohesion in the EU had been crumbling. The rise of nationalism began with the elections in Italy in 2022. Victories of right-wing parties in national elections in Spain and France further destabilized the EU. After having finally abandoned its zero-covid-19 strategy, China took the military initiative in the Taiwan conflict. The re-election of Donald Trump in the U.S. increased the gap between Europe and North America. This forced European countries, particularly Germany, to invest hundreds of billions in its own military capabilities. By 2035, India has also become a military superpower. Several countries gained influence in Africa through an aggressive military expansion strategy to secure access to natural resources.

As differences within the EU grew, the transition of the energy markets and investments in green energy technologies were endangered. EU countries did not join forces in the securing supplies of fossil energy resources either. This protectionist behavior became a driver of increasing energy prices which negatively affected Germany's energy-intensive industry. Due to the problematic supplies of natural gas,

many companies had to cut back on production or even close down their operations. By 2024, Germany had seen a high number of insolvencies. Similar developments occurred in other countries of the Eurozone. These developments initiated a financial crisis in 2024 and 2025 that was fueled by high inflation and drastic increases in the key interest rate by the ECB. As a consequence, even the German government had to significantly reduce its subsidies for companies and private households. This situation resulted in enormous losses in prosperity and a further polarization of society.

Given the terrible economic situation, climate protection did not have a very high priority on the agenda of the German population. Only the wealthy still saw the benefits of a transition toward renewable energy generation. The ruling parties were unable find a consensus on energy policy. While the federal government had initiated several energy policy reforms, the focus was on securing the supply of fossil fuels, particularly natural gas. A few flagship projects demonstrated Germany's engagement in the renewable energy sector, but the government – overall – lacked a comprehensive strategy.

The lack of a reliable regulatory framework was an important reason for many companies to stop investing in Germany. Low funding for essential research and the improvement of renewable technologies further reduced Germany's innovation capabilities. Many engineers rather emigrated to countries that provided better working conditions. This outflow of knowledge slowed down the speed of the energy transition; additionally, international cooperation became difficult due to the acceleration of global conflicts. As a result of the difficult geopolitical environment and the lacking efforts to transform the energy sector, Germany lost large parts of its industrial backbone and faced uncertain prospects.

# 5 Implications

The four scenarios are not meant to predict the future development of the German energy market. Instead, they provide alternative pictures of the state of the industry in Germany in 2035. Common to all scenarios is the far-reaching scope of changes to be expected. It is therefore essential for German energy providers to start preparing today. In this chapter we thus highlight a few strategy implications for respective players. Detailed strategy recommendations, however, can always only be derived in the light of the specific situation of each individual company.

At the corporate level, strategy recommendations relate to the future design of the group's portfolio of businesses, products, or services. To develop such a portfolio from the scenarios, managers should start out by asking two questions for each of the four scenarios:

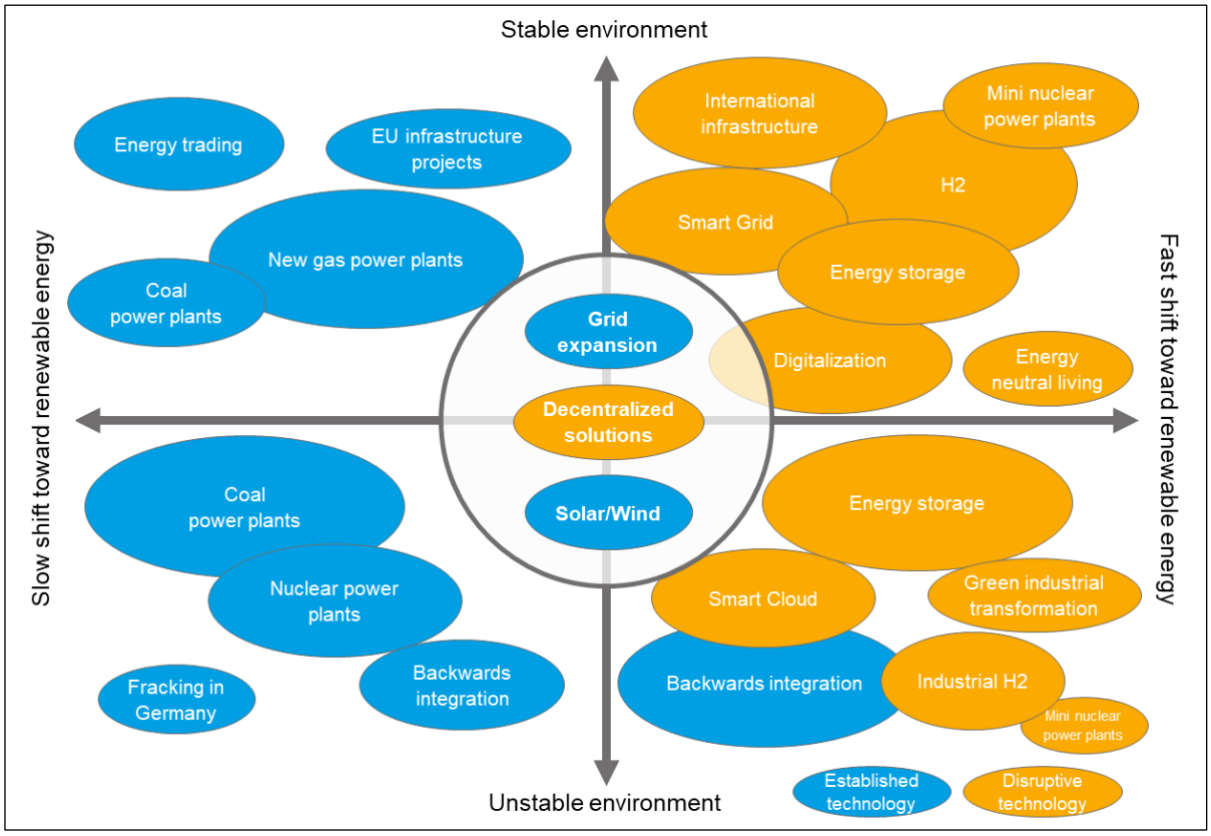
*(1) Which of our current businesses, products or services seem particularly promising under the conditions of this scenario?*

*(2) Which new businesses, products or services are promising under the conditions of this scenario?*

The answers to these two questions yield one ideal portfolio of businesses, products, or services for each of the four scenarios, which together form a scenario-based portfolio matrix. Some businesses, products or services will appear in more than one scenario and deserve particular attention.

The scenario-based portfolio matrix provides an overview of promising businesses, products, or services in each of the four scenarios. As Figure 9 highlights, the four portfolios are different from each other, and the size as well as the specific orientation of the single businesses, products, or services differ in all four cases. Certainly, energy companies are not able (and it does not make sense) to invest in all four portfolios at the same time. Therefore, in a second step managers need to ask themselves which of the four scenarios seems most likely to become reality in order to decide which of the four scenario-based portfolios to commit the majority of the resources to. For this, we use the scenario cockpit as well as scenario-based portfolio management as tools.

**Figure 9: Core Portfolio for the Energy Market in 2035**




The scenario cockpit is a strategic controlling tool that makes the scenario dimensions measurable. For developing the scenario cockpit, managers need to proceed in three steps:

(1) First, they need to define quantitative measures for the two scenario dimensions. The dimension “stability of the environment” can, for example, be measured based on the “World Uncertainty Index” or “inflation in the EU”. For the dimension “speed of the shift toward renewable energy” the “yearly growth rate of renewable energies” might serve as a measure.

(2) Secondly, they need to define “tipping points”, that is: values or value ranges of a measure, that might signal a transition from one scenario to another. An increase of the “inflation in the EU” beyond 8%, for example, might indicate a more unstable environment. Thus, it signals a transition toward the scenarios Sustainable Insecurity", and "Discouraging Descent".

(3) Finally, a traffic light system needs to be applied to the data to clearly indicate for each scenario how likely it is to occur. This helps to determine and constantly monitor the dominant, i.e., the most likely, scenario.

Based on the scenario cockpit, managers can decide, which of these scenario-based portfolios the group should focus on, that is: how resources should be allocated to different businesses, products, or services as part of the scenario-based portfolio management. However, the overview of potential portfolios recommends investments in the following areas (Figure 9):

(1) Grid expansion
(2) Decentralized solutions
(3) Solar/Wind.

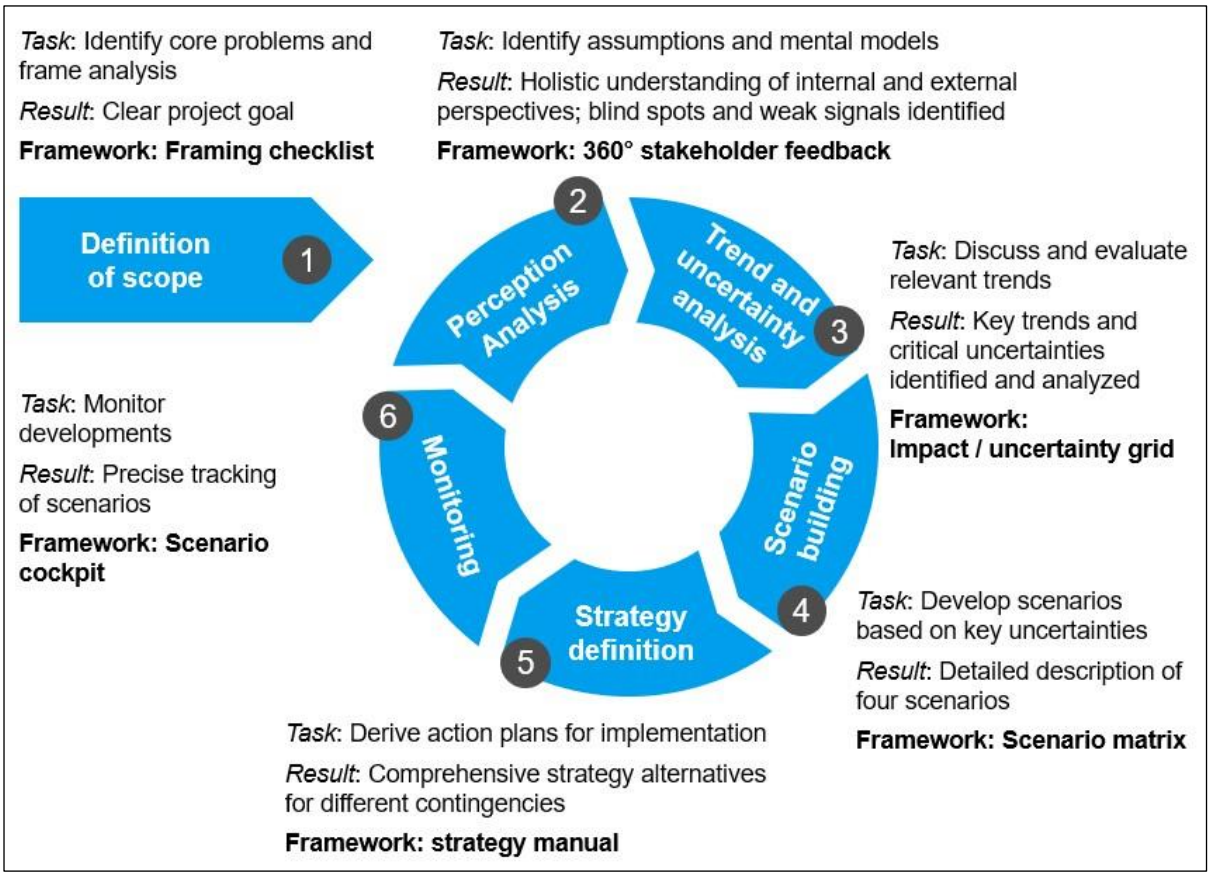
# 6 Methodology

## HHL-Roland Berger Approach to Scenario-Based Strategic Planning

Our scenario study is based upon the approach to scenario-based strategic planning that was jointly developed by HHL and Roland Berger. The approach does not only allow creating scenarios but also enables companies to integrate scenarios into their strategic planning processes.

Our approach consists of six consecutive process steps for each of which we have created a specific tool that eases strategic planning with scenarios in practice. The approach thus enables managers to plan for multiple options. At the same time, it allows managers to integrate and align external and internal perspectives to challenge existing assumptions and mindsets (Schwenker & Wulf, 2013).

**Figure 10: HHL-Roland Berger Scenario-Development Process**




Source: Schwenker & Wulf (2013).

## Description of process steps

### *Definition of Scope*

The first step of the scenario development process is to define the project scope. Experts of our Center for Strategy and Scenario Planning and project partners meet to agree upon the core goal of the project. This includes identifying core problems and framing the analysis. Our Framing Checklist tool makes sure that every important aspect is covered and that all project partners share a common understanding of the steps ahead.

To create the four scenarios for the German energy market we applied the Framing Checklist. We defined the goal of the analysis to be the development of scenarios for the German energy market in 2035. The present study targets the German (energy) market geographically. Due to the complexity and dependency, the analysis will further encompass all frequent energy sources as limiting to a specific energy source results in incomplete scenarios for energy producers using different resources to generate electricity.

### *Perception Analysis*

In the second step of the scenario development process, we apply our 360° Stakeholder Feedback tool to identify assumptions and underlying mental models of different players in the industry as well as of external stakeholders. This reveals important influence factors, but also possible blind spots and weak signals.

To identify important influence factors for the future development of the German energy market, we sent out two questionnaires to managers of major energy suppliers as well as to external industry experts from research institutions, to consulting companies and to customers to get an overview on their assumptions as well as the trends and factors they considered important for the future of the industry.

After conducting the 360° stakeholder feedback, all factors were consolidated and analyzed. The aim of the so-called trend and uncertainty analysis is to identify the most important driving forces affecting the industry and the corresponding uncertainties behind these factors. These factors were mapped on an impact/uncertainty grid to identify the critical uncertainties.

### *Trend and Uncertainty Analysis*

In the third step of the scenario development process, we determine and analyze trends that are likely to impact the project partner in the future. With the help of our Impact/Uncertainty Grid tool, we cluster the trends according to their degree of impact and their level of uncertainty. Factors which score high on both dimensions are then transformed into 'key uncertainties', the basis of the next step in our scenario development process.

Afterwards, different influence factors that were gathered and rated by the experts in the previous process step were transferred into the Impact/Uncertainty Grid and clustered into critical uncertainties, trends, and secondary elements (Figure 11).

Furthermore, two key uncertainties building the basis for the scenario development in the next process step were identified. For this we clustered three and five factors respectively into two meta-categories, which we call critical uncertainties or scenario dimensions. The first meta-category/ scenario dimension is a cluster consisting of three critical uncertainties. These are:

(1) Geopolitical stability (political)
(2) Increasingly challenging market environment (economic)
(3) Rising capital market risks (economic)

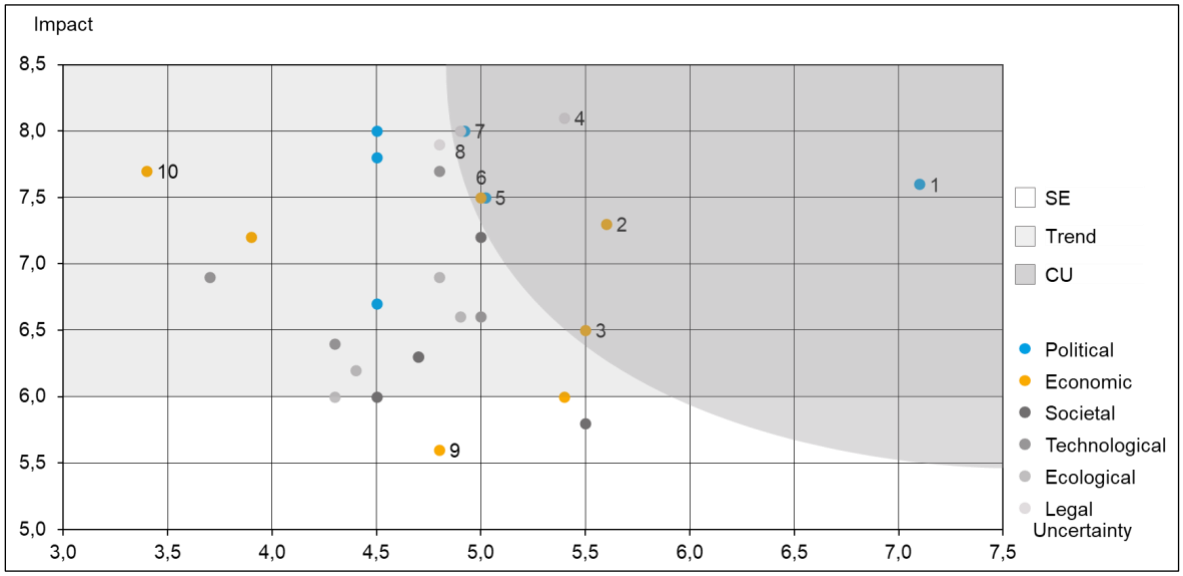
Together they form the scenario dimension **"Stability of Environment"**.

The second scenario dimension, **“Shift toward renewable energy”** is composed of five subcomponents. These uncertainties are:

(4) Ban/restrictions of fossil energy (legal)
(5) Long-term securities for reenable energies (political)
(6) Accelerating shift in all energy intensive industries (economic)
(7) Design of a new environment to support renewable energy (political)
(8) Increase of permitting process (legal)

These five subcomponents mainly capture the regulatory and economic pressures the German energy market faces.

**Figure 11: Impact/Uncertainty Grid for the German Energy**

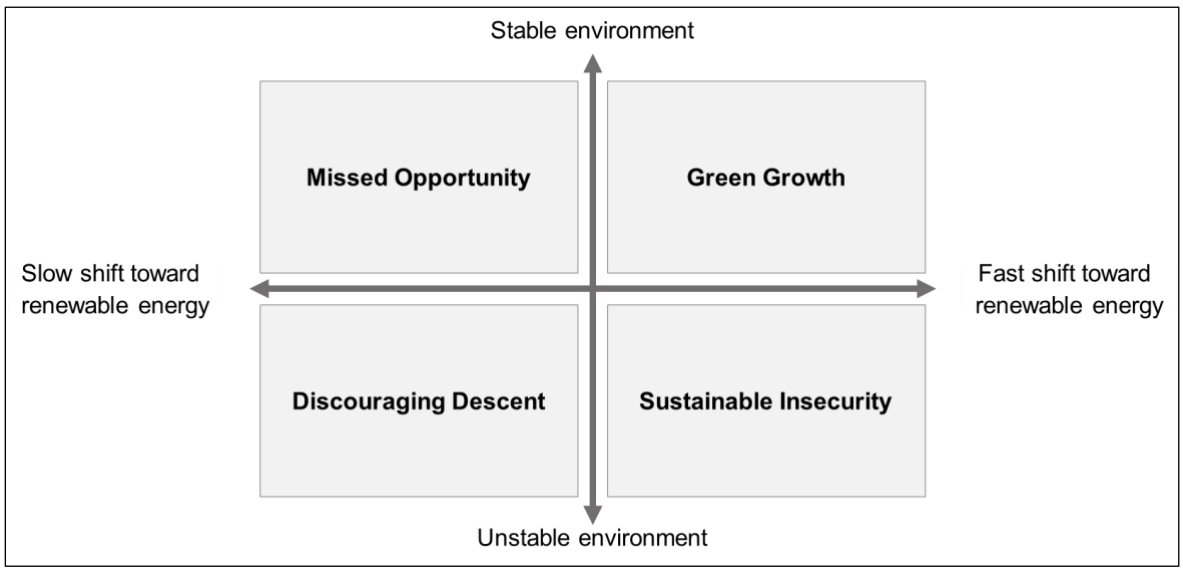



Source: Wulf (2010).

## *Scenario Building*

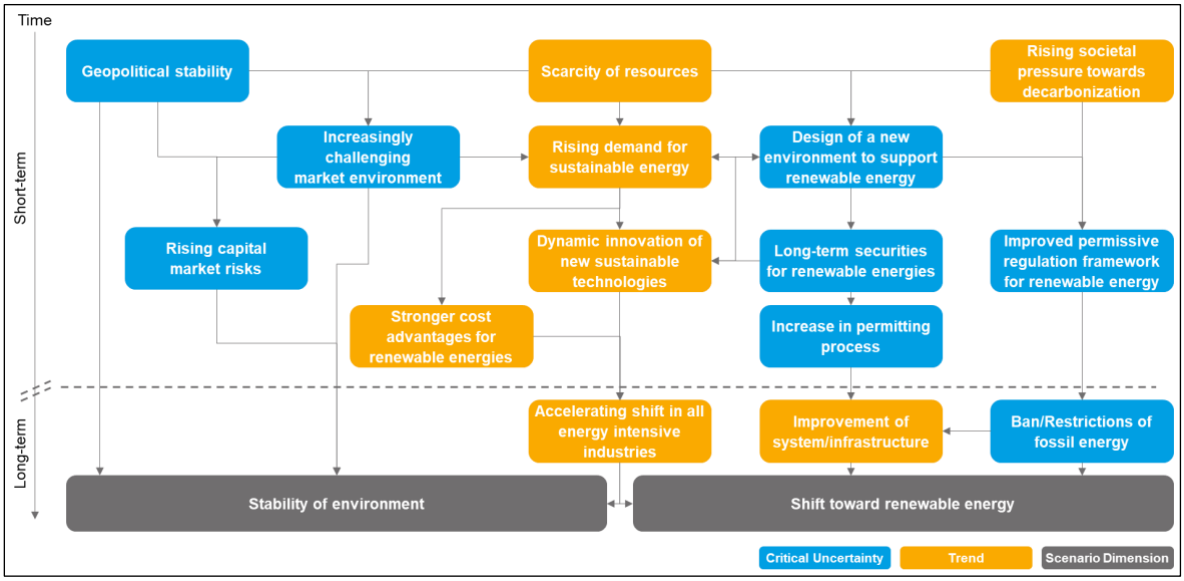
In the third step of the scenario development process, the scenarios themselves are created. Using the scenario dimensions determined in the previous step, we derive possible pictures of the future and describe them in detail. Typically, four plausible and distinct scenarios are developed. Our Scenario Matrix tool guides this process step. To speed up the process and to make the scenarios as accurate as possible, we also use the know-how of global scenario experts assembled in our Scenario network for this step.

**Figure 12: Scenario Matrix for the German Energy Market**



In the present scenario project, the creation of the scenario matrix resulted in four scenarios for the German energy market as described above (see Figure 12). We named these scenarios “Green Growth”, “Sustainable Insecurity”, “Missed Opportunity”, and “Discouraging Descent”. To describe these scenarios in more detail, we created an influence diagram. This diagram displays all trends and critical uncertainties as a chain of causes and effects which lead to the two scenario dimensions. This influence diagram forms the basis for the detailed description of the four scenarios presented below (Figure 13).

**Figure 13: Simplified Influence Diagram for the German Energy Market**




## *Strategy Development*

The main goal of this step is to develop ideal-typical portfolios businesses or products and services for each of the four scenarios. For the strategy definition we use the scenario-based portfolio matrix as a tool. The scenario matrix serves as a basis for the portfolio matrix. In each of the four quadrants of the scenario matrix, we now display one ideal-typical portfolio that is most adequate for this scenario. To arrive at the ideal-typical portfolios, we first list all existing businesses of the company in question. Then, we go back to the scenarios that we developed. For each scenario we ask two questions:

1. Which of our current businesses, products or services seem particularly promising under the conditions of this scenario?
2. Which new businesses, products or services are promising under the conditions of this scenario?

These two questions are discussed as part of a top management workshop and yield one ideal portfolio for each of the four scenarios. Certainly, specific businesses, products or services can also appear more than once in this portfolio matrix if they fit to different scenarios.

### *Monitoring*

The main goal of this step is to constantly track the development of the company's environment and its influence factors and to allocate or reallocate resources to the most appropriate scenario-based portfolio. For the monitoring step we use the scenario cockpit as well as scenario-based portfolio management as tools. The scenario cockpit is a strategic controlling tool that comprises several indicators which help us to determine which scenario is most likely to occur. The scenario cockpit lays the essential basis for scenario-based portfolio management. The company's management needs to decide which of the four scenario-based portfolios, which have been defined in step 5, the company should focus on. Scenario-based portfolio management helps to take this decision by answering two questions:

1. Which scenario is the dominant one, that is: which scenario is most likely to occur?
2. How far are we from reaching certain tipping points, that is: Is the transition from the presently dominating scenario to a different one likely?

After having formulated a company's core strategy as well as coping strategies, the scenario planning process supports managers with a monitoring approach, referred to as *Scenario Cockpit* (Wulf et al., 2012). The *Scenario Cockpit* supports the management in identifying critical indicators for changes in the market environment. Based on defined values for each scenario, a regular assessment enables the management to choose the right strategy for the respective developments. Therefore, the senior management must get reports regularly to align their perception with objectives, focusing on a few objectively measurable indicators to simplify monitoring (Schwenker & Wulf, 2013).

## 7 Contacts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# 8 HHL Center for Strategy and Scenario Planning

The HHL Center for Strategy and Scenario Planning creates knowledge and acts as an impetus to change the way decision makers think about the future and organizations plan their future. We provide a platform for the exchange of ideas with leading scenario experts. The Center's activities focus on four areas:

### 1. Research

We advance knowledge about scenarios by developing new methods and tools for strategic planning, exploring the cognitive and behavioral implications of using scenarios in strategic decision making, and developing new scenarios across a broad range of domains.

### 2. Teaching

We teach scenario planning to business leaders and strategic planners in executive seminars and workshops, to graduate students in summer seminars, and to MBA and MSc students at HHL studying strategic management.

### 3. Consulting

We advise corporate, public, and civil organizations on establishing scenario planning structures and processes, reviewing, and adapting existing planning processes, and communicating effectively with all stakeholders in times of uncertainty.

### 4. Networking

We provide a platform and act as a facilitator to bring together scenario experts from around the world, bridge the gap between theory and practice, and share ideas about what the future will look like.

For more information about the Center, visit *www.scenarioplanning.eu*.

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