

France and Germany in the Energy Crisis: Past, Present, and Future

Linn Leon Junge

This paper compares the past and current energy policies of France and Germany to examine which one is better equipped to weather the current energy crisis. I compare data concerning energy production and electricity production and analyse the public discourse and political attitudes in both countries. The result is that both countries have for historical reasons diverged significantly on energy policy, and this divergence is having a significant impact right now. Finally, I conclude that, despite the struggles of the country's nuclear reactors, France is overall better situated to navigate the situation without major difficulties than Germany. France has better chances of keeping electricity prices down for its citizens and ensuring a steady supply of energy, both electricity and heating. Additionally, even though renewable electricity production is higher in Germany, France's energy system is much more efficient in terms of combating global warming. I finish by arguing that the EU offers a framework for fixing many of the problems that are plaguing both countries' separate issues.

UNEQUAL PAST AND UNCERTAIN FUTURE

'Can Europe Keep the Lights on?' read the headline of the Financial Times in November 2022 ([Hook & Thomas 2022](#)). Since Russia's invasion of Ukraine in February 2022, European leaders have been working tirelessly to construct a more independent energy system, as citizens and companies worry about paying ever-increasing energy bills. Energy policy has developed into a matter of national security, and much focus has been given to the topic in recent months. In the political as well as in the academic realm, this subject area has gained immeasurably in relevance.

While the EU has made efforts to integrate the energy systems of its member states, the current situation still rests on each country's independent decisions. The current energy system is the product of some specific development in Europe over the last two decades. Since the early 2000s, the energy sector has become increasingly a matter of the private sector, with governments taking a backseat. The climate crisis, meanwhile, and the recognition by Western governments of the need to act, has fundamentally changed the way these states look at energy. In addition, the shale revolution has increased global gas-production, especially in the United States.

Germany and France, the two largest economies in the EU, have varied drastically in their approaches to energy. After WWII, Germany and France built two completely different politico-economic models due to their history and their success in the war. This led to today's different energy models, and thus two ways of facing an exogenous crisis such as the one right now.

Not only do they offer different backgrounds, but any attempts to further integrate the energy systems in the EU will need the backing of, if not the initiation from, these two countries. Such an integration will likely be needed to make the continent as a whole more robust to such shocks.

Therefore, the current situation calls for a need to compare France and Germany's energy systems and policies, to analyse how both countries deal differently and have had varied success with the challenges presented by the current crisis. What, concretely, this article tries to explore is whether France's politico-economic system is better equipped to deal with an exogenous energy crisis than Germany's. Especially

in the light of the current situation, which due to its recentness has not been academically explored, I aim to contribute to the understanding of the crisis, its roots, how it impacts governments, and ultimately why some governments are better suited to weather it than others.

This text argues that, while both countries lack diversification in their energy supply, France's current system is much more robust and climate friendly than Germany's. In addition, the EU offers the possibility of creating a unified European energy system that could alleviate the problems the individual countries face.

The topic will be analysed by means of three criteria. The dependency on other countries for the energy needs will be the first; the relationship between the receiving country and supplying country will factor into this as well. Secondly, I will analyse the supply situation of energy overall, including heating, consider whether both governments will be able to ensure a steady supply throughout the winter and beyond, and compare the level of electricity prices. Lastly, the CO₂ emissions connected to energy will serve as the data point to judge the climate performance of each country, focusing on global warming and the 1.5-degree goal.

The question will be answered in three parts. The first will analyse how we got to this situation by comparing the economic models as well as public discourse surrounding energy policy in both countries. In the second part, I will look at precisely these policies that are right now being implemented. In the third and final part, the European Union and its potential will be interrogated.

The topic will be analysed both quantitatively and qualitatively. For the quantitative side, I will mainly look at statistics concerning energy usage, imports, the electricity and energy mix, and legislation.

The qualitative research makes it possible to analyse the difference in cultural and overall approach to energy, especially when looking at changes through time. I have decided not to draw data from one source, but from multiple. Using just one source limits the analysis and prevents the researcher from looking at the issue holistically. Additionally, it is here considered important to incorporate both quantitative and qualitative research, making it a necessity to draw from a plethora of available

sources, many of which were reports by governments, agencies, and companies. These reports offered a lot of value for the quantitative side, such as BP's (2021) report *Statistical Review of World Energy*, which served as the main source for energy consumption data. I chose this report because it compiles known data in one source, and after due diligence it is deemed accurate.

The book *Low-carbon Energy Security from a European Perspective* edited by Patrizia Lombardi and Max Gruenig (2016) provides a basis for a multitude of the aspects that are analysed in this paper.

Cotella, Crivello, and Karatayev's (2016) chapter in Lombardi's and Gruenig's book deals with the development of European energy over the decades since WWII. Multiple parts of this article are grounded on and expanded upon this chapter, especially those regarding historical analysis, the section on Europe, as well as when the dangers of a dependence on other nations for energy imports are mentioned. It also provides a methodological framework that uses an analysis of the past to inform decisions about the future. This article expands on the scope of Cotella, Crivello, and Karatayev's chapter, which is limited to chronological review.

Petit (2013) compares nuclear energy policy between Germany and France, and provides valuable insight on the need for comprehensive analysis to compare and assess the situation of the two countries. I expand this argument beyond the realm of nuclear energy.

Aykut overall provides a rich literature on the topic. In his 2019 paper *Reassembling Energy Policy*, he analyses the topic from a historical perspective. This also helped to frame my methodological approach. Aykut and Evrard (2017) trace the emergence of the notion of 'energetic transition' in the two countries. They emphasize how the two models led to a transformation of the energetic system.

Gawel et al. (2014) explain the complicated route that led to transition in Germany. For the French side, Guillaumat-Tailliet (1987) explains the decision to choose nuclear power in France. What this paper adds to this already existing literature is a combination of qualitative and quantitative research.

I believe that there is a research gap when it comes to the crossroads of energy policy, geopolitical decision-making, and security policy, and aim to demonstrate the link between all of these fields.

I. TRACING THE HISTORICAL NARRATIVE

A. PUBLIC DISCOURSE

Germany's current energy situation finds its roots, like many aspects of contemporary German politics, in its defeat during World War II and the resulting attitudes and policies.

When the Federal Republic of Germany was founded in 1949, it was clear that one of its overarching goals was to avoid war in Central Europe. The country's post-war discourse was dominated by rebuilding and restoring Germany and its image, whilst also asking for forgiveness.

Famously, this was one of the key ideas behind the founding of the European Coal and Steel Community in 1951. The concept was simple: increase economic ties so that going to war would be unprofitable for everyone so that war would be avoided. Robert Schuman, the architect of this project, declared that the 'merging of

our interests in coal and steel production ... will make it plain that any war between France and Germany becomes not only unthinkable but materially impossible' (1950).

During the early years of the German Republic, conservative chancellor Konrad Adenauer worked towards the integration of Germany into the Western Alliance. With the election of social-democrat Willy Brandt in 1969, the focus shifted to the east. Brandt's *Ostpolitik* tried to achieve reconciliation with the eastern European countries that Germany had attacked, most notably the Soviet Union (Lippert 2010). In 1973, after a deal had been struck, the Soviet Union began to export billions of cubic meters of gas annually to West-Germany, the same year that an oil embargo hit the West, including Germany (Lippert 2010). Importing cheap gas not only guaranteed energy supply, but was also part of Brandt's *détente* (Högseilius 2013). Meanwhile, this led to a dependence on Soviet gas that rose to close to fifty percent before its collapse, and subsequently Germany neglected the cultivation of other sources of gas, nor did Germany reduce its usage of gas in the first place.

One factor was the growing environmentalist movement of the 1980s, which primarily had nuclear energy in its sights and grew especially relevant after the 1986 Chernobyl disaster. Grassroots activists campaigned to warn of the dangers that nuclear energy and its waste posed. From this movement sprang the Green party, now the third-largest force in the German parliament. A focus on nuclear meant that fossil fuels were comparatively neglected by environmentalists. By the 2011 Fukushima accident, this had profound impacts. One, that German society and politics were ready to exit nuclear energy, and two, that, even though renewables had been massively extended, the country and its economy were still heavily dependent on fossil fuels, especially gas (International Energy Agency 2013). This was exacerbated by the fact that for the past decades, there was a consensus to not touch the Russian gas imports, even after the Russian annexation of Crimea in 2014. The Social Democratic Party of Germany (SPD) had shown a dangerous closeness to Russia, demonstrated by the fact that Gerhard Schröder (SPD) went to work for Russian gas giant Gazprom after his retirement. This reluctance was only forcefully broken by the Russian invasion of Ukraine on the 24th of February, 2022.

France, meanwhile, is impacted by a different kind of history. Rather than asking for forgiveness after WWII, it sought to re-establish dominance as one of the world's great powers. Unlike Germany, France aimed for maximum sovereignty, which translated into energy independence, a priority it had even before WWII.

Concern about sovereignty was reflected in the arrival of the state in the management of energy, dominated up until the 1940s by entrepreneurs (Planète Énergies 2015). One of the first energy laws in France was passed in 1928. This law gives a monopoly to the State to decide on the quantity of oil imported, the refineries that process it, and last but not least, to set oil prices by decree (1928). Thus, at the end of the war, the nationalisation of companies appeared as 'a means of liberation' which should make it possible to 'develop the production of our country' (Bécharde 1946). Following that path, the National Council of Resistance decided

upon the nationalisation of companies dealing with electrical energy, which created the company *Électricité de France* (EDF) in a rare political consensus. EDF became the engine of French industrial development (*Planète Énergies* 2015). The large vote in favour of nationalisation was due to a widespread post-war consideration that energy is a public good and that, as such, its management cannot remain in the hands of private companies (*Assemblée nationale* 1946; *Loi n° 46-628 du 8 avril 1946*). This idea led to a centralized and sovereignist system where electricity production is a matter managed by the French state (*Guillaumat-Tailliet* 1987), demonstrated by the fact that EDF is 84% owned by the government (*EDF* 2022).

France also tried to re-establish its influence by fighting wars to maintain control over colonies. Despite that France lost most of this control in the 1950s and '60s, through still-existing cultural ties it maintained easy access to uranium. Niger, for example, possesses the eighth largest known reserves of uranium in the world (*Nuclear Energy Agency (NEA) and International Atomic Energy Agency (IAEA)* 2022). France used this to build a massive number of nuclear reactors to produce energy. After WWII, Pierre Mendès France, Minister of State, believed that France must have atomic weapons, like all the other member countries of the UN Security Council. In 1956, he secretly launched a research program to manufacture atomic bombs as a deterrent (*Planète Énergies* 2015). Wider use ensued, and EDF built its first nuclear power plant in 1963 in Chinon. Unlike France, for the reasons discussed, Germany did not develop nuclear weapons after the war (*Petit* 2013). The build-up of nuclear power was intended to make up for a lack of natural resources and make France energy-independent (*Guillaumat-Tailliet* 1987). Nuclear power, initially considered a national defence issue, has now become the main energy source of the French energy mix.

Thus, unlike Germany whose main 'zones of interest' is Eastern and Southeastern Europe, France has been more oriented towards the Mediterranean area, rich in oil and uranium that is not tied to Russia. While in Germany, the SPD and Christian Democratic Union of Germany/Christian Social Union in Bavaria (CDU/CSU) were historically very friendly with Russia, in France, Sarkozy, and Hollande devoted their attention to Africa.

B. DIVERGING ECONOMIC MODELS

Germany's economic model inherently follows the articulation of pacifism. This approach was first applied in Western Europe, but over time has been used as a strategy with other countries, too, such as Russia. To understand why and under which circumstances Germany decided to buy masses of Russian gas, the country's economic model must first be examined.

Germany was one of the first countries to take part in the Industrial Revolution. Their quick adoption of the industrial economy can potentially be explained by the large coal reserves that Germany sits on: numbered at around 3.3% of the known reserves in the world (*BP* 2021). Empirical research links proximity to coal fields to above-average economic growth during the period of the Industrial Revolution (*Fernihough and O'Rourke* 2020). Since then, the country has, to a large extent, been dependent upon coal as its main source of energy.

However, it lacks other sources of energy, except for uranium, which was extracted in East Germany before this was shut down after the reunification (*NEA and IAEA* 2020).

Natural gas, meanwhile, is important for the country for two main reasons. Since the 1960s, most German homes have installed gas-powered heating. Nowadays, 49.4% of homes there are heated with gas, which sits in contrast to France's emphasis on electrical heating (*Loesche* 2017). Secondly, Germany's economy is made up of large parts of medium-sized manufacturing companies, many of which produce in an energy-intensive fashion, often using gas. Many of these companies produce for the export market, which the German economy is reliant on. Since the mid-2010s, almost half of the German economy has been made up of exports (*World Bank* 2021).

Overall, German gas consumption is significantly higher than France's. The share of gas in the nation's energy mix is around a quarter, while in France this number is around fifteen percent (*Goess* 2022). Since the 1970s, Germany has covered most of its gas needs through imports from the USSR, and later Russia. This gas was not only cheap, but also fulfilled the promise of closer economic ties to avoid war.

In the last decade, German reliance on gas, and more specifically on Russian gas, has only grown. After the Fukushima accident in 2011, the conservative-leaning government decided to exit nuclear energy, with the plan being to close the last reactor by the end of 2022. In the 1990s and 2000s, during the peak of nuclear energy consumption in Germany, nuclear power accounted for roughly a quarter of energy production (*BP* 2021). In addition, after massive pressure to phase out coal, the German government—still under a conservative-leaning leadership—decided in 2020 to end coal-based energy production by 2038. Meanwhile, 2011 marked the first year Russian gas was supplied to Germany with the undersea-pipeline Nord Stream, and quickly after plans were made to build an expansion pipeline, Nord Stream 2, to supply more gas from Russia to Germany.

WWII and the German occupation profoundly diminished the production capabilities of coal production in France. In a country to be rebuilt and whose infrastructure was still largely dependent on coal, the French state embarked on a major modernisation of coal-mining installations (*Planète Énergies* 2015). However, the post-war coal revival was short-lived. The share of coal in France's energy mix fell by nearly fifty percent with the rise of cheap oil. Additionally, the country agreed on major gas purchases from the Netherlands, Norway, the USSR, and Algeria (*Planète Énergies* 2015).

However, France has experienced a series of damaging oil embargoes linked to its oil dependence on foreign countries: that which followed the Suez Canal conflict in 1956, another following the independence of Algeria in 1962—which holds a large oil reserve in the Sahara (*Planète Énergies* 2015), and the 1973 Oil Crisis. These events demonstrate how dependent Western nations were on oil imports from the Middle East, at a time when France was importing significantly more of its energy requirements than even Germany (*de Carmoy* 1979). These hard blows gradually pushed it towards nuclear energy, to the point where the country

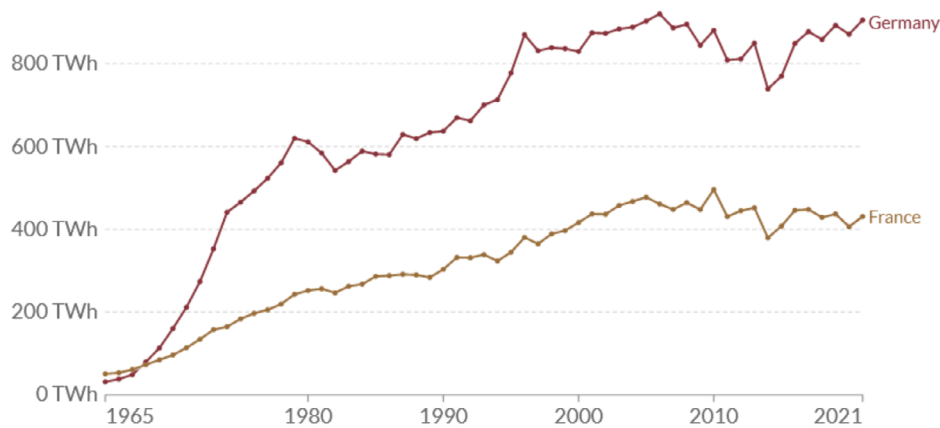


Figure 1 | Annual gas consumption by Germany and France, in absolute terms. Data from BP (2021).

experienced a great public debate aimed at deciding the future of the nuclear sector during the 1960s.

The country completed its nuclear sector by creating its own nuclear safety agencies, the Nuclear Safety Authority (ASN) and the Institute for Radiation Protection and Nuclear Safety (IRSN) (*Planète Énergies* 2015). In what became known as the ‘Messmer Plan’ (*Institut national de l’audiovisuel (INA)* 2022), the mass expansion of nuclear energy was adopted after the 1973 Oil Crisis as a way to solve the energy crisis. This first major civilian nuclear plan was initiated by Pierre Messmer, the prime minister under Pompidou. The idea was to ensure the autonomy of French energy by covering all of the country’s energy needs (*Guillaumat-Tailliet* 1987). Since then, the nuclear industry has been the main source of production of electricity. This implementation of nuclear power in France has no equivalent abroad (*Guillaumat-Tailliet* 1987). Emmanuel Macron unveiled his nuclear recovery plan on the 10th of February, 2022 in Belfort, which sought to build six new reactors, a plan reminiscent of that of Messmer more than forty years earlier. With this new plan, the president is aiming for the use of gas, oil, and coal in France to be phased-out completely by 2050 (*INA* 2022).

While in Germany, industry is the biggest user of electricity due to the strong and energy-demanding manufacturing sector, in France the residential sector is the biggest user, representing almost thirty-four percent (*Petit* 2013). Domestic electricity consumption in France is increased by the fact that many homes rely on electricity for heating.

To sum up, Germany is heavily reliant on natural gas, and, more specifically, Russian natural gas. Its economic model and geographical disposition are partly at fault, yet this is exacerbated by the country’s history, which drew it to Russia. The refusal by many politicians to recognise this danger and at least partly diversify Germany’s energy imports have led the country to its currently precarious position. France sources its energy differently due to a different historical starting point and is therefore not as vulnerable as Germany. In addition, both countries reacted fundamentally differently to the 1973 Oil Crisis, and their paths have diverged significantly since. It is worth noting that in both countries,

there is a certain political continuity between the left and the right.

II. NAVIGATING THE CRISIS

A. POLICIES ON GAS AND ELECTRICITY

Natural gas accounts for almost twenty-six percent of Germany’s electricity mix in 2021, while in France that number is about 16.5%. Per my calculations, Germany as a whole has annually consumed one hundred ninety-six percent more gas than France, taken over a ten-year average (*Figure 1*). Even when the difference in population is accounted for, this number remains high.

The fact that natural gas exports from Russia have significantly decreased with the onset of the war in Ukraine, therefore, ostensibly has a stronger impact on Germany than on France. This is also reflected in the policies enacted by the governments.

Since the Russian invasion of Ukraine and rising energy prices, Germany passed three aid packages with a combined value of ninety-five billion euros, the last of which comprised sixty-five billion euros, passed at the start of September (*Bundesregierung* 2022). Additionally, the governing coalition, comprising the Social Democrats, the Greens and the Liberal Party, have pencilled in two hundred billion euros for a so-called ‘protective shield’ (*Gesetz zur Änderung des Stabilisierungsfondsgesetzes zur Reaktivierung und Neuausrichtung des Wirtschaftsstabilisierungsfonds*), which cushions ‘the effects of the tighter energy situation ... reduces economic damage. Key elements of the protective shield are an electricity and gas price brake’ (*Drucksache* 20/3937).

Starting in March, but retroactively including January, this program will cap gas prices at eighty percent of a households or business’ consumption. The last twenty percent price will be determined by the market price, to retain incentives for individuals to save on their gas usage (*Drucksache* 20/3937; *Gesetz zur Änderung des Stabilisierungsfondsgesetzes zur Reaktivierung und Neuausrichtung des Wirtschaftsstabilisierungsfonds*).

Meanwhile, the government is building floating liquified natural gas (LNG) terminals to import gas via means other than pipelines. Gas shipments from the United States and Middle Eastern countries are supposed to replace those from Russia. On the 29th of November, 2022, Qatar announced it had struck a deal

TOTAL : 1 423 TWh (in 2020)

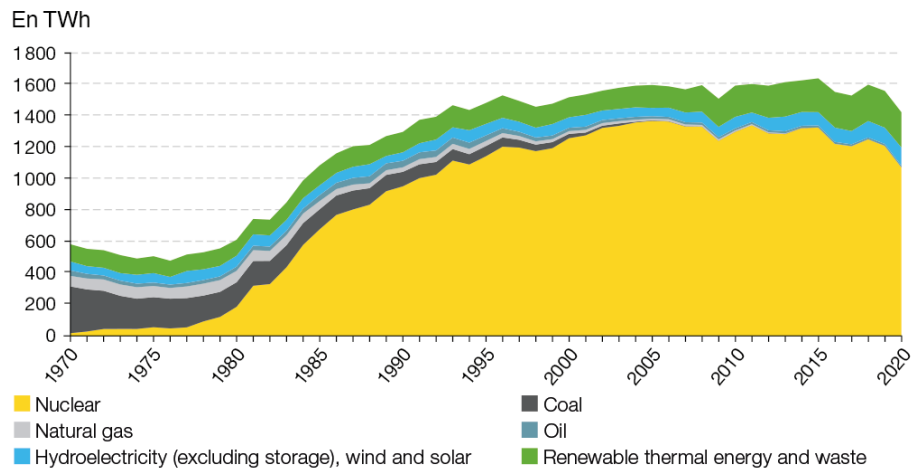


Figure 2 | Primary energy production by energy in France. From Ministère de la Transition Écologique (2021).

with Germany for shipments of LNG starting in 2026 (ZEIT ONLINE 2022).

The first of four terminals is set to go into operation in mid-December (Petermann 2022). This is, of course, only a step to lessen the dependency on Russian gas, not on gas itself. Although some argue that this is the perfect timing to invest massively in renewables and shift away from fossil fuels, this is not reflected in the current policies (Deutsche Presse-Agentur (dpa) 2022). Ottmar Edenhofer, Director of the Potsdam-Institute for Climate Impact Research, argued for a new energy policy, 'and in the face of Russian aggression, one that combines energy security and climate security' (dpa 2022). The fact that the state's priority right now is to ensure a steady gas supply is demonstrated by the eight-billion-euro bailout of the German gas company Uniper, which has since been nationalised (Henning & Sorge 2022).

So far, the government's efforts to procure gas from new sources on the one hand, and encourage citizens to save on the other, seem to be working. In early November 2022, Germany's gas storage inventory was one-hundred-percent filled, getting there earlier than targeted and also earlier than the average (Gas Infrastructure Europe (GIE) 2022).

The nature of the crisis is different in France. Indeed, as already mentioned, France is not and has never been dependent on Russian gas for two reasons. First, France consumes gas to a lesser extent than Germany. Secondly, France has diversified its sources of supply: Norway remains France's main supplier of natural gas (thirty-six percent), ahead of Russia (seventeen percent), Algeria and the Netherlands (both at eight percent) (Ministère de la Transition Écologique 2021).

Thus, the current problem in France concerns nuclear power. Following the implementation of the program to expand nuclear energy production, French primary energy production rose from nine percent nuclear power in 1973 to seventy-five percent nuclear power in 2020 (Figure 2). However, in 2019, one can observe a decline in the nuclear power generation (-11.3%). This decrease can be explained by unavailability within the fleet, the pandemic having led to delays

in scheduled maintenance (Ministère de la Transition Écologique 2021).

Nuclear production thus fell to a level that had not been observed since the end of the 1990s. Twenty-three out of fifty-six nuclear power plants were shut down. For EDF and the entire nuclear industry, 2022 looks like an 'annus horribilis' (Stiel 2022). The government has thought of several alternatives to continue producing electricity during the winter. To compensate for the shutdown of nuclear power plants, France is turning to coal. Much more coal is likely to be burned this winter than the previous ones (Tixier 2022). For example, the Moselle power plant, one of the last to run on coal in France, was initially scheduled to close in March 2022, but reopened in November 2022 to make up for the drop in energy production (Franceinfo & Agence France-Presse (AFP) 2022). Other energies are also being considered by the government, such as gas. The reserves are now at ninety-nine percent of their capacity. The situation is also improving for hydroelectric dams (Tixier 2022). Finally, the first offshore wind farm, in Saint-Nazaire, was inaugurated on the 22nd of November, 2022. With eighty wind turbines, it is expected to produce the annual electricity consumption equivalent of 700,000 people (M.L. & AFP, 2022). If these alternatives represent an increasingly large share of electricity production, they may fail to compensate for the decrease in nuclear power supply. France must also import energy from abroad and especially from European neighbours such as Germany or Belgium (Tixier 2022).

To compensate for this drop in electricity production, the French government has implemented 'an energy sobriety plan' to encourage citizens to consume less. Regarding heating, it encourages its citizens to limit heating to nineteen degrees in flats and offices on a voluntary basis. In housing, residents are encouraged to buy programmable thermostats, with assistance of up to sixty-five euros. Building heating dates may be shortened by fifteen days, depending on the weather. Measures are also planned in other areas such as transport or leisure and culture. The objective is to reduce French energy consumption by ten percent in two years (Gouvernement de la République française

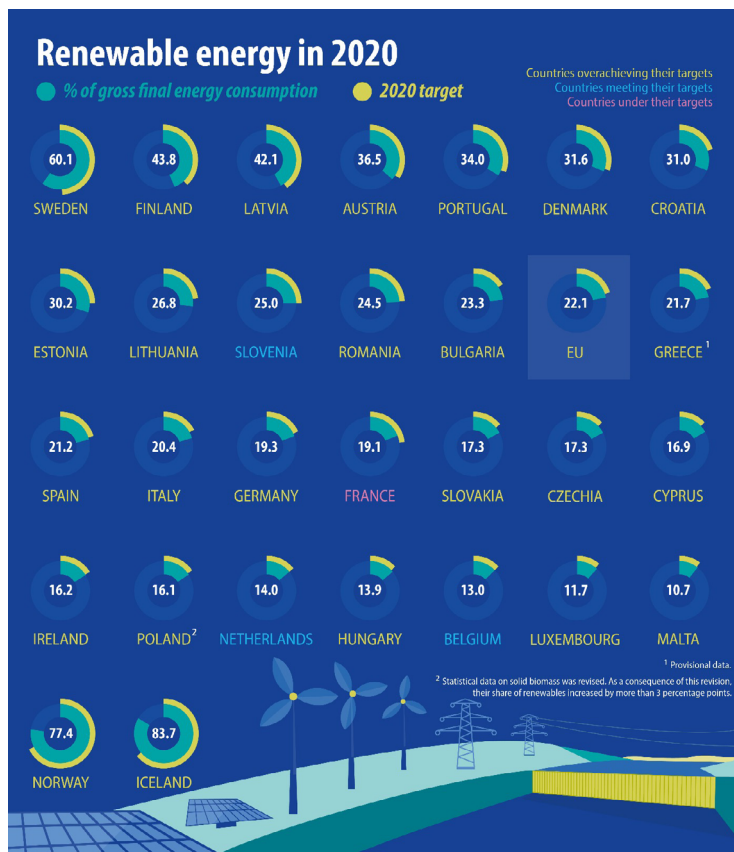


Figure 3 | Renewable energy in 2020 in the European Union. From Eurostat (2022).

2022).

The second objective of the government is to limit the rise in electricity and gas prices. A 'tariff shield' had already been put in place before the crisis, and this has been extended until 2023 to offset the increase expected in energy prices for households (Direction de l'information légale et administrative 2022). The increase in gas and electricity prices will be limited to fifteen percent. While the limit is higher than that of 2022, which was four percent, it concerns 'all households, condominiums, social housing, small businesses and the smallest municipalities'. According to the French government, this measure implies an average increase in bills of around twenty-five euros per month for households using gas for heating. The increase would be around two hundred euros per month without a tariff shield. For households that use electrical heating, the increase is expected to be limited to twenty euros per month, instead of one hundred and eighty euros per month without a tariff shield. In addition, up to two hundred euros in aid is also provided for French households heating with oil or wood (Direction de l'information légale et administrative 2022). A price shield has also been provided for businesses to cover part of their bill. This level of support for the public is made possible by the predominant role of the French state in the nation's energy sector.

B. POLICIES ON GREEN ENERGY

At the end of the 1970s, France was betting on research of renewable energies. They had already made enormous progress in solar energy, the chemistry of solar ovens and

photovoltaics, to the point where the nation acquired a certain lead over their European neighbours. Yet good returns were still pending. France finally abandoned research on renewable energies, which turned out to be expensive and unprofitable, in favour of nuclear energy, which was much cheaper (Planète Énergies 2015). This decision led to a deep delay *vis-à-vis* its European neighbours, especially Germany.

Indeed, the comfort provided by nuclear power and the comparatively large share of hydraulic power discouraged the development of renewable energy sources (Semperes 2021). However, France's share of renewable energy has grown significantly since 2005 with the development of biofuels, solid biomass, heat pumps, wind power and photovoltaic solar energy (Ministère de la Transition Écologique 2021). Renewable energy represents about 23.4% of the electricity production mix and twenty-one percent of the energy mix in 2021. This figure has been largely influenced by European directive 2009/29/EC on renewable energy, also called RED. It established a European target of twenty percent renewables in the total energy production (Directive 2009/29/EC). France was under its own target of twenty-three percent with around twenty percent in 2021 (Ministère de la Transition Écologique 2021). Germany had a target of eighteen percent, and even though the share of renewable energies in its electricity mix is higher with more than forty percent (Bundesministerium für Wirtschaft und Klimaschutz 2022), these account for only about nineteen percent of the energy mix (Eurostat 2023; Figure 3).

In 2000, the *Renewable Energy Act* was passed by the

German parliament, which has been updated multiple times since. Its goals were, among others, ‘to enable sustainable development of energy supply, in particular in the interest of climate and environmental protection’ (*Erneuerbare-Energien-Gesetz*). Essentially, this wrote into law that renewable energy is to be preferred and will be politically as well as financially supported by the government.

Renewables have been massively invested in since then. While they comprised just 20.4% of the electricity mix in 2011, as mentioned they made up 41.4% a decade later. In that year, 2021, a total of 13.3 billion euros were invested into renewable energy (*Bundesministerium für Wirtschaft und Klimaschutz 2022*).

In the long term, investment into more efficient or renewable sources in heating is needed. As discussed, while the share of renewables is high in the electricity mix, it drops to below twenty percent for overall energy consumption. In France, such a steep drop is not present. This is due to the already mentioned problem that Germany heats primarily with gas, and also with oil (*Loesche 2022*). Heating accounts for roughly twenty percent of all energy consumption; increasing the share of renewable energy in household heating (currently only fifteen percent) is therefore a priority in public discourse. Because Germany heats so much with fossil fuels, while France primarily heats with electricity (powered by nuclear and renewables), the overall energy share of renewables in both countries is ultimately similar.

When evaluating the green energy potential of Germany and France, the question of whether nuclear can be categorized as a renewable or green method of electricity production inevitably arises. Strictly speaking, it cannot be described as renewable since uranium is a finite resource. When it comes to if it is green, one cannot overlook that, excluding construction, nuclear energy emits practically no CO₂. This is in line with the observation that CO₂ emissions related to energy are significantly higher in Germany than in France. Therefore, while the renewable sector is larger in Germany, and notwithstanding the debate about nuclear energy, France’s end result *vis-à-vis* climate crisis mitigation is more positive than Germany’s.

III. THE POTENTIAL OF THE EU: A SOLUTION?

A. THE CURRENT COMMON ENERGY POLICY

In an age of transnational borders, France and Germany are in two related yet different struggles concerning their energy system. Many of the problems at hand can be resolved or at least improved through the European framework. How cooperation and solidarity can be of great help is demonstrated by the cooperation between France and Germany. As mentioned, France has been having trouble operating its nuclear plants, and is receiving energy imports from Germany, at least in part in return for gas. One of the three nuclear reactors that will remain operating in Germany until April 2023 has at least partially been kept online in case France continues to require assistance throughout the winter, according to the government (*Záboji 2022*).

The EU has a framework for the common energy policy dates, officially ratified in the Lisbon Treaty (*Lavrina 2016*). Its goals are a diversification of sources

of energy, solidarity between member states, a fully integrated market, and reducing dependency on imports, among others (*European Parliament 2022*). The EU as ‘*sui generis*’ represents a unique opportunity to overcome the problems and create cross-border solutions for a sustainable, safe energy supply.

The European Green Deal, adopted in 2021, fundamentally revised the energy framework with the goal of reducing greenhouse gas emissions by fifty-five percent by 2030, compared to 1990 levels. For the issue at hand, the package’s value lies in investment in renewable energies, which can replace imports from non-EU members. In fact, ‘reducing external energy dependency’ is one of the stated goals of the Green Deal (*European Commission 2021*).

What is therefore apparent, taking these two pillars of EU energy policy into account, is that the EU has been aware of the fragility of its energy system, especially concerning the dependency on imports, from before the current crisis. While it did not take an expert to recognise these shortcomings before the war, this means that many of the goals that the EU is already working towards stay the same. Even for emergency situations, much of the framework is already in place, such as *Regulation (EU) 2019/941*, requiring ‘the EU Member States to cooperate with each other to ensure that, in an electricity crisis, electricity goes where it is most needed’ (*European Parliament 2022*). Political will in a non-emergency situation is needed to fully unlock the potential of the common energy policy, which can in turn prevent future emergencies.

Since the beginning of the war, the EU has kept trying to address the energy crisis. The European Commission adopted regulated tariffs to help the most vulnerable and strengthened incentives to reduce consumption to avoid power cuts during the winter. The European Commission also tried to diversify their supply, signing multiple agreements with Egypt, Israel, and Azerbaijan to do so. They also want to strengthen the solidarity amongst members, for instance through buying energy together (*European Commission 2022*). However, all of their work is conditional to the will of each country.

Contrastingly, member states have been acting unilaterally in their crisis management over the past months. Germany especially caught a lot of criticism when it implemented the protective shield for not looking for a European solution.

The typical problem is the slow-moving bureaucratic gears of Brussels, which some argue ‘churn’ too slowly to be effective in the situation that the bloc finds itself in (*Taylor 2022*). It is questionable whether the EU can prove these critics wrong, or whether national leaders right now are even interested in working on a European solution in the first place. Yet, I argue that many of the EU’s objectives and measures are in the medium- and long-term suited to make the entire European energy market safer, more reliable and more sustainable.

B. A TURNING POINT?

The liberalisation of the European energy market and the privatisations occurring as a result, as enacted by the European Commission at the turn of the millennium, now seem likely to be reversed at least in part. This somewhat artificial introduction of competition does not bode well in times when states are forced, regardless of all ideological considerations, into strong

government intervention. This situation has made it clear that energy is a matter of national security and a sector in which the government should take a keen interest. In Germany, the Federal Network Agency is already controlling significant parts of the German energy market. The government has not just taken over Uniper, but also nationalized Sefe, a gas wholesaler which was the subsidiary of the Russian company Gazprom in Germany (Stratman 2022). Germany, where the liberalisation was more impactful than in France, is therefore seemingly moving in the direction of France when it comes to state control of energy supply.

Taking a step further, it is worth asking if this is a turning point in the fundamental transformation of Germany's, France's, and Europe's energy system away from private, national competition intent on finding the cheapest energy at any cost, and towards a green, integrated European energy market in which governments take charge of their nation's energy policy.

The likely answer is that governments will for the foreseeable future have a significant say in directing the procurement of energy supply. Any further prognosis, those asking whether this is renewables' time to shine, for example, cannot be made at this point.

When it comes to the role of the EU, the situation appears more complex. In this context, it seems difficult to imagine a common energy policy that will erase separate national paths and institute EU-wide mechanisms of coordination. Indeed, as mentioned, most of the member states are acting unilaterally and the path to a collective response remains long.

IV. CONCLUSION

The historical background of the two countries, France and Germany, led to two distinct economic models and energy mix. While Germany is too dependent on Russian gas, France is comparatively more independent. Indeed, France uses less gas and has multiple sources, with Norway being its main supplier of gas. The French desire for independence after WWII led to today's situation where France's electricity production is not reliant upon

other countries, even if one should note that France still uses outside sources for a significant portion of its overall energy mix. However, France's nuclear situation shows that one should not be too dependent on one source, even if it is safe or guarantees energy independence to do so in theory. Moreover, France's centralised and nationally-controlled system makes it possible to better respond to the interests of the population and the country. For instance, the price of electricity is lower in France with an average of €0.17 per kWh in November 2022 (Fournisseur Énergie 2022) whereas Germany is among the countries with the highest electricity prices in Europe with an average of €0.42 per kWh in November 2022 (Hesseling and Behrend 2022). German profit-run corporations do not take long-term climate goals, or matters of national security, into account. Indeed, even if the share of renewable energy sources in the energy mix is significantly more important in Germany, the country has the highest greenhouse gas emissions among all European countries. Concerning power supply, Germany previously seemed to be more at risk than France, but currently it appears that both countries are going to be able to ensure steady supply of electricity and other energy needs for their citizens throughout the winter. Here, I conclude that France is better equipped to deal with exogenous crises due to its centralised economic model, even if France still faces some limitations in this model. Many of the EU's objectives and measures are in the medium- and long-term suited to make the entire European energy market safer, more reliable, and more sustainable, but only if there is consensus and enough political will.

This paper has some limitations, mainly due to the fact that the current situation is very dynamic, and consequently changing over short timescales. Thus, some parts of the research may be somewhat out of date within a few months. Nevertheless, this article still provides general insights into European energy policy that is likely applicable over the medium- and long-term.

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