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Energy diplomacy. Europe's new strategic mission

A report by the Brussels Institute for Geopolitics

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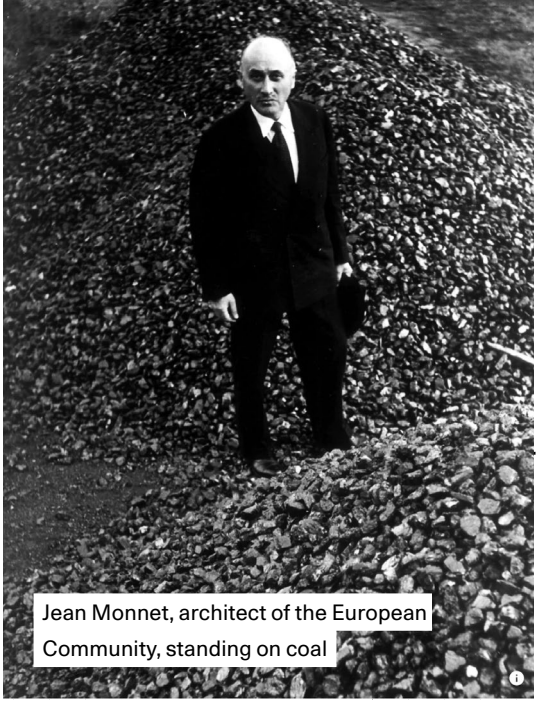
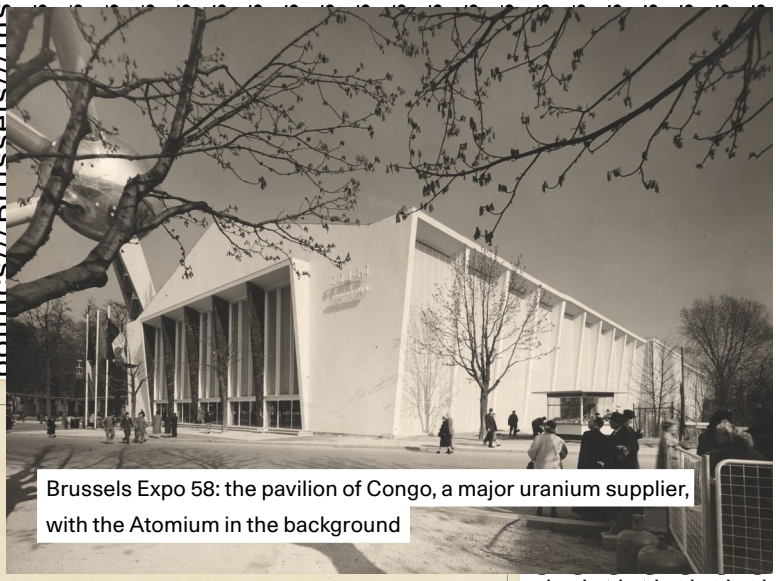
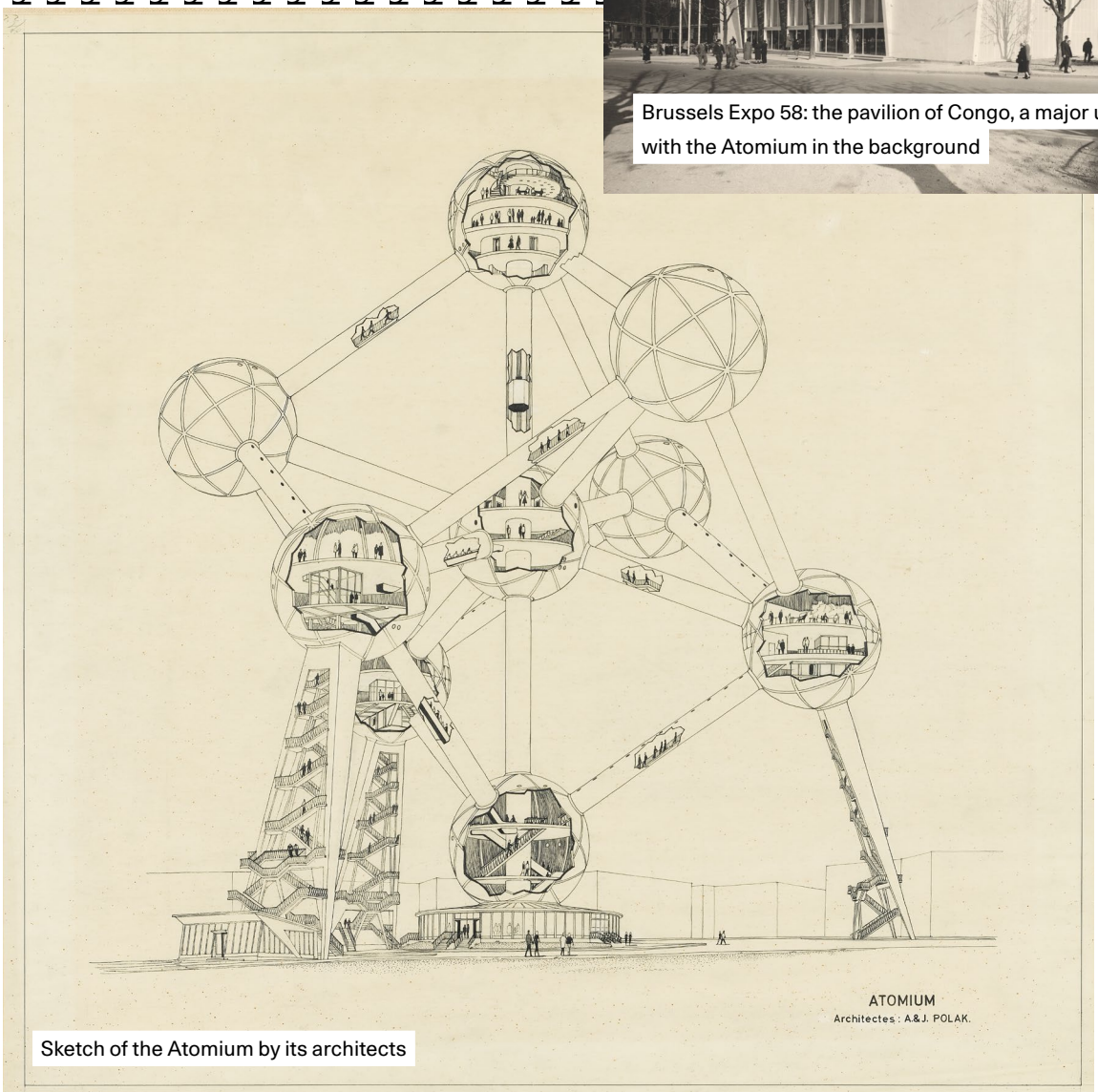


Jean Monnet, architect of the European Community, standing on coal

Saudi oil workers taking instructions from an Indian expert, 1952



Brussels Expo 58: the pavilion of Congo, a major uranium supplier, with the Atomium in the background

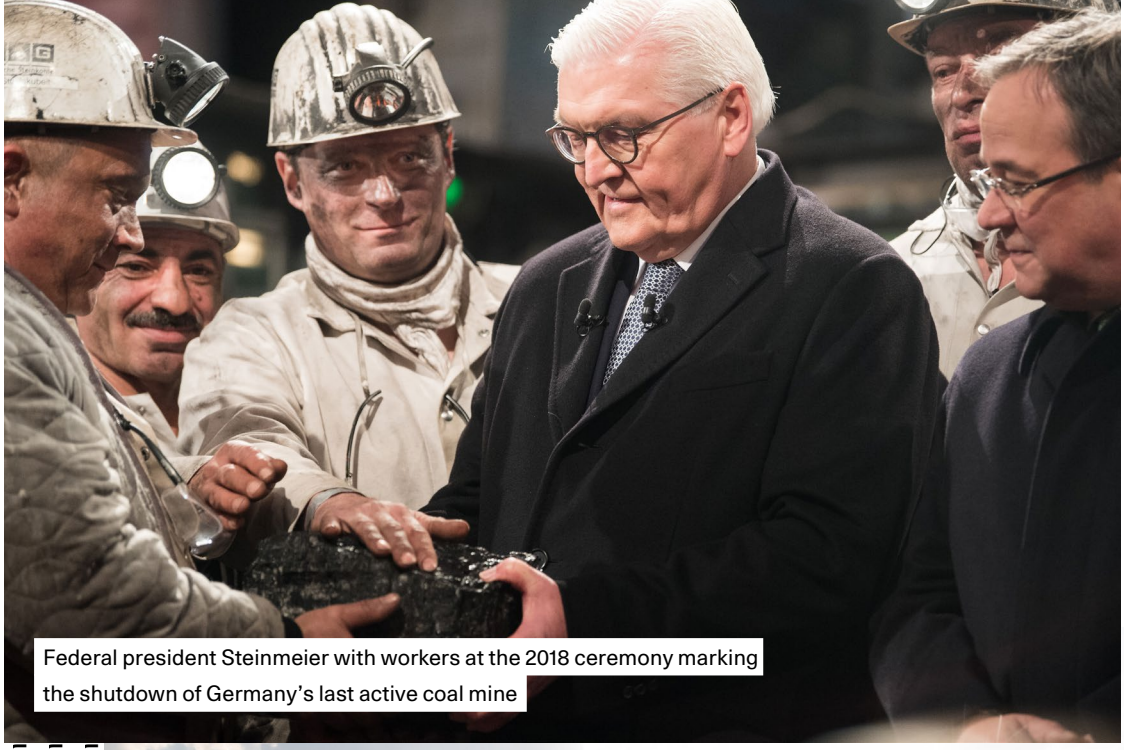


Sketch of the Atomium by its architects

Delegates to the first OPEC Conference in Baghdad, 1960

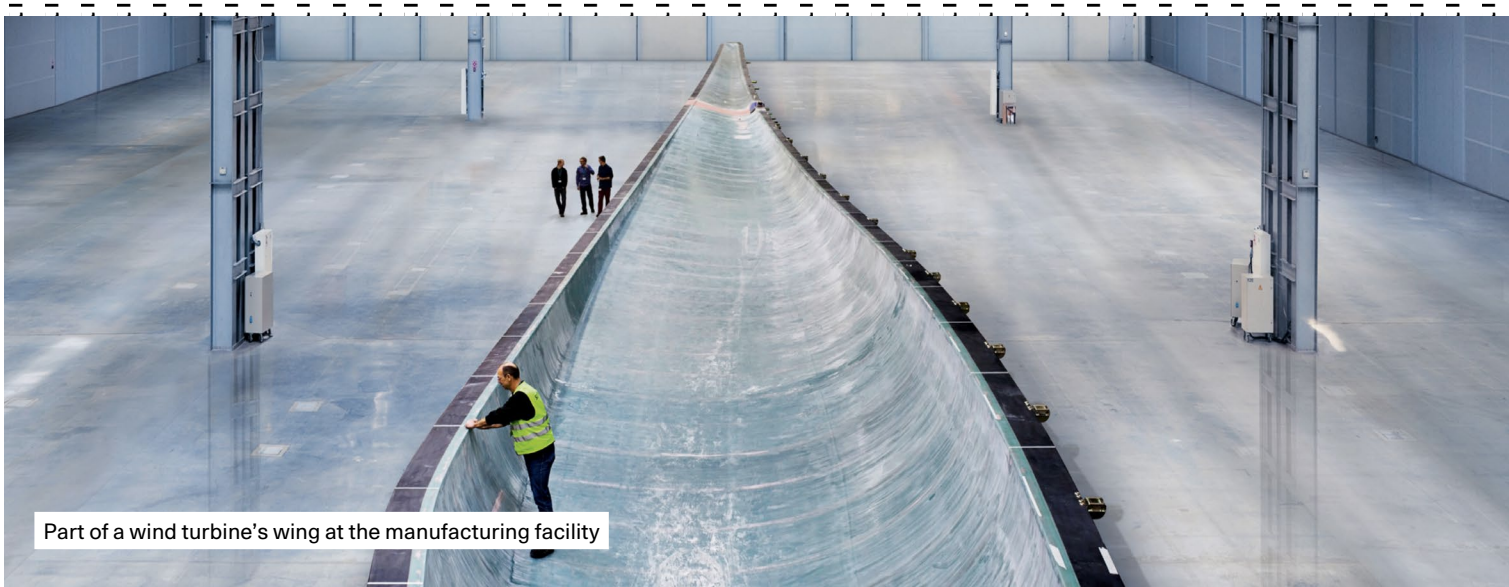
A deserted motorway close to Munich during the 1973 oil crisis

Spanish volunteers cleaning up the Galician coast after the *Prestige* oil spill, 2002



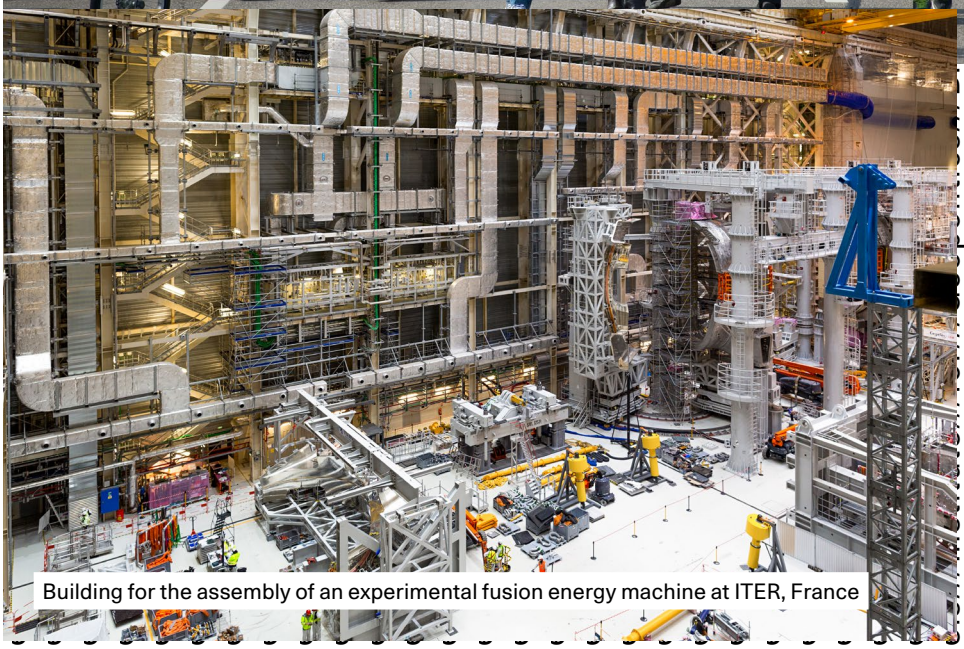
Federal president Steinmeier with workers at the 2018 ceremony marking the shutdown of Germany's last active coal mine

Workers at an illegal cobalt mining site in the Democratic Republic of Congo, 2021



Part of a wind turbine's wing at the manufacturing facility

Anti-nuclear protest in Germany, 2018



Building for the assembly of an experimental fusion energy machine at ITER, France

Electric cars assembly line at a BYD factory in Shenzhen, China

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Introduction

It took the shock of war for Europeans to realize that the stable flow of affordable energy we have all become accustomed to is not a natural right. Plugging your phone into the wall socket to charge, filling up your car at the petrol station, the sight of power stations with their steam clouds: these are things most Europeans took for granted (even if the bills remind us that none of this comes for free). The collective effort to secure a sufficient supply of fossil fuels and electricity to meet the needs of households and industry was an abstract notion to most of us, all but invisible. This changed dramatically when Russia invaded Ukraine. Gas pipelines were shut off and even blown up. The flow of energy and power was no longer a given. Factories faced with huge energy bills feared closure. Securing affordable heating for homes rapidly became the number one political priority. It sparked a European energy panic, and a domestic cost-of-living crisis that plunged many into poverty.

Two years later the initial shock is behind us. But Europe cannot afford to forget that in the years and decades ahead, achieving energy security – whether through fossil fuels, nuclear or renewables – will require planning, diligence, diplomatic skill and a real sense of mission.

Powered from abroad

Observing a similar lack of appreciation for those whose labour provides the energy sources for our modern lives, George Orwell wrote in 1937, 'In the metabolism of the Western world, the coal-miner is second only in importance to the man who ploughs the soil … on whose shoulders nearly everything that is *not* grimy is supported.'[1] Much has changed since then, but not our fundamental need for energy. New energy workers are now required: solar panel installers, wind turbine engineers and battery technicians working to green the energy on which Europe's economy is based. These new skills and trades follow on from those of the nuclear engineers, dam constructors, oil rig workers and gas explorers who entered the field in the early post-war decades.

Furthermore, with the arrival of new technologies and resources, our energy supply has acquired new geographic origins. Since 1945, the European continent has no longer been able to power itself and has become a massive energy importer. This dependence on foreign supplies of fossil fuels (coal,

oil and gas) created unprecedented strategic and economic vulnerabilities (which renewable resources will mitigate but not fully eradicate in the years ahead). Today, the 27 EU states produce only just above 40 per cent of their energy domestically.[2]

Enter the traders, politicians and diplomats, who secure our energy supply from abroad. Buyers, shippers, insurers, bankers and brokers obtain oil and gas from the Middle East, Africa, Russia and the Americas and deliver it via ports, pipelines and lorries to Europe. These businesses, however, do not act alone. The foreign endeavours of big European and US oil and gas companies are almost always backed by their home governments and administrations and, not least, by military power. Energy interests continue as ever to shape foreign policies. Energy diplomacy, the government-led effort to facilitate and guarantee the supply of affordable energy from abroad, is *raison d'état*.

No dreams of green autarky

Although Europe has weaned itself off cheap Russian gas, fossil fuels will continue to play a prominent role in the continent's energy system for years to come. The flurry of new long-term supply deals with gas powers such as Qatar, Norway and the US, some of which reach beyond 2050, is no cause for surprise. Setting bold renewables targets is relatively easy for EU climate politicians. It makes them popular. But meeting those targets is much harder. It is then that constraints and costs make themselves felt, as well as disgruntled farmers, furious homeowners and squeezed businesses. Missionary climate zeal, however necessary to change habits, must not blind us to the reality that for technical or political reasons hydrocarbon dependency will be with us for longer than is desirable.

As this report will show, green energy technology comes with its own foreign dependencies, necessitating its own brand of energy diplomacy. How pervasive and problematic will those dependencies be? As always, the answer hinges on the political choices the continent makes in the coming years. Not least, it depends on policy efforts to attract investment and lure green energy industries to European shores. If successful, those efforts may leave Europe significantly less reliant on energy imports than it has been since 1945, which would be a major achievement. That said, industrial policy aimed at reshoring has its own limitations.

One such constraint results from the decisions made in the last 35 years to promote global markets and international trade. Much of European manufacturing moved to China, where production costs were lower and regulations less stringent. It made economic sense in a post-political world, in which major conflicts had supposedly been settled. However, reversing the strategy of outsourcing production is hard. Decades of industrial decline have altered Europe's landscape. Where once factories stood, residential areas and shopping malls have been built. Attitudes have changed, too. Minerals and rare earths can, in principle, be found and mined in Europe. But will societies tolerate the return of mining activity and the costs it imposes on the landscape and local residents? Will voters stomach the construction of nuclear power plants, wind turbines, solar farms and hydrogen storage facilities on a massive scale?

Another constraint is price. Certainly, cheap is not always good. One of the benefits of local production with local supply chains is the greater resilience, security and control it brings. If this adds a premium to the price of energy, it may well be worth paying, especially when international supply chains are at risk of disruption by war or strategic blackmail. However, there are inevitably limitations and complicated trade-offs. Relying on foreign imports of energy will often prove the more expedient choice, particularly when multiple suppliers are available and outright dependency can be avoided. Carbon neutrality and energy autonomy do not always make easy bedfellows. Without affordable solar panels, heat pumps, batteries and EVs from abroad, getting voters to scrap their combustion engines and other polluting habits will take much longer.

The need for energy diplomacy

Energy diplomacy has returned to Europe, following its apparent demise after 1989, as the pursuit of energy is now increasingly shaped by great power competition. In a world of state actors playing hardball with energy, the deployment of a new energy diplomacy is sorely needed.

This effort can succeed only if it brings together the clout and resources of classic diplomacy (traditionally the domain of national governments) with the regulatory and financial means of Europe's industrial and energy policy (a Brussels prerogative). While these two worlds have long been apart, geopolitical shifts and technological changes are welding them together.

Consequently, for the first time ever, energy diplomacy is becoming a focus of collective EU action.

After some years of gas panic, political crisis management and improvisation, now is the moment to face up to long-term trends and tough trade-offs. Setting Europe on a path towards secure and affordable energy supplies is one of the Union's crucial strategic missions. Achieving it requires more than just setting goals. There must be a productive interplay between all political actors, underpinned by broad public consent.

Chapter I of this report describes how modern energy diplomacy was born in the age of oil, only to be superseded by the post-Cold War conviction that energy security could be guaranteed by exporting market regulation ('History').

Chapter II charts the worldwide energy geographies and value chains that are rapidly shifting as wind and solar power take over from fossil fuels ('Transition').

Chapters III and IV then zoom in on Europe's energy situation. The former looks at the geography and past choices that have shaped the continent's layered landscape ('Geography'), while the latter examines how longstanding energy policy tensions within the EU have been partly overcome in a newly found consensus favouring active industrial policy at home ('Politics').

Chapter V brings all the above aspects together in laying out the principles of a new energy diplomacy ('Strategy'). It concludes that this will be hard work, demanding geopolitical vision and situational awareness, expertise and coordination, and in many circumstances strength and diplomatic tact.

The Conclusion to the full report observes how energy's return into the public debate – its renewed material and political visibility – makes the moment opportune for such an endeavour, and sets out that the fundamental reorientation on energy issues will require politicians, market actors and the broader public to come to terms with at least seven new strategic and political realities.

I History: origins, demise and return of energy diplomacy

Introduction

Ever since coal was superseded by oil and Europe lost the ability to supply itself sufficiently with fuel, the continent has faced one pressing question: how to source energy from abroad affordably. Various solutions were found, from colonial imperialism in the first half of the twentieth century through Cold-War pipeline diplomacy with the Soviet Union to the export of the EU's free-market regulations after 1989. These were answers that enabled Europe's economy – its energy-intensive industries in particular – to survive and flourish despite it not being an energy power itself. However, none of the solutions Europe deployed in the last hundred years have stood the test of time. Technological development, geopolitical crises and historical events have, at moments, forced policymakers to radically rethink their assumptions and fashion new approaches to energy security. Europe is now at such a juncture once again. New answers are needed to Europe's energy problem. However, to understand what they might be, we need to appreciate how we came to find ourselves in this position.

Imperial oil diplomacy and the turn to Soviet gas

The roots of Europe's oil diplomacy go back to the early twentieth century. When Europe's armies went to war in the summer of 1914, a new fuel – oil – had gained strategic dominance. Oil's derivatives (petrol and diesel) powered the machines of war, including planes, submarines and tanks. Ensuring unchecked and cheap supplies of crude oil became a strategic imperative during the fighting but also once peace was restored. Oil was found in eastern Europe, in Romania and in Galicia, the region that straddles today's Polish-Ukrainian border. This was supplemented by reserves in colonial possessions in the East Indies. But these resources were no match for the abundance of reserves in the US and Russia. Europe found itself heavily dependent on oil imports from the Western Hemisphere, particularly from the US, Mexico and Venezuela. With Germany out of the race, hobbled by its 1918 defeat, this strategic dependency ignited a period of intense competition between Britain and France to establish spheres of influence in the former Ottoman empire, today's Middle East, where promising oil prospects beckoned. Italy also

expanded its influence into Libya.[1] When there was little domestic oil to be found, Europeans turned automatically to their overseas empires to guarantee supplies, if necessary by extending their dominion to where oil was plentiful.

Securing affordable energy supplies became a matter of national security and a foreign policy goal, pursued in collaboration with gigantic national oil companies, many of which are household names today. In the interwar period, this small club of companies tapped Middle Eastern oil supplies through imperial concessions. British Petrol (BP), originally the Anglo-Iranian Oil Company (AIOC), Total (*Compagnie française des pétroles*), Royal Dutch Shell and others were simultaneously commercial and strategic actors, vital cogs in Europe's economy, and in the vanguard of its imperial energy diplomacy. Together with Standard Oil in the US, this cartel of Western oil companies, sometimes referred to as the 'Seven Sisters', operated to safeguard European energy security and kept prices artificially low, which served the broader industrial interests of the West.[2]

However, this cartel began to unravel from the late 1950s as Europe's colonial empires came to an end and with the emergence of Arab nationalism. A series of events painfully exposed Western Europe's oil predicament, including the 1956 Suez crisis and the 1973 Arab oil embargo. Britain, the leading Western power in the Middle East, was in decline and forced to step away from its role as guarantor of regional stability. Its responsibility for securing vital shipping lanes in the Gulf was gradually taken over by the US. In the postwar era Washington significantly grew its regional influence, including in Iran. Together with the UK it staged a *coup d'état*, helping the Shah to power in 1953 and effectively ending Tehran's plans for nationalizing the British oil industry in the country. But sitting on large oil reserves itself, and unwilling to prop up Europe's old colonial empires, the US would act more reluctantly than Europe had done to keep oil prices in check.

The founding of the Organization of Petroleum Exporting Countries (OPEC) by Iran, Iraq, Kuwait, Saudi Arabia and Venezuela, in Baghdad in 1960, signalled that elites and populations in the Middle East had had enough of Western suzerainty. Demanding a bigger share of profits, national governments gradually assumed control over upstream oil production, weakening the grip of the Western oil majors. The rise of colossal national oil companies, such as Saudi Aramco and the Abu Dhabi National Oil Company, eventually brought the era of cheap oil to an end. Washington's continued involvement in the

region made Western oil dependency manageable, for example by preserving the regional balance of power in the 1990 Gulf War. But no longer in control of oil prices, and with hardly any oil reserves itself, Europe remained vulnerable to OPEC's pricing and production decisions.

In response, Western Europe looked to diversify its energy suppliers and turned to the Soviet Union for oil and gas, as well as to domestic nuclear power generation. Extensive oil and gas fields had been discovered in the North Sea and in the Netherlands in the 1960s. However, it was the focus on trading with the Soviet Union that changed the diplomatic dynamics. In the 1960s, various European energy companies, backed by their governments, engaged in talks with the Soviets about potential gas exports. Key players included Italy's ENI and Austria's ÖMV, two sizable gas producers facing declining production at home. Austria, still a neutral state, signed the first gas contract with the Soviet Union in 1968, taking advantage of its proximity to the newly finished 'Bratstvo' (brotherhood) pipeline to Czechoslovakia. In the years that followed, France, West Germany and Finland concluded agreements. These initial contracts involved a 'pipes-for-gas' exchange, with the Soviet Union receiving large-diameter steel pipes in return for gas.[3] This led to the construction of a vast network of cross-border pipelines, channelling natural gas into and across Europe from Siberia in the north and from Algeria in the south, where gas fields had been discovered in 1956.

Politically, Europe's pipeline diplomacy with the Soviet Union was not uncontroversial. In the early 1980s, Europe's growing gas ties with the USSR caused a transatlantic rift, as the Reagan administration unsuccessfully urged Europeans to abandon plans for a major Siberian gas pipeline.[4] However, Europe needed cheap energy from abroad to keep its industrial economy competitive. Gas from Russia represented a lifeline.

Early European integration

The European Union itself might be said to be a product of postwar energy diplomacy. Coal shortages in the aftermath of the Second World War – during which the coal industry had been the target of massive military bombardment – gave rise to a number of international initiatives. Ending Europe's 'coal famine' was a driver of the Marshall Plan.[5] Most famously, the French plan for a European Coal and Steel Community (1951) brought the coal industry in

six key European states (France, West Germany, Italy, Belgium, Luxembourg, and the Netherlands) under a joint authority. This administrative innovation marked a strategic breakthrough in the reorganization of the European continent as a whole. (One reason the UK did not join was that it produced more coal than all six put together.[6])

In 1957, the same six Western European states launched the European Atomic Energy Community (EURATOM) in an effort to advance the energy source of the future, nuclear. Both the ECSC and EURATOM followed the interventionist spirit of their inventor, French civil servant Jean Monnet, former head of the national planning bureau. Some even considered EURATOM a more important breakthrough than the European Economic Community (EEC), which was launched at the same time.[7] In hindsight, however, the latter proved much more consequential. It laid the foundations for market integration and trade liberalization, which over time also came to affect the politics of energy.
The EEC treaty did not contain a dedicated energy chapter. With coal and nuclear being covered by separate treaty arrangements, it was believed that horizontal market provisions would suffice for any problems that might arise concerning oil, natural gas and electricity. This approach had two consequences. First, leaving coal and nuclear aside, Brussels principally viewed energy through the prism of the market. Second, securing oil and gas supplies remained the business of the member states individually.

Unsurprisingly, the 1973 oil shock proved too much to handle for the young European Community. The Arab oil embargo, targeted at supporters of Israel in the Yom Kippur War, hit only one of the nine EEC member states directly, the Netherlands – and hence also the major port for oil supplies reaching continental Europe, Rotterdam. Although the UK, which had just joined the EEC, was not embargoed, the Arab-Israeli conflict posed a threat to British oil supplies from the Middle East.[8] With the US and other countries also affected, panic led to the uncoordinated stockpiling of oil. A Copenhagen summit in December of that year, meant to convey a message of European unity, was disrupted by the unexpected arrival of four oil-selling Arab ministers at the venue. Solidarity was quickly displaced by opportunistic bilateral deal-making in the corridors. Not for the last time, Europe's fragmented response to a crisis allowed the US to take the lead in forging a collaborative response across the Atlantic. This led to the establishment of the International Energy Agency (IEA) in Paris in 1974. Paris, not Brussels, then became the central hub for energy-security policy coordination for most Western European nations.

Some argued European energy policy had been 'captured' by Atlanticism.[9] Ironically, France opted not to join the new agency it hosted, preferring to pursue its own oil diplomacy towards the Arab world.

The push to build a single market in the late 1980s gave the European Community a chance to develop further activities in the energy field, despite the absence of specific treaty provisions. Starting in the mid-1990s, a number of directives were adopted to liberalize internal electricity and gas markets. However, these initiatives did not amount to a fully-fledged Europe-wide energy policy. They were predominantly viewed as a means of bringing prices down for consumers. Tellingly, the external dimension remained absent.

For all its achievements, early European integration did not contribute significantly to ending its members' oil predicament, nor did it reduce their collective energy dependence on both superpowers. Western Europe needed the US to secure stability in the Middle East, while it relied on Russia to continue exporting its oil and gas westwards. It was an uncomfortable position. Only when the Cold War ended did the inherent tension in this double dependency relax, allowing a moment of European self-confidence.

After 1989: from energy diplomacy to exporting free market rules

With the Soviet empire in tatters, new opportunities arose, the 'end of history' supposedly signalling the demise of great power politics and the dawning of an era of international cooperation, for which European integration itself served as a model. The classic art of energy diplomacy seemed consigned to the history books too. The security of energy supplies, the reasoning went, was best served by the market and the market alone. Governments were to take a backseat and become regulatory agencies, whose job was to ensure markets worked without distorting subsidies, price agreements, or any other business conduct illegal under European competition law.

Within official EU parlance, the very notion of energy diplomacy became taboo. It was the hour of the economist, bureaucrat and antitrust lawyer. European officials – both in Brussels and in EU capitals – were convinced that external energy security could be achieved by expanding the EU's rules-based, liberal policies abroad. A start was to be made by integrating

the EU's neighbours into initiatives such as the Energy Charter Treaty (1994), the Third Energy Package (providing third party access to energy infrastructure), and the Energy Community with members including Albania, Serbia and Moldova.

In so far as there was energy diplomacy at the European level, it was primarily aimed at bringing Russia and other hydrocarbon-rich post-Soviet states, such as Azerbaijan, into the free market, along with transit countries such as Ukraine. Europe's objectives proved harder to achieve than had been hoped, however. From 2000 onwards, a bullish Russia led by Vladimir Putin stubbornly refused to fall into line. The issue assumed major importance during the 2005–06 gas pricing dispute between Russia and Ukraine, which led Gazprom, an energy corporation under Kremlin control, to resort to turning off gas supplies destined for the Ukrainian market. Unfolding in the dead of winter, the Europeans were shocked by the Kremlin's display of raw power, which, coming hot on the heels of Ukraine's Orange Revolution, appeared politically motivated. They also fretted over the knock-on effects to their own gas supplies from Russia, which were in part delivered through Ukrainian pipelines.

European Commission president José Manuel Barroso decided Putin needed to be put straight. He warned Russia's president that EU antitrust rules allowed Brussels to intervene directly in Gazprom's business, much as the Commission had done with US technology giant Microsoft. His message did not go down well in the Kremlin. For Russia, energy and technology remained two very different businesses. At a dinner with Putin, at which energy relations were discussed, the Commission president 'had his head taken off', according to an EU official. Russia had liberalized its energy markets to some degree. But there were still red lines, and Barroso, whom Putin was said to regard as a 'glorified international civil servant', had trampled all over them.[10]

When it came to energy, and gas in particular, the Russian state wanted to remain firmly in the driver's seat, refusing to bow to EU market regulators. Outwardly Gazprom acquired the trappings of a commercial business, but in the Kremlin's eyes the company's supply agreements in Europe's downstream markets were never contracts between private entities, even if that was their legal status. For Putin, Russia's gas relations with Europe were built on intergovernmental understandings, the outcome of old-style energy diplomacy, as they had been in Soviet times. Applying antitrust laws to

Russian gas exports made no more sense than applying those rules to OPEC or any other bilateral arrangement between governments.

In spite of the EU's efforts to put its energy relations with Russia on a market footing, geopolitics continued to creep back in. In a second Russo-Ukrainian dispute over gas pricing, in the winter of 2009, the European Commission took on the role of neutral arbiter and mediator, keen to minimize the impact on downstream markets in Europe of Russia's decision to cut gas supplies to Ukraine. Slovakia, highly dependent on Russian gas, was hit particularly hard by the interruptions, which forced it to shut down parts of its industry. Opinions differed on who was to blame, however. Robert Fico, in his first stint as Slovak prime minister, travelled to Kyiv to urge it to strike a deal with Moscow, only to find himself berated and humiliated by his counterpart Yulia Timoshenko in front of the press. The encounter left him 'red with anger', according to a Slovak diplomat, and with a distrust of Ukrainian politicians that appears to have endured to this day.[11]

Germany also continued to put its faith in Russia and free-market rules. To mitigate transit risks, and to the annoyance of the US, Berlin threw its weight behind Baltic pipeline projects Nord Stream 1 and 2, which bypassed Ukraine altogether and could therefore not be affected by further gas disputes. Barroso's Commission set out to explore more radical alternatives, chiefly by supporting the development of a Southern Gas Corridor to access Caspian reserves, a move Moscow regarded as bluff. It also launched ambitious plans for the Nabucco gas pipeline, linking Turkey to Austria with Azerbaijan and Turkmenistan acting as suppliers.

Despite such ambitions to find alternatives, Europe's dependency on Russian gas only increased. 'Nabucco' never materialized and the pipelines that have since been built along southern routes have limited capacity.[12] In 2014, Europe acquired approximately one third of its gas supplies from Russia, of which some 40 per cent came via pipelines crossing Ukraine.[13]

After 2014: the need for energy diplomacy returns

Three developments, largely overlapping in time, demonstrated to the EU that its gambit of exporting its 'post-historical' market regulation had run its course. Governments now needed to assume a bigger and more assertive

role in securing the continent's energy interests, including the Union itself. On the one hand, this involves the resurgence of state-led industrial policy, aimed at strengthening and developing green industrial and energy ecosystems on European shores. On the other, it demands a renaissance of energy diplomacy, a profound reorientation towards the wider world with a new focus on the regions and countries that can supply Europe with affordable energy in the future. In the meantime, with the Lisbon Treaty (2009) the European Union had finally given itself a firmer legal basis for joint political action on energy. Leaving aside the early arrangements for coal and nuclear power, the basic charter now for the first time contained a dedicated energy chapter, including the geostrategically crucial notion of 'energy solidarity' among member states.

The Russo-Ukrainian war

Russia's annexation of Crimea in March 2014, in what today could be described as the first act of the Russo-Ukrainian war, made clear that the potential for great power conflict had not vanished from the continent. The idea that Europe's energy relations with Russia could be insulated from a broader clash of strategic interests, or be reduced to questions of supply and demand, began to evaporate. On 10 April, Putin drove home the point, warning eighteen European leaders in a typically frank letter that Gazprom might again be forced to cut gas supplies to Ukraine, which allegedly owed Russia's gas giant some $2 billion in unpaid debt.[14] The move could not be detached from the Maidan revolution, which was abhorred by Putin but egged on by EU politicians. Never had the Kremlin looked so menacing. The letter required a unified response. Stunned by Russia's intrusion into Ukraine, European leaders empowered Commission president Barroso to respond to Putin with one voice.[15] Usually protective of their bilateral gas ties with Moscow, they were growing wary of being picked off, a Russian tactic the Europeans had long endured.

Something was stirring. In the spring of 2014, the Commission presented an 'Energy Diplomacy Action Plan', promptly endorsed by the member states.[16] At around the same time, Polish Prime Minister Donald Tusk launched the idea of an 'Energy Union', calling for diversification to other gas suppliers, a strategy his own country pursued.[17] However, to say that the 2014 crisis initiated a full-blown revival of energy diplomacy would be an overstatement. After Merkel and Putin brokered the Minsk accords in 2015, the pressure diminished, and business as usual resumed. Work on Nord Stream 2 moved ahead. Brussels

officials continued looking for answers through the Union's market prism. In 2018, Margrethe Vestager, EU Commissioner for Competition Policy, brought an antitrust investigation into Gazprom to a negotiated conclusion, announcing with pride that she had provided 'a tailor-made rulebook for Gazprom's future conduct' that paved the way to 'a true internal market for energy'.[18] It took the all-out invasion of Ukraine in February 2022 for the EU to realize that no market-based rule book would protect it against the full force of great power politics. In the end, the decision to supply or not to supply – and to make or break Europe's industrial economy – was the Kremlin's, as it made brutally clear in the course of the same year.

In hindsight, the years between 2014 and 2022 should have been used to diversify away from Russian gas, a strategy Poland pursued. It would have cushioned the blow, had others done the same. However, such diversification required state intervention of a more strategic kind, the sort of energy diplomacy that had been out of vogue since 1989. As things stood, Russian gas remained cheap and plentiful. In its competition with Chinese state capitalism, it was precisely what Europe needed, particularly in its industrial heartlands of Germany. In 2021, Russian gas accounted for roughly 45 per cent of EU gas imports and some 40 per cent of its total gas consumption, more even than in 2014.[19] Then Putin detonated his energy bomb. For decades, cheap Russian gas had been Europe's solution to keeping its economy afloat. With the flip of a switch, that era was over.

New green energy dependency on China

While decoupling from Russian gas was crucial, other developments were awakening the European need for state-led energy diplomacy. Initially, Europe had hoped to become a global leader in green tech and much less reliant on energy imports. By setting ambitious climate targets and introducing rigorous regulation, politicians intended to force Europe's industry to innovate and invest more than elsewhere in the world. However, the renewables revolution came with its own dependencies, notably on China. In 2018, the Commission decided to let its tariffs on the import of inexpensive Chinese solar technology lapse, acknowledging that Europe had lost this battle. Green sectors such as the manufacture of wind turbines, batteries and EVs were at risk of going down the same road. The future of the car industry might not be Volkswagen and Mercedes, but BYD and Xpeng Motors. What made matters worse was Europe's reliance on China for minerals, such as lithium and rare earths, that

are indispensable for the energy transition. Hopes that Europe could, in the short term, become self-sufficient in energy quickly began to fade. At the same time, the consensus grew that the continent needed to limit its exposure to China and build ties with other suppliers.

The emergence of the US as an energy power

Finally, four years of Donald Trump – and the possibility of another four years – made clear that the US, while still an essential power in many ways, cannot be counted on to guarantee global stability and the freedom of the seas indefinitely. By relinquishing some of its influence in the Middle East, the US has increasingly left space for Russia, Iran, Turkey and China to expand into. Moreover, as a net exporter of petroleum products and natural gas, its energy interests do not always run parallel to those of Europe, which is now the world's biggest buyer of US liquefied natural gas (LNG). In 2021 and 2022, as a consequence of the pandemic and Putin's war, European gas prices shot through the roof. More insulated against external shocks by its domestic supply, the US was able to keep price levels largely stable. When prices peaked, Europe paid eight times more for its gas than the US. This gap remains considerable today, putting Europe's industry at a disadvantage.[20] Concerns also arose over the US Inflation Reduction Act (IRA), which introduced subsidies for private investment in green energy technology such as hydrogen and batteries. That those subsidies might undercut energy investment in Europe appeared not to perturb Joe Biden. The race for green tech leadership has turned Europe and the US into competitors, as well as partners. More than ever, Europe will need to find answers on its own.

Conclusion

As the era of free-market rules and Russian gas recedes, a strategic question has returned, but this time to an increasingly carbon neutral world: How can Europe prevent its industrial economy from moving to places where energy is cheaper and critical minerals more accessible than on the continent itself? The need for new solutions to this problem, and for novel forms of energy diplomacy, are acute and among the most pressing issues for the EU in its next five-year legislature. If no answers are found, Europe's industrial base is at risk of further erosion. Strategic dependencies on foreign powers like China are likely to deepen and increase. But where and on what should Europe focus

its new energy diplomacy? Who should take the lead in developing it? And what economic and strategic impact might the global energy transition away from fossil fuels have? To answer these questions, the first step must be to chart the new world of energy (Chapter II), and Europe's position in it (Chapter III).

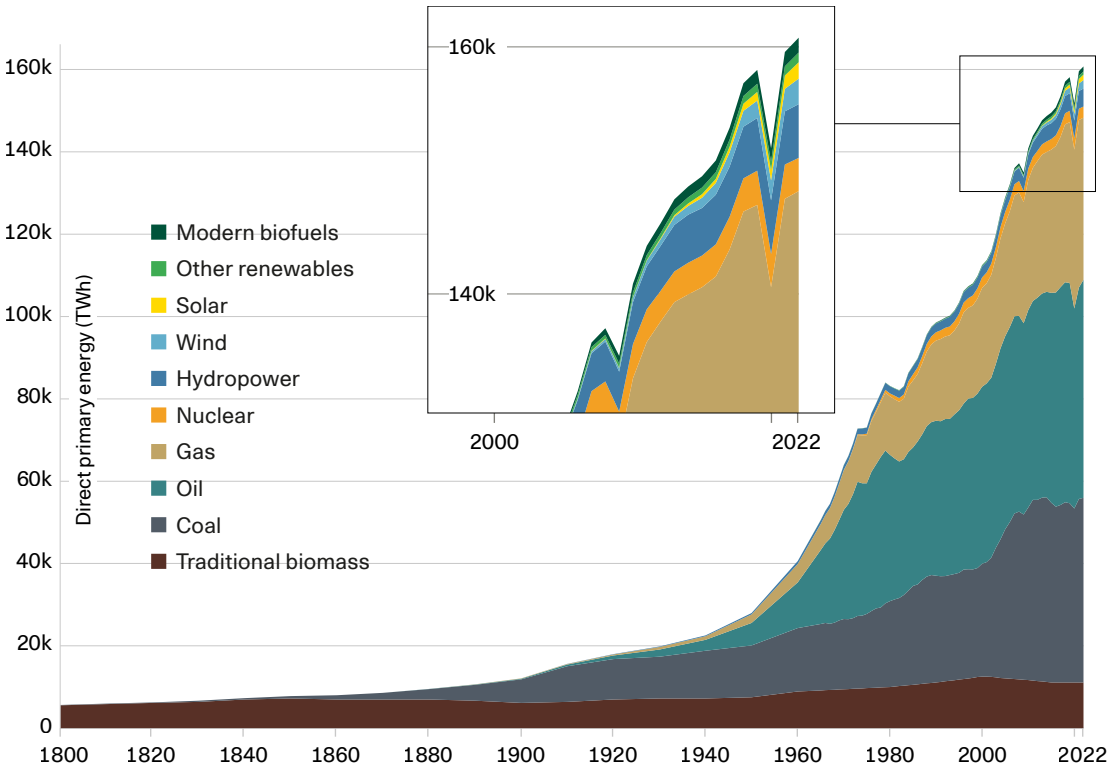
II Transition: the geopolitics of renewables

Introduction

The world is in the midst of a fundamental energy transition, away from fossil fuels and towards renewable energy sources. While the fight against climate change has been the primary impulse behind this shift for decades, current economic and strategic considerations have ratcheted it up, changing the pace and nature of the movement.

Not so long ago, renewable energy was still referred to as being 'alternative' – too expensive to expand beyond niche markets. Today, renewables have become the cheapest source of electricity for most places in the world, and they are growing, according to oil company BP, 'more quickly than any fuel ever seen in history'.[1] The International Energy Agency reckons that the exceptional growth of renewables has become the 'new normal' and describes solar as the 'cheapest source of electricity in history'.[2] A trend that should make it easier to achieve the climate goal of full decarbonization.

World energy mix, 1800–present



Change in global primary energy consumption by fuel

Data source: Our World in Data

Of course the world has seen energy-source shifts before. This one is different in a key aspect, however. Even if we tend to speak, for instance, about the twentieth-century transition 'from coal to oil', one did not entirely replace the other, rather it was added to the energy mix (so we went from coal to coal-plus-oil). The green transition started in much the same way, progressively adding solar and wind energy to existing sources. What makes the current transition unique is that it requires a rapid and large-scale shift to clean energy and a simultaneous phasing out of fossil fuels, which have been the primary source of energy for over a century. Inevitably, numerous vested interests of all kinds are at stake and consequently the ultimate 'net zero' outcome is far from a given.

This chapter examines some strategic consequences of the clean energy transition. After looking at the political battle over the pace of decarbonization, it charts the new cartography of clean energy, zooming in on the emerging maps of green hydrogen, critical minerals and clean tech. It concludes with a brief section on nuclear power.

The battle over the future

It is in the nature of a 'transition' that we know the starting point but not the end point, nor even how long it will take to get there. While technological innovation in clean energy may well happen more quickly than predicted, a number of crucial 'promising' technologies still need to prove their mettle. The rationale of industry and business for sticking with the fuel they know or for betting on green newcomers depends on many factors. Electoral moods may change too, with some voters advocating urgency and green ambition, others protesting against the cost or constraints of climate measures.

The stakes are high – from the future of the planet to the international distribution of wealth and power, and the cost of living. It is no surprise, then, that defining the timeframe and pathway to decarbonization is part of a global political battle – fought at UN conferences, within national governments, within energy company boardrooms, and increasingly on the streets, in courtrooms and at the ballot box.

In late 2023, at the COP28 in Dubai, the world's states jointly declared by their intention to 'transition away' from fossil fuels. But while some 150

countries have committed to reaching net-zero emissions around the middle of this century, there is a huge implementation gap, and a divergence in interpretations of the scope and pace needed to reach the target. Consequently, fossil fuels are likely to remain with us for decades to come, probably well beyond 2050.

Various institutions and companies are building scenarios or making predictions as to how the energy system will evolve in the near future. The inconvenient truth, however, is that there are as many scenarios as there are modellers and they might all be wrong. Unforeseen technological, political and macro-economic shifts often cause energy systems to evolve in less linear ways than the projections suggest. No energy scenario from before 2020, for example, anticipated shocks such as the Covid-19 pandemic or Russia's invasion of Ukraine. Indeed, a common pitfall in scenario development is a failure to grasp political and geopolitical dynamics.

However, even if such shocks were somehow better integrated into the scientific models, there remains an irreducible political element in any such exercise aiming for scientific objectivity. Who sets the standards? What technological avenue is most actively explored? For instance, although the EU sponsors clean energy research, with a focus on alternatives to fossil fuels, there are also scientists who work on mitigation solutions such as 'carbon capture and storage', a prospect supported by gas exporters like Norway and the Gulf states.

To illustrate the contentious nature of energy scenarios, take the work of the International Energy Agency, the self-proclaimed 'gold standard in the energy world'.[3] The IEA's climate models were long criticized as too 'fossil-fuel friendly,' prompting some dissatisfied member states, including Germany, Spain and Denmark, to set up the rival International Renewable Energy Agency (IRENA). However, in recent years, the IEA has adapted, and in 2021 it released its inaugural 'Net Zero Roadmap'. The report was dismissed by the Saudi energy minister as a 'La La Land sequel'.[4] Similarly, the IEA's recent prediction that fossil-fuel demand would peak before 2030 garnered a backlash from OPEC, which denounced the IEA's narrative as 'extremely risky and impractical'.[5] Even if there is more convergence ahead regarding the time horizon, such tensions will remain.

A new cartography

Uncertainties about pace and timing notwithstanding, the overall trend clearly points to the emergence of a clean energy economy. A world map of renewable energy sources is taking shape, which for now overlays the old fossil fuel map and perhaps in due course will replace it entirely.

The contrast between the two cartographies is striking. The fossil fuel map was and is characterized by a geographic concentration of reserves, huge cross-border trade and investment flows, and monumental risks and rewards for actors in these value chains. Think of the 'black gold' of Texas, the affluence of the Gulf, or the gas power of the Kremlin. The emerging renewables cartography looks entirely different. There is no single strategic region or zone that concentrates renewable energy sources. Solar and wind power can be harnessed almost anywhere on the planet; they take the form of inexhaustible flows rather than finite stocks and lend themselves to deployment at any scale—from rooftop solar panels to utility-scale wind farms. This fundamental distinction between the concentrated nature of fossil fuels and the widespread availability of renewables will redefine the dynamics of energy geopolitics in the coming era.

Consequently, the nature of energy dependencies will evolve. As the net-zero transition moves ahead, international trade in fossil fuels will progressively give way to trade in low-carbon technologies, critical materials, renewable electricity and green fuels. Geo-economically, this results in a dual movement: increased energy independence for many countries and residual dependencies for almost all. Both are bound to impact energy diplomacy.

Firstly, we need to bear in mind that a decarbonized world might be a less globalized one. Countries that currently import oil and gas from abroad have an incentive to develop renewables at home. In 2019, petroleum was the top import product for no fewer than 128 countries.[6] By tapping into domestic sources of energy, such as solar and wind, states can improve their trade balance and gain greater strategic autonomy, as they may be less beholden to the geopolitical whims of distant fuel suppliers. In Africa and elsewhere, enhanced access to energy, via rooftop solar panels and mini-grids, could reduce energy poverty. Some developing nations might even leapfrog fossil fuels and centralized grids – just as many of them skipped landlines and moved straight to mobile phones.

On the sellers' side of the balance sheet, fossil fuel exporters may lose geo-political standing and influence. To offset the shock, some, such as the United Arab Emirates and other Gulf states, are investing massively in the transition and may be well placed to keep a leading position in the new cartography. Others, such as Venezuela or Libya, may be less well prepared to ride out a loss of revenues, with as yet unpredictable domestic and strategic consequences.

The deglobalizing effect of the energy transition is visible at various levels. To start with, moving away from fossil fuels will result in less maritime trade overall, since around 40 per cent of maritime cargo *is* fossil fuels.[7] In addition, getting to net zero requires the use of more electricity, which is likely to be produced locally or regionally. Electricity is simply harder and more expensive to transport over long distances than oil or gas. In 2018, less than 3 per cent of electricity produced globally was transported across borders.[8] Finally, the green technology race between China, the US and Europe triggered by the transition has led to an increasing recourse to defensive industrial and trade measures. So although the fight against climate change must be a global effort, it will result in fewer global trade and economic links.

This being said, even as countries become less dependent on fossil fuel imports, they will remain entangled in global interdependencies. Whereas the fossil fuel map simply connected oil and gas fields to markets, the geopolitics of the energy transition will play out across three overlapping maps.[9]

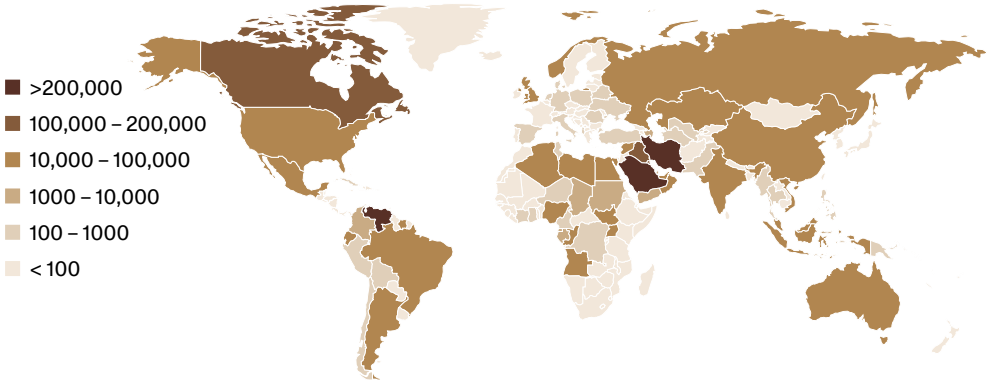
First, there is the map of trade in green hydrogen, a clean fuel made from renewables that could help to decarbonize heavy industry, machinery and some forms of transportation. Second, there is the map of critical minerals, such as lithium, copper and cobalt, which are needed to manufacture batteries, solar panels and other renewable energy technologies. The third map consists of trade in finished low-carbon products and technologies. It covers not only solar panels, batteries, wind turbines, electrolysers and so on, but also a much broader set of industrial activities (the manufacture of steel and automotive vehicles, for example).

These three clean energy maps, together with the fossil map, define the theatre within which Europe's new energy diplomacy must be deployed.

The changing world map of energy sources

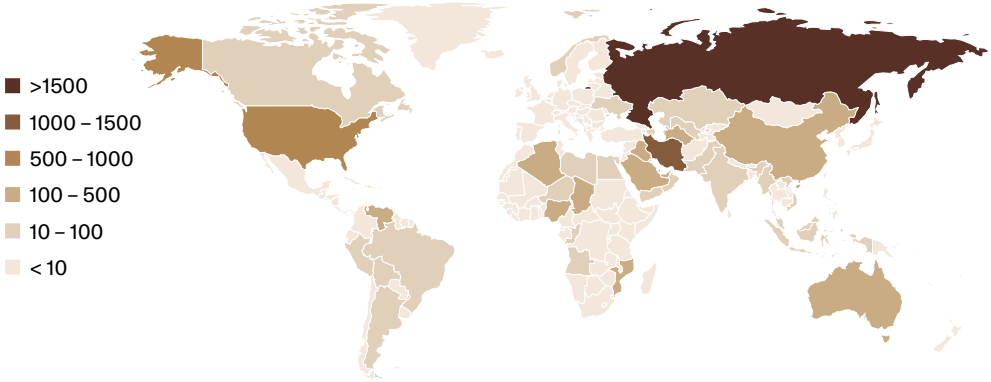
Fossil fuels: World oil reserves

Crude oil reserves incl. lease condensate (billion barrels, 2021)



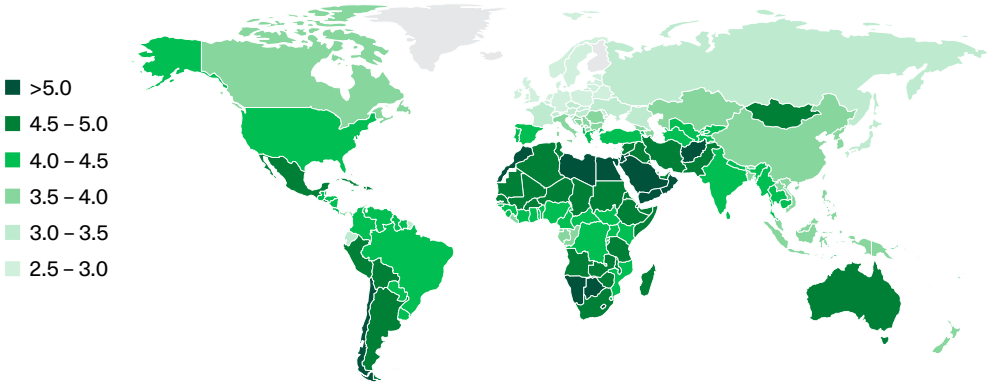
Fossil fuels: World gas reserves

Natural gas reserves (trillion cubic feet, 2021)



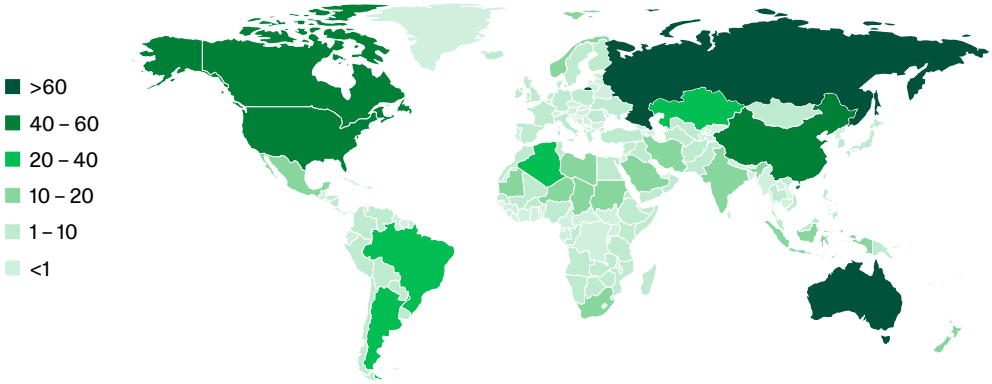
Renewables: Global solar potential

Average practical potential, PVOUT Level 1 (kWh/kWp/day), long-term



Renewables: Global wind potential

Onshore and offshore wind potential (PWh per annum)



Data sources: EIA (fossil), World Bank (solar), NREL (wind)

Map 1: Solar, wind and green hydrogen

Although every country in the world has access to renewable energy sources, the technical potential and costs vary widely across regions. Over the span of a year, for example, southern Algeria receives more than twice the amount of solar energy compared to central Germany.[10] Globally, a total of 148 countries are positioned within the 'Sunbelt' region, spanning an approximate latitude range of 35 degrees either side of the equator.

Other types of renewable energy are more concentrated. Some of the planet's premier wind resources are located on the southern tip of South America, in Patagonia, as well as in northern Japan and the United Kingdom. The biggest hydropower potential is found in large countries such as China, Russia, Canada, Brazil and the US, although in per capita terms, countries such as Nepal and Tajikistan are hydropower giants too.[11] The world's geothermal resources are highly concentrated in a select few countries, including Iceland, Indonesia and the Philippines.[12]

Some countries are blessed with so much renewable potential that they can aspire to be more than self-sufficient. They could become exporters of surplus renewable electricity to neighbouring countries via high-voltage transmission cables. For example, some 75 per cent of Bhutan's hydroelectricity is already exported to India, and there are plans to expand both its hydropower capacity and the cross-border electricity trade.[13] Yet exporting electricity through wires only gets you so far. The longest subsea electricity interconnector that currently exists is the North Sea Link, a 720-kilometre connection between the UK and Norway.

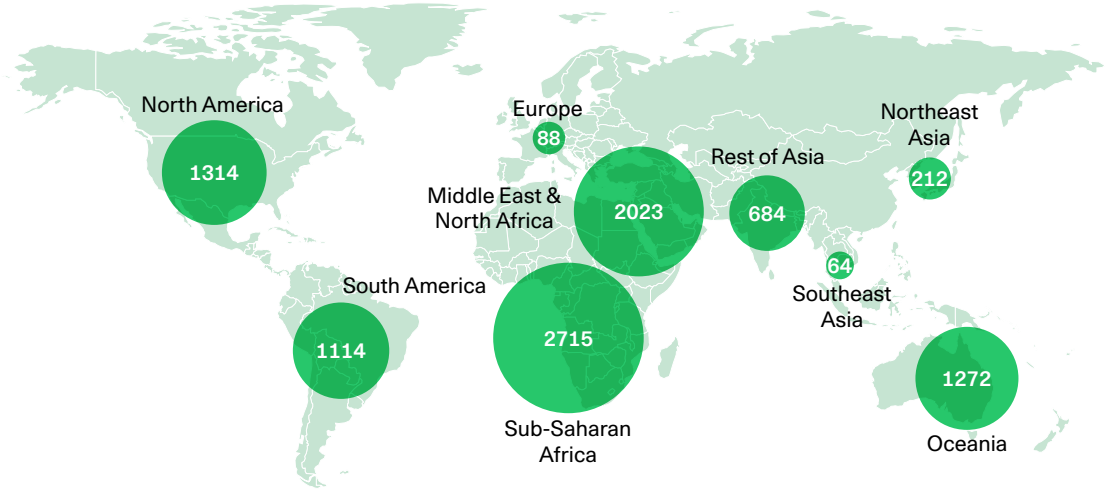
This is where the promise of 'green hydrogen' comes in, a transportable zero-carbon fuel. It is as yet untraded at industrial scale. As so often happens with technologies with 'revolutionary' potential, it has its share of devotees and proselytisers as well as sceptics.[14] Since the future role of hydrogen already shapes energy diplomacy assessments and initiatives across the globe, a brief technical explanation follows.

> Hydrogen is a manufactured product, not an extracted commodity.[15] It can be made anywhere, including in Europe (you just need a chemical compound containing hydrogen plus electricity). It is considered 'green' if the compound is water and the electricity used for electrolysis to release

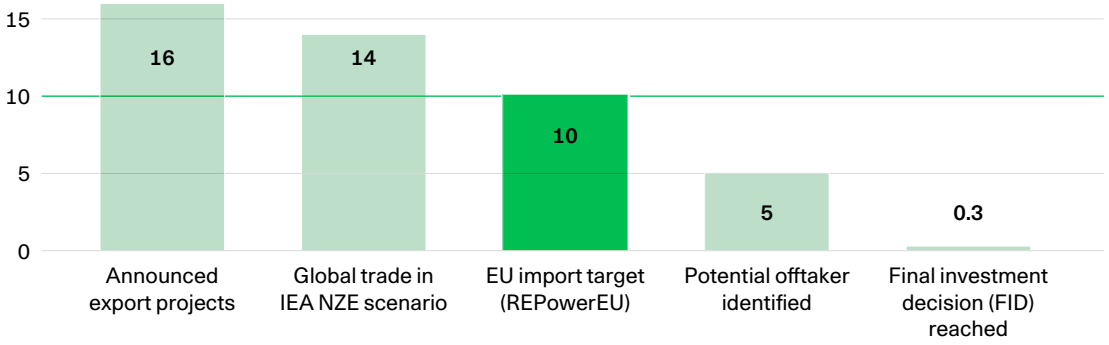
Green hydrogen potential

Technical potential for producing green hydrogen under USD 1.5/kg by 2050 (EJ)

1EJ = 7 Mt of hydrogen



Potential exports by 2030 (Mt H_2 equivalent)



Data source: IRENA, IEA

the hydrogen gas is entirely from renewable sources. It is considered 'blue' or 'grey' when the compound the hydrogen is derived from is a hydrocarbon fossil fuel, depending on whether or not the carbon released in the process is captured (blue) or not (grey).

Just like electricity, hydrogen is strictly speaking a carrier and not a source of energy. It 'carries' energy, acting as storage, not unlike a battery. While releasing this energy can be achieved in many different ways, hydrogen's clean energy potential mostly lies in three sorts of use. First, the hydrogen molecule can be used as industrial *feedstock*, a substance or reactant utilized in the construction of other products, in refineries, chemical plants and steelmaking. Here, green hydrogen could replace the grey variant currently used. Second, hydrogen can serve as a *green fuel*, for long-distance shipping or aviation for instance. In those cases, hydrogen is combusted in place of a fossil fuel, which enables the decarbonizing of sectors that are difficult to electrify. Third, hydrogen can be used to generate *electricity* in power stations replacing fossil fuels. You start with (green) electricity to produce hydrogen, which is then transported to be turned into electricity again. While the first two uses make perfect sense, the third is more contentious because of the substantial energy loss incurred along the way.

So here lies the appeal of green hydrogen: it can connect regions in the world that produce a surplus of renewable electricity (often in the global South) with regions that could use clean feedstock, green fuel or green electricity (often in the global North). In the language of its promotors, hydrogen allows you 'to ship the sunshine', to move the energy of sunlight or wind around the world. It can be transported in gas or liquid form or as liquefied derivatives, such as ammonia or methanol. The future hydrogen market may therefore resemble the natural gas market, with regional systems connected by pipelines and some liquefied forms being shipped globally.

Projections show that large parts of the world could become self-sufficient in hydrogen, including the US, China, India and Brazil. However, Europe, Japan and South Korea will remain dependent on imports. A large number of nations are gearing up to serve those markets, including current fossil fuel exporters such as Saudi Arabia, the United Arab Emirates and Australia, which aim to offer both the blue and the green variants. But a new class of solar-based exporters may also arise, including the likes of Chile, Morocco and Namibia.

While the promises of hydrogen are clear, so are its downsides. In its gas form, it is unstable and explosive. Safely shipping large quantities of hydrogen, for instance in ammonium tankers, is not easy either. Whereas oil spills have contributed their share of ecological disaster, its 'green' successors pose similar risks that must be avoided. The shipping industry is currently taking up the challenge.[16] The other major complication concerns climate efficiency. For instance, to drive the same distance in a hydrogen-powered car, you need two to three times the number of wind turbines as for a battery EV. Inefficiency obviously raises costs. In its first auction, launched in late 2023, the European Hydrogen Bank provided subsidies of up to €4.50 per kilogram of green hydrogen; this subsidy alone is about four times the current natural gas price in Europe (and more than twelve times what US industry pays).[17] Given this cost, using hydrogen widely across electrifiable sectors would risk slowing down the energy transition. It could even lead to de facto de-industrialization.

Finally, rather than exporting their renewable energy surplus, sunny and wind-swept nations may also consider using their renewable endowment to attract energy-intensive industries instead. There is currently a mismatch between the 'hot spots' of heavy industrial activity and the 'sweet spots' of abundant renewable energy. Certain industries – such as steelmaking – may relocate to these sweet spots, an aspect of the new cartography taken up below.

Map 2: Critical minerals

In the emerging geopolitics of energy, despite a nation's power no longer being tied to its oil or gas wealth, it will undoubtedly still be linked to whether it possesses the metals and minerals needed for the manufacture of low-carbon technologies. This interdependence creates our second renewables map, that of critical materials.

Although the key locations of these mineral deposits differ from those of fossil fuel reserves, the dynamics will look familiar. Minerals and metals are extracted, then moved to refineries and processing plants, before being turned into final products. Many of the fossil fuel supply-chain concerns operate – concentration, bottlenecks and cartels – albeit with different specifics.

The trade-off for achieving net zero appears to be the substantial mining and extraction of metals from the earth's crust, rare or otherwise. From copper

for electric wiring and iron to make steel for wind turbine towers, to lithium for batteries and silicon for photovoltaic solar panels, global demand for a wide range of raw materials is set to grow dramatically – and it could transform the economic fortunes of countries that produce them.

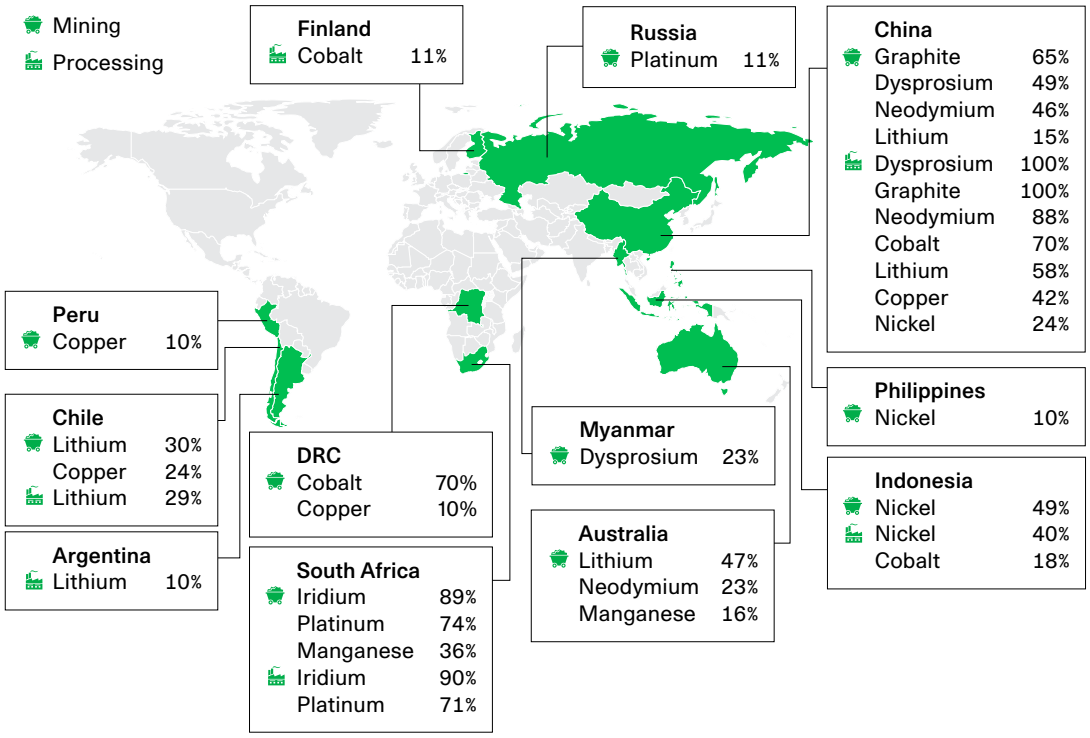
What characterizes most of these mineral markets is the very high geographic concentration of production and processing. The Democratic Republic of the Congo (DRC) produces 70 per cent of the world's supply of cobalt, while nearly 74 per cent of the world's platinum is mined in South Africa. Around two-thirds of all nickel is extracted in just three countries: Indonesia, the Philippines and Russia. Similarly, for lithium, the top three producers (Australia, Chile and China) command a share of more than 90 per cent.[18] By way of comparison, in 2022 the combined market share of all thirteen OPEC members in global oil production was only 36 per cent.[19]

The refining and processing of metals is even more geographically concentrated, with China accounting for over half of the global refined supply of natural graphite, as well as the rare earths, cobalt, lithium and manganese. For some of these materials, China's market share is close to 100 per cent.[20] Besides, over the past ten to fifteen years, Chinese firms have made huge investments overseas,[21] into cobalt and copper mines in the DRC,[22] lithium extraction in South and Central America,[23] and nickel smelters in Indonesia.[24]

After decades of outsourcing industrial production to Asia, today the US and its allies fret over China's dominance in metallurgy. For one thing, certainly after the global trade breakdown during the Covid-19 pandemic, governments now realize that concentrated supply chains are prone to 'single points of failure'. In late 2021, for example, Chinese magnesium plants were partially closed due to nationwide energy rationing, dealing a blow to Europe's industry, which depends on China for 95 per cent of its magnesium supply. For another, some of these metals have become caught up in the rivalry between China and the US. As early as 2010, China restricted exports of rare earths, a move some observers interpret as the first instance of minerals being used for geopolitical leverage.[25] The US, for its part, banned imports of solar panels from China's Xinjiang Uygur Autonomous Region in 2021, in response to alleged human rights abuses. The fact that some metals are crucial for strategic products such as microchips and military weapons systems adds to their geopolitical importance.[26]

Critical raw materials

Countries accounting for largest shares (>10%) of global supply of key energy transition minerals



Data source: US Geological Survey

The geographic concentration of the mining and processing of raw materials needed for the energy transition is a fact of life, at least for the decades to come. More countries could decide to exploit their geological resources than currently do. However, new mine development takes time, preventing the quick redrawing of the global map of metal extraction. On average, it takes twelve to seventeen years from resource discovery to the opening of a productive mine.[27] When it comes to new refining capacity, the timescales are much shorter. Growing global demand, environmental risks and local opposition may nonetheless hinder efforts to diversify refining capacity away from China. It will therefore be next to impossible for Europe, Japan and the US to meet their net-zero goals without maintaining a deep relationship with Beijing – a fact that is presumably not lost on the Chinese.

Mineral-rich countries stand to gain from the energy transition, but they are unlikely to attain the enduring influence that has been enjoyed by oil and gas producers.[28] Mineral markets are many orders of magnitude smaller than those for fossil fuels. Export revenues will never match the immense rents generated by oil and gas exports, a staggering $2 trillion in 2021. Whereas petroleum has long been unrivalled as a transport fuel, energy transition metals have a much higher risk of substitution, effectively curtailing any effort to weaponize or cartelize the metals trade. Moreover, disruptions in the supply chains of these metals do not lead to immediate energy shocks. Finally, while the bulk of fossil fuels are burned, metals and minerals can be reused and recycled. Thus, over time, regions that currently depend on imports could cultivate a steady supply of reclaimed metals.

While the dream of fossil riches may be unattainable, states that sit on mineral resources are increasingly aware of their advantage. Despite what the term ‘rare’ earth might suggest, these minerals, although dispersed, are abundantly present in the earth’s crust. Moreover, surging demand for energy transition technology is creating tighter market conditions, favourable for sellers. Against this backdrop, governments of nations endowed with such resources are seizing the moment to assert control over their mining industries. For example, Namibia and Zimbabwe have banned exports of raw lithium, the DRC is renegotiating foreign access to cobalt reserves, Peru has reformed its copper royalty regime, and the Chilean government plans to create a state-owned company for lithium. Indonesia’s recent ban on nickel exports has helped it in turn to attract investments in midstream (i.e. nickel smelters) and even downstream industries (i.e. battery plants and EV factories). In any

case, the intricate tensions between mineral-rich nations and the countries that depend on them are poised to become an inescapable facet of the new geopolitics of energy.

Map 3: Clean technologies

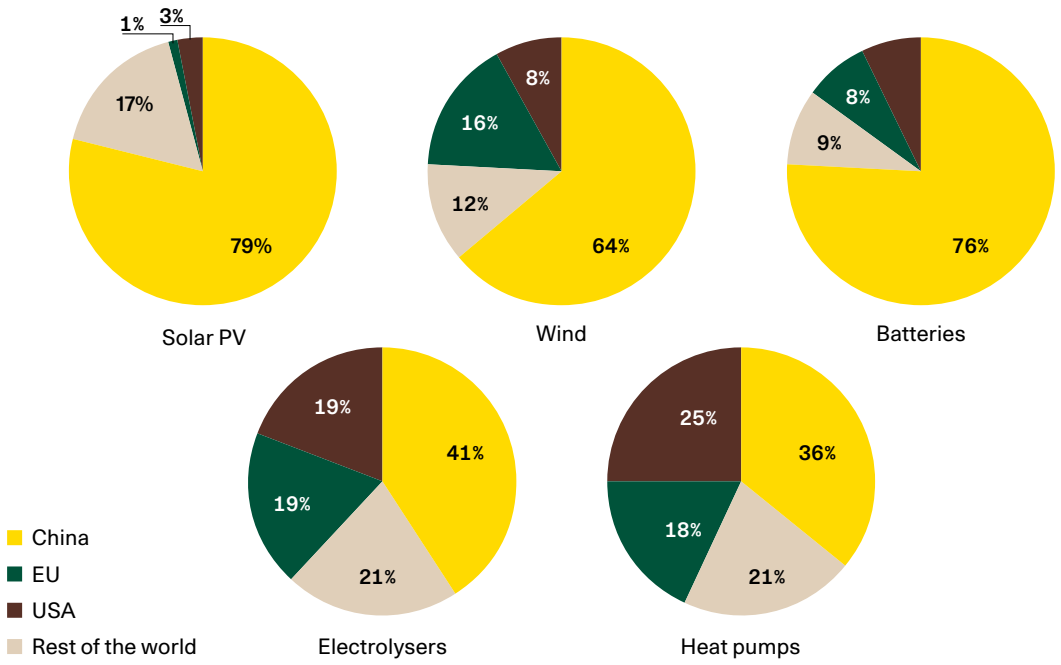
Getting to net zero requires nothing short of a green industrial revolution, so the economic stakes are sky-high. This is why our third renewable energy map is that of clean technologies. Its contours are not yet set, as countries find themselves increasingly locked in a green technology race, whether aiming to become less dependent on geopolitical rivals, or to create domestic jobs and export industries. Regardless of its final shape, this is a map of economic and great power competition.

It is also a different kind of map, in view of the fact that this energy transition is not like previous ones. As mentioned, whereas the world has shifted in the past from one fuel to another, adding each new fuel to the mix, this time we are slowly but unmistakably moving away from fuels and towards the infinite flows of wind, water and sun, and heat from the earth's core. Harnessing these energy flows requires technologies such as turbines, panels, batteries, heat pumps and electrolysers. In other words, we are transitioning away from fuels and towards technology.

In this emerging landscape, geopolitical influence will be less about control of finite resources in specific regions and more about deploying knowledge and technology to drive sustainable energy solutions. Nations with advanced technological capabilities and a capacity to innovate in the field of renewable energy will become the new powerhouses. Mass-manufactured clean energy technologies will be worth around €600 billion a year by 2030 – more than three times today's level.[29] In this huge market, countries want to be technology makers, not technology takers.

All major powers are positioning themselves for the rapidly emerging green economy. Globally, governments spent some €40 billion on energy research and development in 2022, 80 per cent of it devoted to clean energy topics.[30] The largest public spender on energy R&D is China, trailed closely by Europe and the United States – each spending more than €10 billion per year.[31] In terms of innovation, Europe at large, Japan and the United States together

Shares in manufacturing capacity for key clean energy technologies (2022)



Data source: IEA

accounted for more than 75 per cent of all clean energy patent families (patents filed in more than one country) between 2000 and 2019.[32] China follows at some distance, accounting for only 8 per cent.

In actual renewable energy deployment domestically, however, China is the undisputed world leader. For all the talk about its coal dependence, the country is installing renewables at a breakneck pace. Each year since 2020, China has added about 140 GW of renewable electricity capacity to its network, more than the US, EU and India combined.[33] In 2023 alone, it installed more new solar capacity than the US had done over the past half-century.[34] And China's lead is growing. This year it is expected to deliver almost 70 per cent of all new offshore wind projects globally, as well as over 60 per cent of onshore wind and 50 per cent of solar PV projects.[35]

When it comes to the manufacture of clean energy technologies and the international trade in them, China is likewise the undisputed leader. It produces around 75 per cent of the world's solar panels and more than 60 per cent of parts for wind turbines. It dominates the global supply of components,

producing 80 per cent of the world's solar-grade polysilicon, 85 per cent of all solar cells, and 97 per cent of the silicon ingots and wafers that form the core of solar cells. Or consider battery electric vehicles: China is dominant at almost every stage of the supply chain. Shenzhen-based BYD recently took over from Tesla as the world's leading EV company in units sold.[36]

Three factors explain why the other major economies find it very difficult to compete with China in green tech manufacturing. First, it benefits from economies of scale: with a population of 1.4 billion, the country's domestic market is many times larger than that of the US or the EU. Second, the Chinese have succeeded in securing a dominant position at every stage of supply chains. This is where the maps for critical minerals and clean tech interact and overlap. Third, its state subsidies create a considerable competitive advantage. Understandably, state intervention in the market is eyed with suspicion by Washington, Brussels, Paris, Berlin and London. However, given the comparative advantages conferred by the first two factors, lavish state aid for Western green tech firms will not unseat their Chinese competitors.

Nuclear ties

Nuclear power deserves specific consideration; although it is not a renewable energy source, it is largely carbon-free.[37] Consequently interest in its potential role in the transition is increasing globally.[38] At the same time, security concerns and the disposal of radioactive waste make nuclear power a politically divisive topic, especially in Europe.

A dozen states in the world rely on nuclear power for a third or more of their electricity. This includes France and Slovakia (ca. 60 per cent), Czechia and Switzerland (ca. 35 per cent) and Sweden and South Korea (ca. 30 per cent). In Russia and the US, nuclear contributes close to 20 per cent of electricity supply, whereas in China, Germany and Japan it is just below 5 per cent. However, in terms of the amount of electricity generated, the US is by far the world's number one producer (with over 750 TWh), followed by China (close to 400 Twh).[39]

As in the case of renewables, nuclear power gives rise to two types of trade and strategic dependencies: mining and enrichment of uranium; and nuclear reactor design and technology. The reactors require a huge initial investment,

enjoy a multi-decade lifespan, but rely on non-substitutable fuel. This makes the nuclear sector more prone to supply chain dependencies than for instance solar.

Fewer than ten countries play a significant role in global uranium extraction. After 1945, most Western uranium supplies originated from the Belgian Congo and were reserved for the Americans and their British allies through covert agreements. Later, the UK and the US secured resources in Canada and Australia, whereas France relied heavily on deposits in its former colony Niger. On the other side of the Iron Curtain, uranium was mined in Kazakhstan, Uzbekistan and Russia. The same group of countries still control global production today, except that Congo stopped mining and has been replaced by Namibia and South Africa.[40]

Uranium enrichment is dominated by Russia (46 per cent of global capacity), followed by Europe (30 per cent), the US (12 per cent) and China (11 per cent). Together they account for a worldwide enrichment capacity surplus. However, concerns in the US and Europe have been growing, given that they depend on Russia for a fifth of their enriched uranium.[41] Five EU states still rely on nineteen Russian-designed reactors built during the Soviet era, which are entirely dependent on Russian nuclear fuel. One such power plant supplies Hungary with 50 per cent of its national electricity. In August 2022, after Russia's invasion of Ukraine, it went on to invest in two more.

The export of nuclear technology, while a considerable commercial activity, also represents a potential tool of geopolitical influence – something the US and Soviet Russia soon realised. Engaging in a nuclear project with a foreign partner establishes a commitment spanning almost a century, from plant construction to operation and decommissioning. Today, Russia exports its expertise and technology to more than 20 countries in Africa, including Egypt and Rwanda. China has growing export ambitions, despite losing the contract for the construction of the Hinkley Point reactor in Somerset over the UK's belated security concerns; it is now primarily engaged in Pakistan and Bangladesh, countries over which it has stronger leverage.[42] The US Congress, realizing the country was losing ground to its rivals, is currently discussing an 'International Nuclear Energy Act' to step up its action overseas. In late 2023, the Americans struck a deal to construct Poland's first nuclear power plant, which should be operational by 2033.

Finally, Saudi Arabia, the fossil fuel behemoth, is betting not only on solar energy investments but also planning to build its first nuclear plants. For the kingdom this is not just about energy supply, since the regional nuclear balance is at stake: nuclear weapons in Israel, a nuclear programme in Iran and new nuclear power stations in the United Arab Emirates (provided by South Korea). Mindful of its global strategy as well, Riyadh seems to be soliciting bids for reactors from both Washington and Beijing[43] – a nuclear aspect of the Saudi balancing act between its long-time (American) security guarantor and its new (Chinese) fossil fuel customer.

Conclusion

A worldwide clean energy economy is rapidly emerging, thanks to exponential growth in solar, wind and battery capacity. The transition could prove a blessing for the many nations currently reliant on expensive and insecure fossil fuel imports. At the same time, the energy shift will create new trade dependencies and vulnerabilities. As the maps in this chapter show, we cannot simply transpose old thinking about the geopolitics of oil and gas onto the new geopolitics of renewables. For one thing, the resources for renewables are much less concentrated than fossil energy: there is no green equivalent to the fossil wealth and power of the Gulf. There is also a big difference between being dependent on Russia for gas and being dependent on China for solar panels, as industrial supply-chain ruptures do not translate into acute or immediate blackouts or power cuts.

The exact pace and nature of the clean energy transition are impossible to predict. Leaving aside the uncertainties of technological change, the outcome will depend to a significant extent on the clash between those economic and political forces that will either accelerate or decelerate the process. After a period of relatively quiet policymaking, in which ambitious targets such as those of the EU's 'Green Deal' were laid out, this clash is rapidly entering domestic electoral politics. It is evidenced by the Yellow Vest protests in France in 2018, by the 2023 heat-pump uproar in Germany and by US presidential candidate Donald Trump's pledge to drill unabashedly for oil and take his country out of the Paris Agreement (again). The public opinion backlash, which overrides a simultaneously sharpening climate activism, may well slow down the transition to net zero.

Moreover, strategic considerations increasingly play a role. While Russia's invasion of Ukraine boosted Europe's net-zero ambitions (as will be seen in the next chapter), the ensuing 2022 gas panic also showed how deeply dependent the continent remains on fossil fuel imports. The current crisis in the Middle East, with its smell of '1973' and potentially another Arab oil embargo, underlines this vulnerability. Such crisis moments go to show that, when security of supply clashes with the green transition, the former wins. Ultimately, having energy is more important than having clean energy.

This being said, two other forces are pulling in the direction of green acceleration: industrial competitiveness and geostrategy. Economically, the rapidly decreasing cost of solar and other renewable energy technologies is already having an impact on industrial investment decisions across the globe. Geopolitically, the deep-seated strategic rivalry between China and the United States will continue to work as a green technology accelerator. It is to these two forces that Europe needs to respond, not least by deploying a more strategic energy diplomacy. To assess the urgency, the next chapters will turn to the geography of Europe's own energy landscape (Chapter III) and its changing policy debates (Chapter IV).

III Geography. Europe's energy landscape

Introduction

For over two centuries, Europe's energy map was delineated by fossil fuels. First came coal, transported from mines near or far to any coal shed. Then followed gas and oil, for which networks and transport systems were progressively established, just as for electricity. Underground pipelines were drilled, cables laid, power stations complete with their cooling towers built, while pylons bestrode the European countryside.

As the continent moves from fossil fuels to carbon-neutral energy, a new layer is being added to this energy landscape. Renewables require new energy production spots, ranging from the windswept North Sea basin to the sun-drenched plains of western Spain. Battery and electric vehicle factories are sprouting up in Poland, Germany and elsewhere across Europe. Meanwhile, one or two generations after the shutdown of most coal mines, from Portugal to Finland and Serbia to France, companies are now opening new pits and shafts, actively exploring for lithium and other minerals to propel the energy transition.

Although the precise contours of this evolving energy landscape remain uncertain, one thing is clear: the new cartography will not only reshape industrial prospects and the balance of power within Europe but also determine the continent's need of foreign supplies and hence its energy diplomacy outlook.

This chapter takes a look at the geographic and material aspects of Europe's energy position today. Chapter IV will then focus on the policy preferences and initiatives of the Union's 27 states and the EU institutions.

Domestic coal and industrialization

Setting aside all the local wood, peat and other biomass fuels that have been burnt since humans discovered how to make fire, Europe's first decisive energy layer is that of its coalfields. Cheap and plentiful coal enabled Western European countries to become the wealthiest economies in the modern world. As an economic historian put it, 'The map of the British Industrial Revolution … is simply the map of the coalfields.'[1] On the continent, the coal

belts of Belgium, northern France, Germany and, later, Poland and Ukraine became major centres of heavy industry. Other industrial centres were able to thrive only if they had access via waterways to a good source of coal.[2] To this day, the location of iron and steel factories in Europe still closely mirrors that of either active coal mines or major rivers, canals and ports, with one notable exception: factories close to hydropower stations in Northern Italy.[3]

Up until the Second World War, Europe managed to meet its coal demands from within its own borders. However, following the destruction of mines during the war, coal production in Western Europe struggled to regain its pre-war levels, necessitating imports, primarily from the United States, to fill the gap.[4] Concurrently, once Poland became part of the Soviet sphere, its coal supplies went east. As mentioned in Chapter I, coal led to the first major Western European collaboration in the form of the European Coal and Steel Community (1951), which quickly became a means to manage the sector's challenging decline.[5] From the 1960s onwards, coal was outcompeted and displaced by oil. However, notwithstanding the closing of mines in Lancashire, the Ruhr or Wallonia, coal still powers European heavy industries. In Germany, some 20 per cent of primary energy came from coal-fired power stations in 2022.[6] In Poland, it was as much as 42 per cent.[7] Although coal power is supposed to be phased out by the EU (and other industrial nations) by 2030,[8] the continent's last coal miners are still digging seams in Silesia, the Donbass and the Western Balkans.

Oil and gas: new flows and import dependencies

By the early 1960s, oil had firmly established itself as the predominant energy source across many European states. The German Federal Republic, for example, rapidly converted to an oil-based economy in the early post-war decades. Cheap oil from the Middle East fuelled consumer society, with the automobile, made in Germany, at its heart.[9] Alongside the coal industries of the Ruhr (and steel companies such as ThyssenKrupp), major automotive manufacturers developed in southern Germany around Stuttgart, Ingolstadt and Munich (with household names like Mercedes, Audi and BMW).

With the exception of Romania, the continent had limited oil production and relied heavily on imports from the Middle East and North Africa, shipped via the Suez Canal. Meanwhile, Eastern Europe secured its oil supplies from the

Major gas pipelines and LNG terminals in Europe

Gas covers pipeline and LNG, oil covers crude

Data source: ENTSOG

Soviet Union, particularly via the 'Druzhba' ('friendship') oil pipeline, which was inaugurated in 1964 and is still flowing.

In addition to petroleum imports and the accompanying infrastructure, from the early 1960s a network of natural gas pipelines was developed.[10] This was triggered by the unexpected discovery of natural gas reserves in the Netherlands (1959), the United Kingdom (1965) and Norway (1969). The local gas was used for domestic consumption, but the boon was such that it also allowed substantial exports. After the 1973 oil shock, the rest of Europe keenly welcomed this new supply as a means to diversify away from oil.

Meanwhile, Austria, Italy and West Germany had negotiated gas agreements with the Soviet Union, leading to the arrival of 'red gas' in West Germany in 1973. From the 1980s onwards, long-distance pipelines were also built along Europe's southern flank, to move gas from North Africa across the Mediterranean.

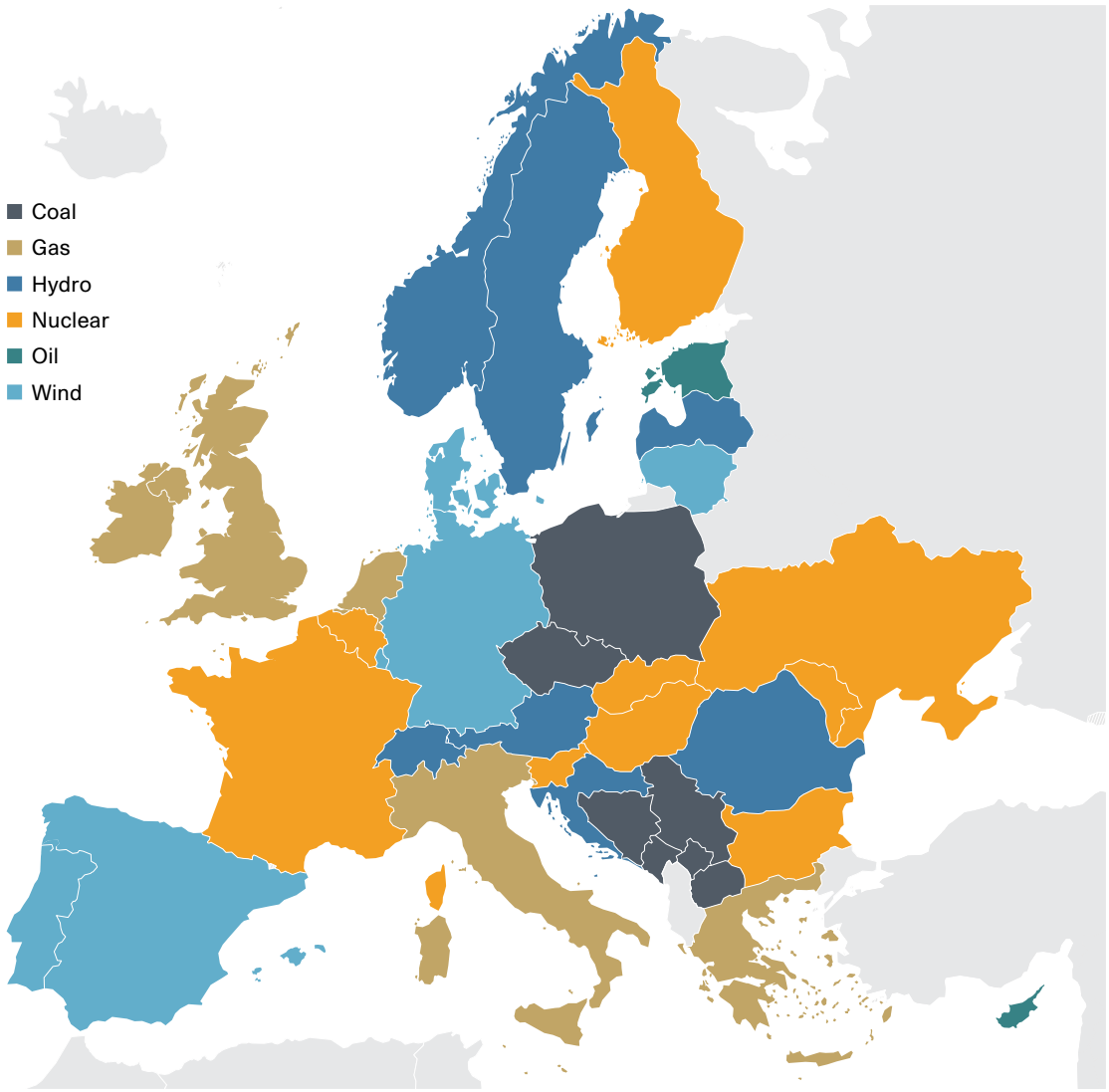
By 1990, Europe was importing roughly half of its natural gas, a figure that steadily surged to over two-thirds during the first decade of the new millennium, ultimately reaching 97 per cent in 2022.[11] Natural gas production in the EU dwindled from over 150 billion cubic metres (bcm) in 1996 to just over 40 bcm in 2022.[12] However, one producer filled the emerging gap, namely Russia.

Electric power and its sources

While oil and its derivatives fuelled Europe's industries and motor vehicles, and natural gas provided fuel for cooking and heating, it was electricity that powered everything from trains and streetlights to washing machines and personal computers, with distribution across the continent in an ever finer networked grid.

The generation of electricity can be achieved using a variety of energy sources, but in most cases it requires heat to generate steam to drive a turbine. Late-twentieth-century power stations could burn coal, gas or biomass to create that heat, or split uranium atoms to release their latent nuclear energy, or in hydroelectric power stations use the force of waterflows to spin the turbines. Choices depended first on location – such as a proximity

Biggest source of electricity generation in Europe (2023)



Data source: Ember

to mines, pipelines, railways, and water to cool nuclear reactors, or suitable topography for hydropower plants.

The technology for nuclear power was first developed in the US and in the Soviet Union. Both Cold War rivals eventually shared it with their respective European allies – in the American case, not until after President Eisenhower's landmark *Atoms for Peace* speech in 1953. By the mid-1970s, France, the UK and West Germany had developed their domestic nuclear technology industries to the point that they could export nuclear technology both within and outside Europe. At the same time, nuclear power became an issue of major public protest across Europe. This discontent grew after the 1986 Chernobyl disaster, and again after the reactor breach in Fukushima in Japan in 2011. Nevertheless, nuclear power has remained a crucial component of many countries' energy mix.

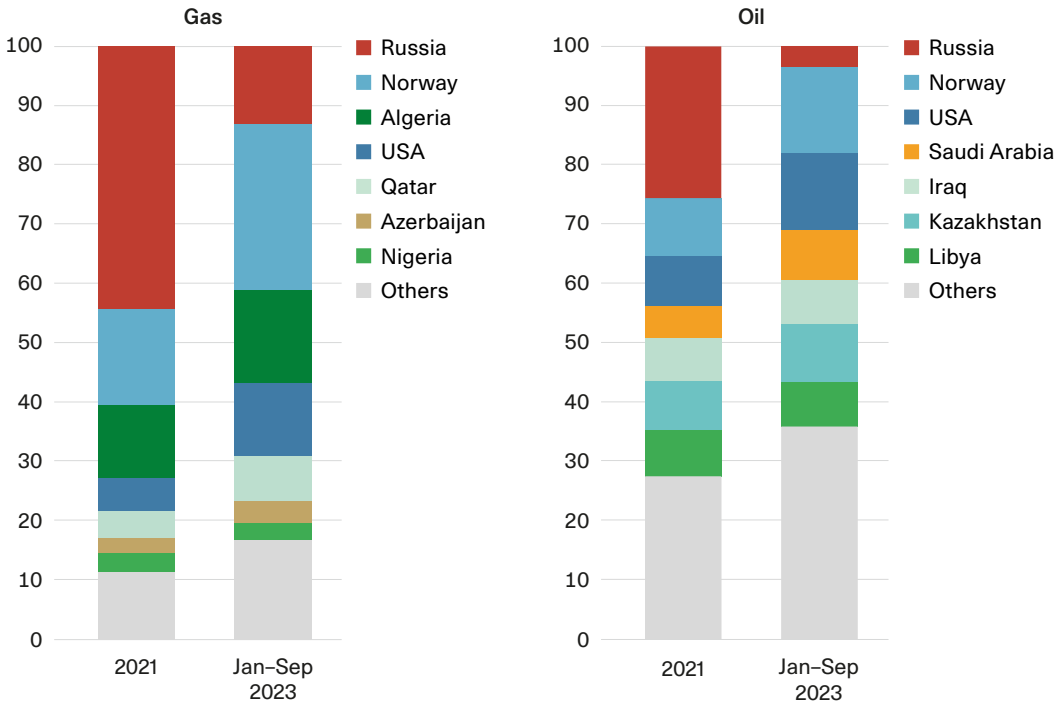
Even if electricity constitutes little more than 20 per cent of total energy consumption in most of present-day Europe, a country's electrification choice determines its long-term perspective on energy – and consequently on its energy transition. For instance, France conceives of itself as a nuclear state, whereas Denmark and Lithuania have emerged as the continent's earliest wind-power states, in contrast to coal states such as Czechia and Poland and gas states like the UK or Italy. Germany, until recently a coal state, is moving towards wind power, while Spain, Portugal and Greece, currently reliant on gas, are betting on solar and wind for their electricity future.[13]

Turning point 2022: Gazprom exit plus green acceleration

Changes in the energy landscape are usually gradual, because technological innovations take time to become mainstream. But political events can have more acute repercussions. Just as the 1973 oil shock accelerated the transition to gas and nuclear power, the 2022 Russian invasion of Ukraine jolted the European energy system. There have been two major consequences: a move away from Russian gas to other gas providers and a shift to other energy sources, accelerating the green transition.

Before the war, Russia was Europe's leading supplier of coal, natural gas and oil, accounting for 52 per cent, 40 per cent and 25 per cent of imports respectively.[14] Natural gas, more difficult to store and transport than other

Change in EU gas and oil import flows, before and after 2022



Data source: Eurostat

fossil fuels, created the biggest vulnerability for Europe – a weak spot the Kremlin was keen to exploit. Gazprom's reduction in gas pipeline deliveries to Europe in 2021 escalated to a near-complete discontinuation in 2022, following the closure of the Yamal-Europe and Nord Stream pipelines. Currently, only a fraction of Russian pipeline gas trickles into Europe through the Ukraine and Turkstream route.

As Russia closed off the gas spigots, it brought an end to Europe's established east-west gas pipeline flows, built up over half a century. Within a matter of months, the flow of gas shifted from its traditional east-west trajectory to a new west-east axis. Norway became Europe's primary gas supplier, connected by pipeline to the UK, France, Belgium, Germany and, following the Baltic pipe's opening in November 2022, to Poland too. All these countries, as well as the Netherlands, have now become crucial transit routes for Norwegian gas and LNG entering Germany and the landlocked Central Eastern European region, including Ukraine. New gas pipelines, such as the Polish-Slovak interconnector, have been built or planned, fundamentally changing Europe's gas transmission map.

Europe also turned to LNG from the United States, Qatar, Algeria and, counter-intuitively, Russia to fill the shortfall. Tellingly, the EU now imports more LNG from the US than pipeline gas from Russia, giving credence to Trump's characterization of US LNG as 'molecules of freedom.' Europe is rapidly expanding its LNG import capacity to diversify gas supplies. Germany, Europe's largest gas market, had no LNG import infrastructure before the war. Now it has three operational LNG terminals across its northern coast, installed in record time and capable of meeting more than 17 per cent of the country's gas demand.[15] More LNG import capacity has also been recently installed or planned on the Atlantic coasts of Ireland, France, Spain and Portugal, as well as in Belgium, Croatia, Greece, Poland, Lithuania and elsewhere.

Looking ahead, the mission of bringing gas to Europe will require further expansion of the pipeline network and the deployment of diplomatic initiatives, not least on the continent's south-eastern flank. Recent focus has been on the Black Sea and the Caspian regions (with Azerbaijan). The Eastern Mediterranean has also seen significant gas discoveries in the past decade – both a potential blessing and a curse, given the tumultuous relationship between Turkey and its Greek and Cypriot neighbours.

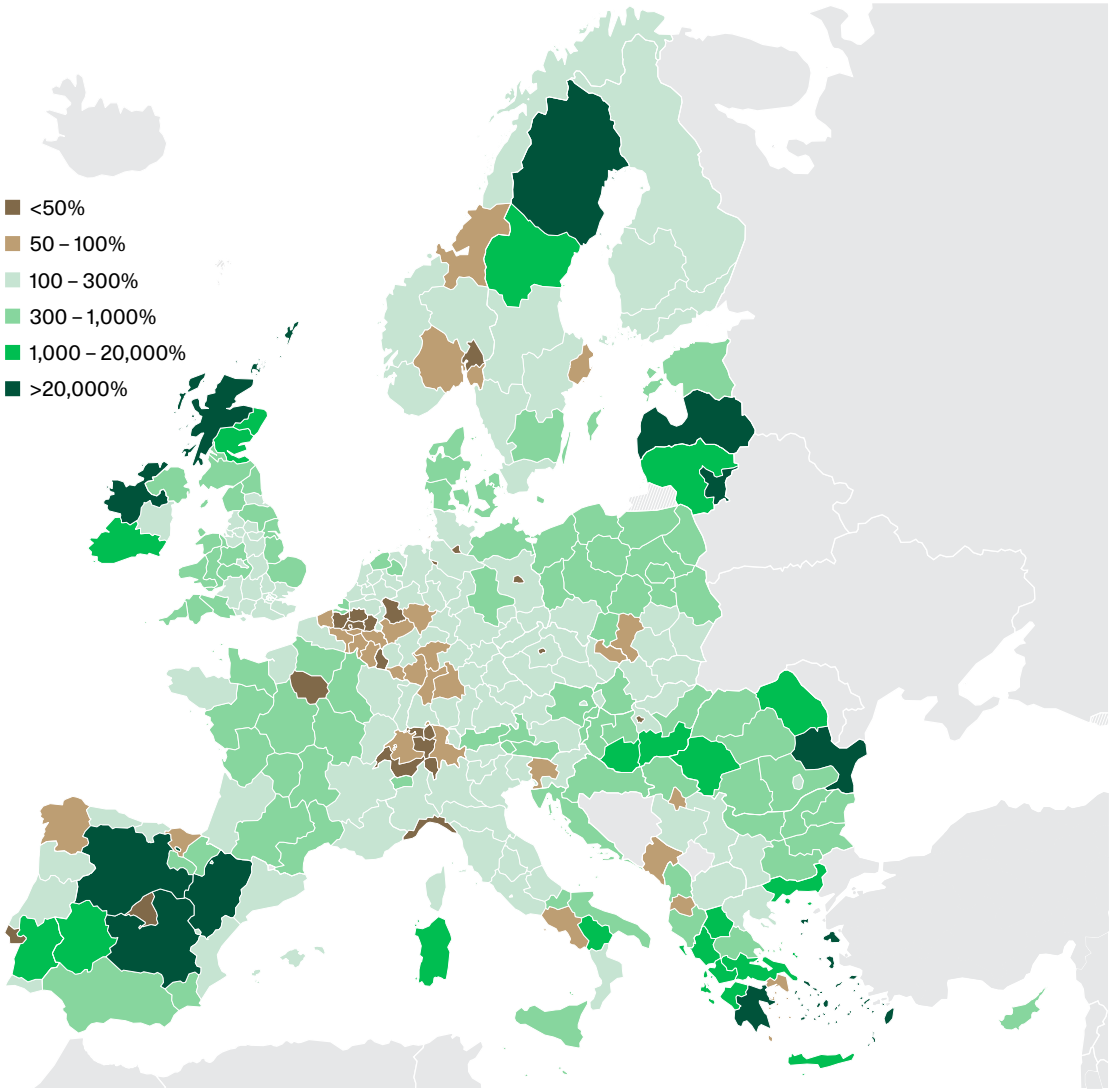
The war in Ukraine is speeding up the energy transition in Europe. In 2022, photovoltaic (PV) solar capacity soared by almost 50 per cent, heat pump sales surged by 39 per cent, and electric car purchases increased by over 15 per cent – with one in five new cars sold being EVs.[16] Wind installations also set records, despite supply chain obstacles.[17] In parallel, policy objectives at the EU level became much more ambitious (as discussed in Chapter IV).

The potential for renewables

Behind the war-induced cessation of Russian gas imports lies a more profound and enduring transformation of Europe's energy landscape. Europe's gradual move away from fossil fuels predates both Russia's war in Ukraine and the net-zero commitments embedded in the 2020 'European Green Deal'. In fact, EU demand for fossil fuels peaked in 2006 and has since declined by 22 per cent.[18]

Renewable energy potential in Europe's regions

Renewable electricity supply potential (2050) compared to current demand (2021)
Technologies covered: solar, wind (onshore and offshore) and hydropower



Regions defined at NUTS 2 level

Data source: Kakoulaki et al. 2021

This revolution is rewiring energy supply lines across the continent and will add another layer to Europe's energy landscape. Currently visible in the form of additional wind turbines and solar panels, more changes will come.

The potential for renewable energy in Europe is not to be underestimated, even if it is unevenly distributed across countries and regions. The continent has enough solar and wind resources to meet its electricity demand entirely from renewable sources by 2050.[19] According to scientific models, the total potential renewable electricity output at the continental level could expand to four times current demand, even taking social and technical limitations into account (for instance, not all land can be covered with solar panels). If the constraints were greater, Europe could still potentially achieve electricity autarky both at the continental level and in each individual country.[20]

Hydropower, biomass generation and geothermal energy are mature technologies and a significant proportion of their potential in Europe has already been tapped. Wind and solar, by contrast, are experiencing rapid growth. Coastal areas in particular boast abundant wind resources, fuelling the development of onshore and offshore wind farms in countries like Denmark and the UK. Southern nations such as Spain and Greece enjoy ample solar irradiation, which drives down the cost of solar-generated electricity. Together, wind and solar generated 22 per cent of the EU's electricity in 2022,[21] more than natural gas and coal. Thanks to cost declines, climate action and Putin's war, solar and wind could potentially provide up to 70-80 per cent of Europe's electricity in 2035.[22]

Achieving this potential requires both an acceleration in the deployment of renewable installations – a process that is picking up but still facing obstacles such as slow granting of permits and public opposition – and a much greater transmission capacity across the continent. Adding wind farms and solar installations alone will not suffice, since the electricity they generate needs to instantly be matched with demand.

A European supergrid

A green electricity grid is possible at various scales, from a Europe-wide supergrid to microgeneration at household level, and any scale in between. In a continental network, the most favourable locations for generating cheap

solar and wind power have the capacity to produce far more renewable electricity than they need. Countries like Ireland, Lithuania, Estonia, and Albania could generate more than four times their own electricity demand with renewables.[23]

These green energy locations could become major suppliers. Such a scenario would lead to a remapping of centre–periphery relations in Europe and bring about new relationships of power and interdependence.

A European supergrid would require a doubling of the current transmission capacity.[24] This entails a big investment, but it would pay off in the long run since the more cross-border interconnections exist, the less electricity-generation capacity would need to be built. It would also help to smooth fluctuations in supply.

Even in a scenario whereby each country in Europe annually generates its own demand, countries would still need to balance the fluctuation in wind and solar through cross-border trade. Without network reinforcements, some renewables installations would have to be curtailed. By 2030, this 'spilled energy' would add up to roughly Denmark's current total electricity demand (some 35 TWh/year).[25] This is one reason why the Union has set a 15 per cent interconnection target by 2030, meaning that each country should have in place electricity cables that allow at least 15 per cent of the electricity produced in its territory to be transported across its borders. Progress, however, has been slow.[26] The less developed the grid, the more the electricity system remains reliant on power stations fuelled by gas, coal or nuclear power.

Finally, high-voltage cables linking national grids are more than just technological artefacts. Cross-border electricity trade can intensify regional cooperation, creating 'grid communities.'[27] These have existed for decades among Scandinavian countries, but they are now being developed elsewhere in Europe. The geopolitical and security dimensions of interconnected grids were particularly evident in March 2022, when Ukraine and Moldova made an urgent request to synchronize their grids with the continental European grid following Russia's invasion. The Baltic States are planning to join in early 2025, turning Russia's Kaliningrad into an energy enclave.[28]

New mines

As discussed in Chapter II, the energy transition will drive an unprecedented worldwide surge in demand for critical raw materials. Given the geological constraints within Europe, most demand can be met only through imports.

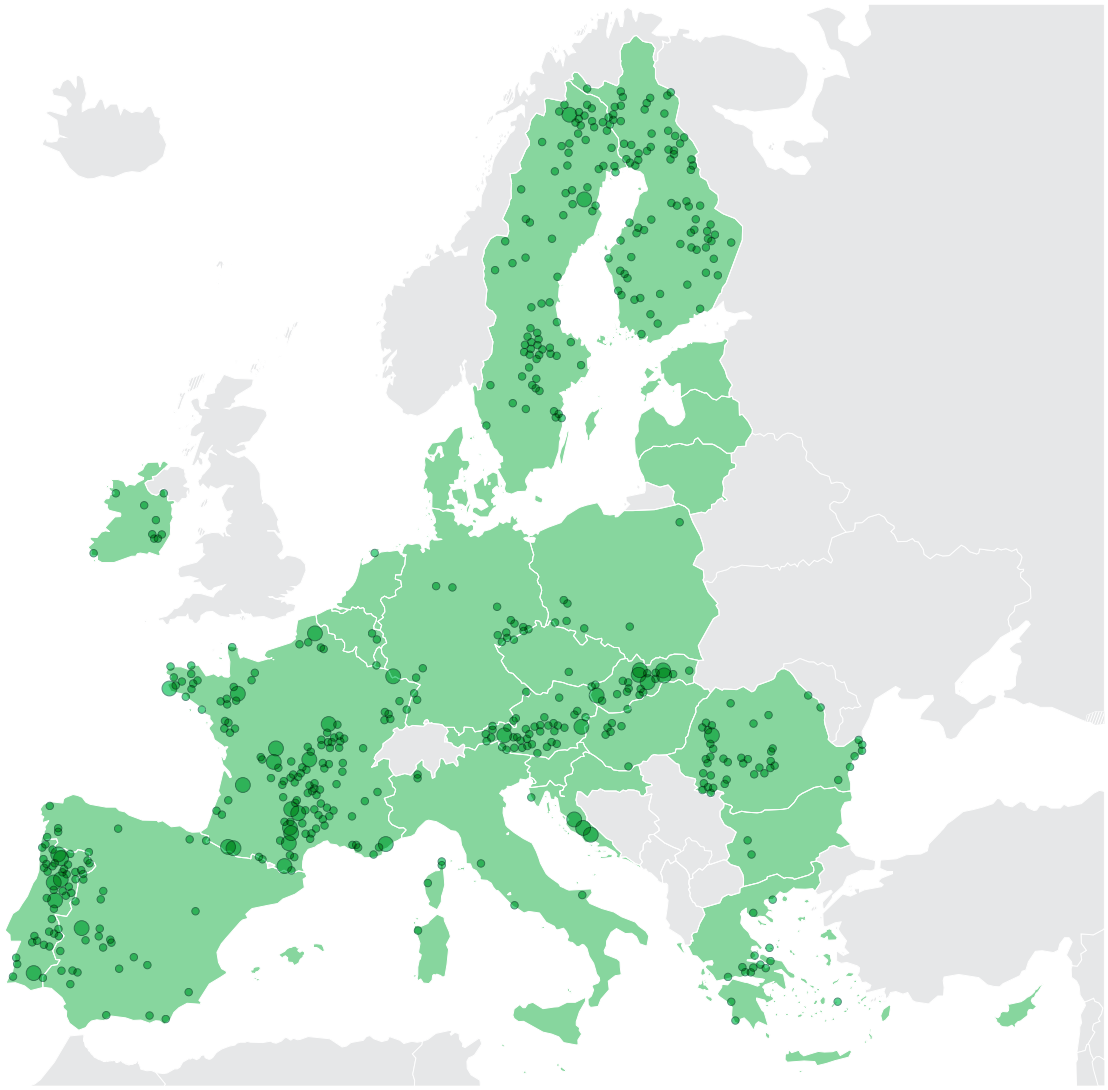
The numbers are telling. European demand for rare earths is expected to increase at least sixfold by 2050, that for lithium (used in EV batteries) more than fifteen times.[29] To get what is required, EU countries can only turn to a handful of suppliers. For their current imports, they rely on China for 98 per cent of rare earth elements, on Turkey for the same share of borate, and on South Africa for 71 per cent of platinum.[30]

One way to address these dependencies is to mine the minerals at home, where geologically possible. Today, domestic mining meets 20 per cent of the EU's nickel demand, 14 per cent of copper demand, 10 per cent of cobalt demand and barely 3 per cent of lithium demand. Virtually all these minerals must then be exported for processing in third countries before they can be delivered for end use.[31] Europe has only one nickel smelter (in Finland), just one lithium refinery (in London) and only one rare-earth refinery (located in Estonia).

Europe's geology presents good mining opportunities for battery raw materials such as lithium, nickel, cobalt, graphite and manganese. Many of these resources lie in regions that are heavily dependent on coal or carbon-intensive industries and where battery factories are planned, offering local employment opportunities.[32] From the EU point of view, it is strategically relevant that candidate countries like Ukraine, Serbia and Albania hold important deposits, including platinum, borate and lithium.

Recently the European Commission put forward a list of strategic raw materials with the aim of achieving an EU capacity for meeting at least 10 per cent of domestic demand through mining and extraction by 2030, where possible.[33] Given that experience with large-scale mining in Europe since the decline of coal is limited, this is an ambitious target. Long and arduous national planning and permit procedures, not to mention 'nimby' public opposition, are additional obstacles.

Critical raw materials deposits potential in the EU



Data source: EuroGeoSurvey with COM(2020) 474

Further down the value chain, the Commission proposes meeting a minimum of 40 per cent of mineral demand by 2030 through processing and refining, and at least 15 per cent through recycling. For the latter, the EU is well placed when it comes to base metals like aluminium and copper, but currently less so for metals in high demand such as lithium.[34]

Hydrogen corridors

While Europe's electricity demand can be met by locally produced renewables and nuclear power, these are insufficient to fulfil its entire energy demand. Not every industry is amenable to electrification – not least aviation, shipping, steelmaking and fertilizer production. These sectors cannot be readily 'plugged in' and connected to the power grid. Therefore, if Europe wants to reach net zero, it needs both green electricity and green fuel. As set out in Chapter II, hydrogen is currently attracting most attention in R&D and policy circles, despite the problems and challenges to be overcome before it could be fully operationalized.

While France and the UK aim for hydrogen self-sufficiency, Germany, requiring by far the largest volume, lacks sufficient renewable potential to fulfil its own hydrogen needs (the more so since it has ruled out using nuclear energy). It would need to import hydrogen, either from EU partners Spain, Portugal, Ireland, Denmark and the Baltic States, from regional neighbours such as Norway, Morocco and Egypt, or from global suppliers such as Chile, Namibia and the US.[35]

Taking the lead in hydrogen trade, Germany has opened 'hydrogen diplomacy' offices in Angola, Kazakhstan, Nigeria and Saudi Arabia, all of which are current oil exporters. Belgium and the Netherlands have piggybacked on their neighbour's efforts, hoping that the ports of Antwerp and Rotterdam can act as hubs for international hydrogen imports into the German industrial heartland, just as they continue to do for oil.[36]

A coalition of European gas transmission companies has proposed the establishment of a comprehensive European 'hydrogen backbone', consisting largely of repurposed gas pipelines as well as a few newly constructed, dedicated hydrogen pipelines. Some of these lines would extend into North Africa, through Italy and Spain, and others into Ukraine, with Poland, Slovakia

and Hungary likewise emerging as transit countries.[37] Critics, however, do not see the case for such investments and argue that four 'no-regret', cross-border hydrogen corridors would suffice.[38]

Conclusion

Over the past century, layer after layer has been added to Europe's energy landscape – from coal to imported oil and gas as well as other sources of electricity, such as nuclear and wind. Early in 2024, the whole system is still in flux, as it has been since the Russian invasion.

Following the onset of the war in Ukraine, import flows of oil, gas and coal have been rerouted away from Russia in record time. Whereas Europe's energy supplies traditionally flowed from east to west, that flow has now been reversed, chiefly thanks to pipelines connecting Norway to its European neighbours and to LNG imports from across the Atlantic and the Gulf. In the future, these new trade links will no doubt also impact the strategic balance of power on the continent.

Although the overall trend and key policy objectives predate the conflict, Russia's war has also spurred on the green transition – a revolution that will alter Europe's energy landscape even more dramatically. Over time, the continent is poised to become self-sufficient in electricity production by using climate-neutral sources of energy. But this requires more political will, public investment and popular support than are currently available. The case for a European supergrid should be easy to make. It could turn countries on the geographical periphery – from the North Sea to the Balkans to the Iberian Peninsula – into net exporters of green energy. It would tie participants together in a continent-wide 'grid community' – harking back, practically and symbolically, to the early days of Europe's coal and steel integration. This, however, is clearly no longer a matter of geography but rather of politics.

IV Politics: cleavages and synergies within the EU

Introduction

European energy politics is shaped by a number of clashing ideas and interests among the Union's 27 member states. These differences are largely attributable to Europe's diverse geography and resource endowments (gas fields, water access, solar potential, etc.) or past political choices. For a better appreciation of Europe's role in the new geopolitics of energy, this chapter will first explore three policy cleavages: climate ambition, nuclear preferences and trade.

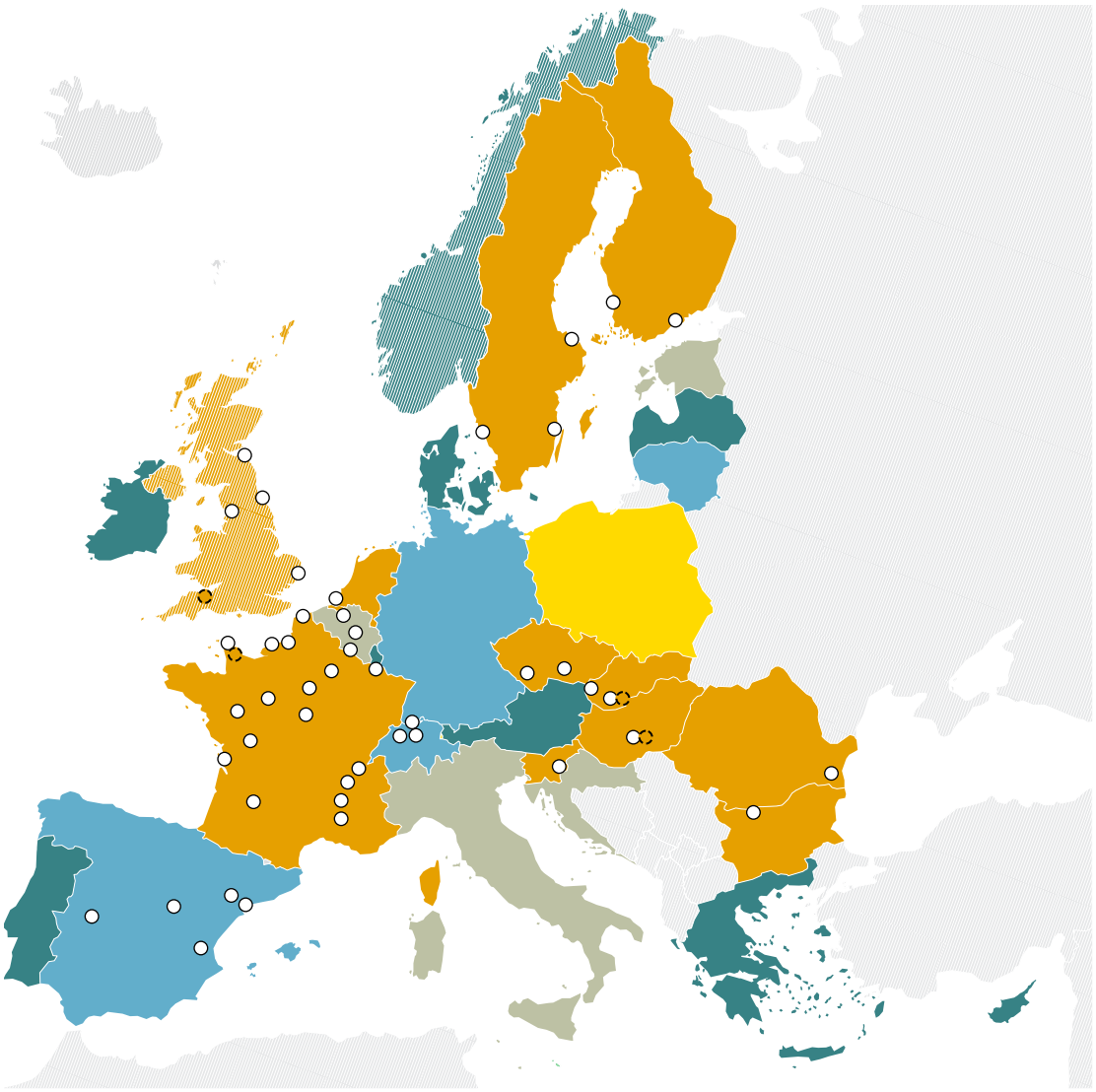
All member states face the same global trends and external historical events, while sharing many strategic interests and values. The EU Treaty requires them to conduct energy policy 'in a spirit of solidarity'.[1] It is on these synergies that new joint action in energy politics has been built in recent years, exemplified by Brussels' volte-face on industrial policy and by the short-lived 'energy war economy' approach following Russia's invasion of Ukraine.

Climate ambition

Some European countries want to move more quickly on energy transition, others less so. Typically, countries in Central and Eastern Europe have been less enthusiastic about the pace of the transition, because their economies are still heavily reliant on fossil-intensive industrial production, with the coalmining industry and industrial workers constituting strong domestic pressure groups. The financial as well as electoral costs of the transition from fossil-fuel systems to renewables have led many Central and Eastern members to resist more ambitious climate targets in the name of realism.[2] In doing so, they can appeal to a sacred EU rule: whereas energy is a shared competence, the choice of energy source remains a national prerogative.[3]

At the other end of the spectrum, post-industrial states like Denmark, Finland, Sweden and even the UK have made strides in diversifying their energy mix and reducing their reliance on fossil fuels. These states have the financial capacity to champion more aggressive decarbonization and renewables targets, and they tend to perform well in terms of emission reductions, energy efficiency, renewables and climate targets. Other Western European states have likewise advocated sticking to ambitious goals.[4]

Stances toward nuclear power in Europe



Non-nuclears: have no reactors and no plans to build any.

Decommissioners: have phased out, or are phasing out nuclear.

Limited supporters: extend lifetimes of existing reactors or consider building SMRs.

Entrants: countries currently with no nuclear but planning to build nuclear power plants.

Expanders: new reactors are proposed, planned or under construction.

Non-EU

Nuclear power plants
- Operational
- Under construction

Data source: Global Energy Monitor, Brussels Institute for Geopolitics

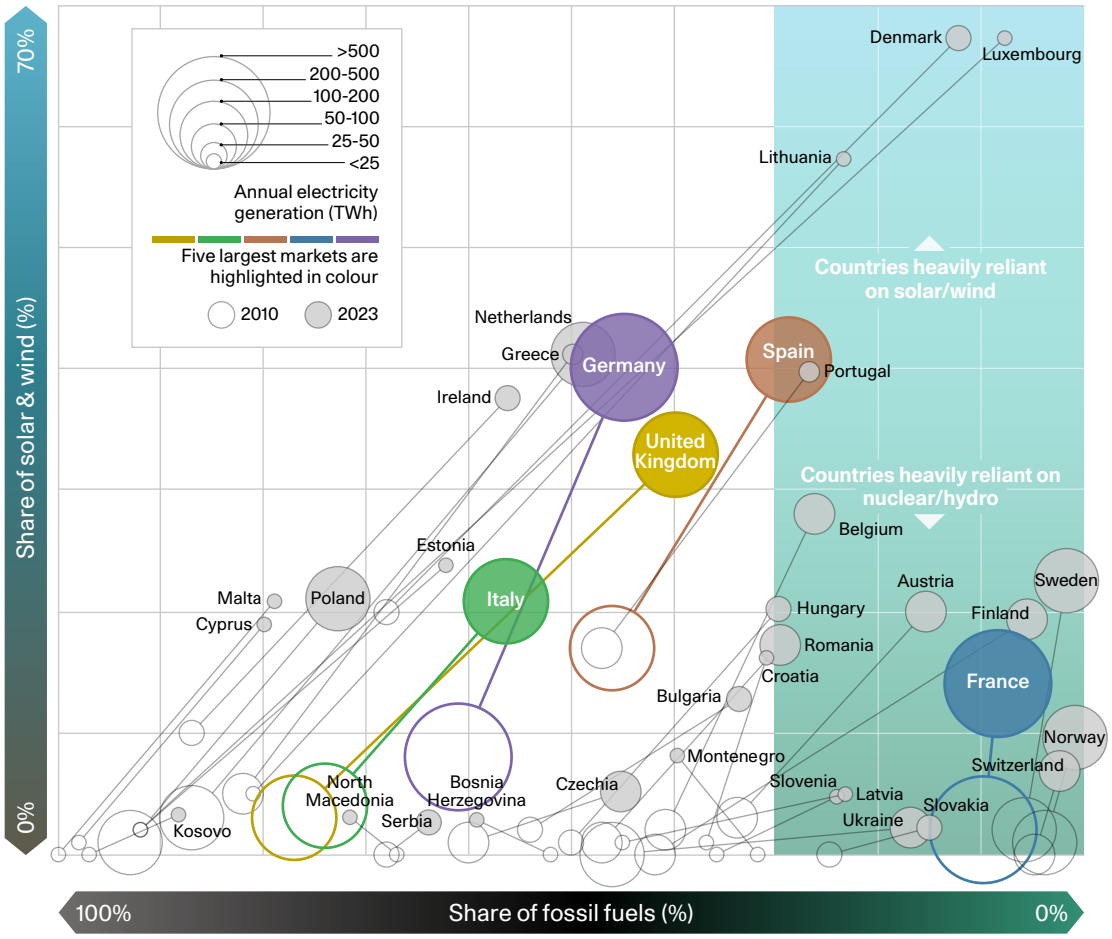
The more ambitious group has for years been able to push European climate and energy policymaking forward, thanks to its voting power in the Council and its influence in the European Commission and within the Parliament. However, the division between the more committed and the less enthusiastic countries is not fixed. Crucially, recent and upcoming national elections may well change the overall dynamics and balance between the players. In the 2022 Dutch regional elections for instance, a striking green-policy backlash took hold, with the rise of the Farmer-Citizen Movement.[5] The German coalition government, under pressure from the Liberals, blocked EU legislation to ban the sale of new CO2-emitting cars from 2035, while in the summer of 2023 it also faced huge protests, stoked by the populist opposition party (Alternative für Deutschland), against stringent green home-heating rules.[6] In May 2023, French president Macron called for a pause in environmental legislation for the sake of industrial competitiveness.[7] Interestingly however, Poland, under its new government led by Prime Minister Tusk, announced a change of camp and now embraces ambitious targets.[8] Looking ahead, the upcoming June 2024 European Parliament elections could well dent the chamber's climate and energy ambitions.

The nuclear split

Nuclear energy, although a focus of early EU integration efforts, has become a polarising and contentious topic within the Union. It permeates many other debates, from the criteria for green investment to the reform of the electricity market and the rules for green hydrogen production. At the heart of the debate lies the definition of clean energy: does this include only renewable sources like solar or wind (plus their derivatives) or can nuclear power claim the same status as a low-carbon source, notwithstanding the other environmental risks it poses?

France is the most vocal supporter of nuclear power, which typically provides up to 70 per cent of its electricity and allows it to export surpluses to neighbouring countries. The war in Ukraine has led to a revival of interest in nuclear energy in quite a number of European countries as a means of securing energy independence.

Changing national electricity mixes in Europe, 2010 – 2023



Data source: Ember

Currently, twelve out of the 27 EU member states host nuclear reactors on their territory. Some are ramping up their nuclear capacities, including Finland and Slovakia, where new nuclear reactors started operating in the last two or three years, or France, where a new reactor is being constructed at Flamanville. Sweden recently announced plans to invest considerable sums in nuclear energy. New reactors are also being planned or proposed in Bulgaria, Czechia, Hungary, the Netherlands and Slovenia.[9]

Other member states have sharply decreased their nuclear production over the past few years. Following its 2011 *Atomausstieg* decision, Germany shut down its last three operating nuclear power plants in April 2023. Spain aims to phase out its five active plants by 2035. Belgium had a phase-out policy but stalled it in the wake of Russia's full-scale invasion of Ukraine.[10] There, as well as in Italy and Romania for instance, the debate has shifted to building small modular reactors (SMRs), considered a promising innovation requiring less capital and shorter lead times.

Proponents of nuclear energy in the EU lost significant voting power when the UK left the EU, but eleven pro-nuclear states led by France have banded together.[11] While acknowledging it cannot be classified as a renewable source of energy, the group asserts that 'nuclear is a strategic technology for achieving climate neutrality'.[12] Their goal is to ramp up nuclear capacity by 50 per cent by 2050.[13]

As a reaction to this French-led pro-nuclear club, a rival group was set up by Austria called the 'Friends of renewables'. Nine states attended a first meeting in March 2023 alongside the host: Denmark, Estonia, Germany, Ireland, Latvia, Lithuania, Luxembourg, Portugal and Spain. At a subsequent meeting, Greece, Malta and Slovenia were also present, as were the pro-nuclear Dutch. France also expressed interest, and was reportedly barred from attending the gathering before subsequently being admitted.[14]

The nuclear and the all-renewables camps came to blows within the EU in the 2023 debate over the reform of the electricity market triggered by the gas price hikes following Russia's invasion. The most divisive question concerned the role of nuclear power in European climate action and whether it could be eligible for public funding. The conflicting interests, mutual misunderstanding and acrimony between Paris and Berlin ran so deep on anything energy-related that for months no agreement seemed possible. Eventually, a technical compromise was found (it allows nuclear energy to benefit from state-backed investment schemes while avoiding market distortions). Showing the extent to which energy policy has entered the highest levels of domestic politics, the agreement among the 27 EU governments followed a deal made in Hamburg between German chancellor Scholz and French president Macron.

Although in this particular case (of the electricity market) the splits in the Union caused by the nuclear question have been papered over, the underlying tension between France and Germany has not been fixed. In the months and years ahead, the political fight over what counts as clean energy and the role of nuclear – with its bearing on import needs and energy diplomacy – may well erupt again. The more so since the France-led pro-nuclear camp feels the current context allows it to go on the offensive.

Trade versus strategic autonomy

A third major division in European energy discussions today is trade openness versus what the French have dubbed *autonomie stratégique*. The trade debate is a longstanding one and it took a specific energy turn only recently.

Since the EU produces no more than 41 per cent of its energy at home, becoming less trade-dependent means reducing imports and dependencies on quasi-monopolistic suppliers.[15] However, this could slow down the green transition. Although all EU states have signed up to climate targets, and most aim to become less exposed to an ever more volatile outside world, there is no agreement on what to do when these objectives clash. For some member states, such as Germany, greening is the priority, even if it ends in Europe's 'green dependence'. For others, such as France, strategic autonomy trumps climate considerations, in the worst case to the point of a 'polluting autonomy'.[16]

Alongside Germany, the first group notably includes the Danes, Dutch and Swedes. These free-traders prefer to preserve and extend trade and investment relations with third countries. They have no objection to relying on hydrogen imports to achieve climate goals. Likewise, they would rather buy critical raw materials abroad than venture into domestic mining. One of their chief concerns is that privileging EU companies over foreign firms is not only protectionist but could also slow down the energy transition, as it raises the cost for consumers and taxpayers.[17]

France, by contrast, is focussed on energy independence (as is the UK[18]), resorts to nuclear power to back this up and is ready to pay more as a form of strategic investment. To this end, it advocates setting up 'defensive' trade instruments and is pushing the rest of the EU to 'buy European' on its way to a green economy. Paris does not understand the appetite for non-European hydrogen imports, and aims instead for domestic manufacturing and even mining. The French objective of energy independence is shared by Finland and most countries in Central and Eastern Europe, inasmuch as reducing Moscow's grip has been a long-standing theme in their national energy policies. The latter group, however, readily accommodates itself to substitute fossil-fuel import dependencies vis-à-vis the US or Gulf countries.

This split on trade versus autonomy is evident in multiple dossiers. In a recent anti-subsidy probe by the Commission concerning Chinese EVs, France was

very much in favour, whereas Germany was reluctant due to its exposure to potential Chinese retaliatory measures against its wider industrial interests. The relative strength of Europe's clean-energy industries also influences political stances. Although the wind sector, which is vocal about unfair competition from China, advocates protectionist measures,[19] Europe's solar industry has warned policymakers that tariffs on imports would hurt the sector.[20]

The classic tension between free-trade and protectionist member states is part of the wider economic debate on the role of markets versus government. The Brussels policy consensus on this point has changed dramatically in the past fifteen years. For the changed outlook on energy diplomacy, this may well be the most crucial policy shift.

The return of industrial policy

For decades, achieving a 'level-playing field' was seemingly the be-all and end-all of EU economic policymaking. It was about market liberalization, regulation and strict state-aid rules as the best way to flatten out national differences and create a smooth Europe-wide internal market, benefitting efficient producers and price-conscious consumers. To the extent that industrial policy still existed in Brussels, it was 'horizontal' (for instance, aimed at stimulating innovation and research across all sectors) rather than 'vertical', which would mean supporting specific sectors or even single companies with state subsidies or other targeted measures. The liberal abhorrence of state intervention rested on a number of bad experiences with state aid for industry in the 1970s and early 1980s, when national authorities had ended up 'backing losers' rather than 'picking winners'. As we have seen, the market-regulation approach also came to dominate EU energy policy, especially from the 1990s onwards. Here too, the states took a backseat.

Since 2008, however, the liberal economic doctrine has been tested by a raft of economic and geopolitical crises. If the Great Financial Crisis taught Western policymakers anything, it was that the authority of the state was still needed to underpin the financial system. Private actors could not be relied on to provide all public goods. This lesson also holds true for climate and energy policy: state intervention beyond regulation alone is required to effect the green transition. Additionally, the European belief in unhindered global trade flows backed by strong multilateral institutions was derailed by the

words and deeds of the US administration under Trump and, in 2020, by the supply chain breakdown during the pandemic. Perhaps most fundamentally, the emergence of China as a high-tech industrial power from 2015 onwards and the robust US response to this economic and strategic challenge – no less aggressive under Biden than under his 'America First' predecessor – has forced a European reorientation towards industrial policy. All these experiences called for a more strategic, even territorial consideration of Europe's industrial base.

Suddenly, therefore, industrial policy is no longer taboo.[21] Building on the broad consensus that something needs to be done, the von der Leyen Commission has deployed a plethora of industrial policy initiatives, of both a 'supportive' and a 'defensive' kind, which have also affected energy policy.

Easing EU state-aid rules is the most straightforward supportive measure, as it allows national governments to subsidize specific industries under certain conditions.[22] This is why substantial national subsidies for the production of semiconductors – a stake in the China-US technology race – were green-lighted in 2022 as part of a European Chips Act, which also identified funding from the EU budget for microchip factories. The Commission has likewise allowed extra state aid to stimulate the production of electric vehicle batteries. This is in addition to its facilitation of a 'Battery Alliance' (2017), an initiative bringing together public and private actors and offering a template for other projects, including hydrogen.[23] In early 2023, the Commission proposed the 'Net-Zero Industry Act' to facilitate investment in manufacturing green tech.[24]

During the Covid-19 pandemic – with its devastating impact on all economic activity – a lot of flexibility was temporarily introduced into EU state-aid frameworks across the board. Billions of euros kept industrial and other activity afloat, to the extent that the simultaneous suspension of EU public deficit and debt rules was also needed. This set a precedent, and after Russia's invasion of Ukraine, the Commission adopted a 'temporary crisis framework' allowing national support to industries battered by sky-rocketing energy prices.[25] A year later, in response to the US Inflation Reduction Act, the programme was adapted and extended until the end of 2025 to enable higher investments in the green transition.[26]

In parallel to this unprecedented, albeit largely crisis-driven support for industry, the Union is also deploying *defensive* trade and investment

measures. This overturns Europe's quasi-exclusive focus on free trade and opening external markets. With global supply chains under pressure and an increase in the strategic importance of domestic production, economic security and resilience have gained in urgency. This change of tack is embodied by an EU foreign investment screening mechanism (set up after 2017 in response to a series of high-level Chinese takeovers), as well as a foreign subsidies regulation and an 'anti-coercion' instrument (allowing countermeasures to be taken against economic bullying by strategic rivals), which both entered into force in 2023. Early in 2024, the Commission proposed new EU rules on foreign investment in strategic sectors – ranging from cloud computing and other high-tech sectors to batteries and hydrogen.[27] In order to avoid arbitrary trade protectionism, it also started some years ago to map global supply chain vulnerabilities and strategic dependencies. The Critical Raw Materials Act (2023) is an outcome of this effort, charting a path to mitigate these vulnerabilities. Ideally the exercise should help the Union to find a middle ground between securing strategic resilience and upholding open markets worldwide.

From an energy perspective, the most significant defensive trade tool is the Carbon Border Adjustment Mechanism (CBAM). This climate measure, which began progressively to enter into force from 2023, aims to ensure that green industrial production within Europe is not outcompeted by (cheaper) imports whose production is carbon-intensive. To do so, it provides for tariffs based on the CO2 emitted during the making of the goods in question. From 2026, the measure initially applies to cement, iron and steel, aluminium, fertilizers, electricity and hydrogen. Under its old free-trade paradigm, the EU would never have proposed an approach which clearly smacks of protectionism. Today, it must face critics such as Brazilian president Lula, accusing the bloc of 'discriminatory' practices and even 'green neocolonialism'.[28]

Although the centre of gravity of the industrial policy debate has decisively shifted towards greater state intervention, old divisions and pro-market habits have not disappeared. This is true for the outlook on trade, where (as seen above) not all liberals have become interventionists overnight. The biggest bone of contention, however, concerns the nature and volume of state aid to domestic European industry. The key concern is that 'temporary' interventions could lead to a fragmentation of the internal market. Larger member states and those with more budgetary space simply have deeper pockets compared to smaller member states with strained public finances when it comes to

investing and attracting green jobs.[29] The massive recent subsidy and loan package aimed at ensuring that Swedish battery maker Northvolt builds its next gigafactory in Europe and not in the US is a case in point. After Germany decided to allocate around €900 million in (EU-approved) state aid, the plant is to be built in Schleswig-Holstein.[30]

The resulting debate on state aid features a threefold political line-up: there is a group of frugal liberals, with Sweden, Denmark, Austria and the Netherlands among them, who want a return to strict, pre-pandemic state-aid practices, to the point of denying the changed strategic context. A second group, led by Germany and France with their large state coffers, favours relaxing state-aid rules even further, happily looking at US practices for inspiration. A third group, likewise acknowledging the need for strategic investment, prefers the industrial subsidies to come from EU funding instead, so that its own taxpayers are spared the cost and all members can share in the benefits, an approach analogous to the post-Covid fund, which was financed through joint borrowing.[31] These underlying fault-lines will shape the economic policy debate during the next EU political cycle (2024–29).

Notwithstanding remaining tensions, a new consensus on the need for industrial policy is emerging across the European Union. The state is back as an economic actor and its choices will steer the future of industry and technology. The main driver of these changes has been the need for Europe to respond to the US–China strategic rivalry. In this respect, the new energy diplomacy the Union needs to deploy should be seen as the external arm of its industrial policy.

A ‘war economy’

Although the green transition has been a key driver in bringing about a return of industrial policy, for quite some time energy itself remained off the radar of Europe’s high politics. This changed on 24 February 2022, with Russia’s invasion of Ukraine. Topics which until then had been negotiated by national experts in obscure working groups in the Brussels Council building suddenly dominated headlines across Europe. Where will we get gas from, if Putin shuts off the taps? How will we heat our homes next winter? Can we shield citizens and companies from the price shock? From one day to the next, energy security required the full political attention of the Union’s heads of state and government.

In the emergency – and against the sombre background of war's return to the European continent – leaders approved a series of state interventions in energy markets that would have been unthinkable just months before. These included setting mandatory gas storage targets, capping the wholesale gas price, mandating joint procurement of gas and reforming the electricity market. For a striking number of these crisis measures, the Commission proposed using the 'solidarity clause' in the EU Treaty, which can be invoked in case of economic emergencies, specifically mentions 'severe difficulties' in energy supply and allows majority-voting.[32] Massive state aid to limit the damage done by high energy bills was a further part of the package.

At their summit in Versailles on 10–11 March 2022, EU leaders declared they would strive for 'energy sovereignty', adopting a notion straight out of the lexicon of state power.[33] Importantly, the experience of the pandemic was still fresh, with its global scramble for vaccines and protective equipment in which states used all available means to procure what they needed, without any concern for market rules. A 'war economy' situation rapidly developed, in which it is not the balance between supply and demand expressed in a price that determines who gets what, but the balance of power, the capacity of a state to exert pressure on industry, to force production or to produce goods itself, to expropriate or even plunder if necessary.[34] The notion even entered the Brussels conference rooms; in a July 2022 EU Council meeting, more than 20 energy ministers used expressions such as 'war economy' or 'rationing' – vocabulary previously unheard of when talking about European energy.[35]

In a moment of post-invasion frenzy, individual EU states went on the hunt for substitute gas. Germany and others turned to the US, Norway, Qatar and other Gulf states – even snatching up stock destined for other (Asian) customers by offering much higher prices, upsetting world markets in the process. Although the Commission set up a gas purchase platform aggregating demand so EU members would not outbid each other, the institution could not play the same role it had during the pandemic, when it was directly tasked with negotiating vaccine contracts. On the energy market, energy companies sign the contracts and not the public authorities, even if the division of labour between them is not always so clear-cut.

The Commission had more success with proposals aimed at reducing energy consumption, ensuring adequate gas storage and spurring on diversification, as set out in its May 2023 action plan REPowerEU.[36] It also beefed up

renewable energy ambitions by setting targets for solar capacity of 600 GW to be reached in 2030 (from 167 GW in 2021), and a nearly threefold increase in wind generation, adding almost 500 GW.

In another sign of increasing politicization, the call for European energy solidarity – translated into mandatory reduction of gas consumption in all member states – went down badly in some quarters. Why should Poland, which had warned for years against Moscow, pay for Germany's shortsightedness over Gazprom? Why should Spain and Portugal, which together had set up seven LNG-terminals, now save energy for others who had not planned and invested in energy security? (During one long summit night, both Iberian nations negotiated a special position on this point.[37]) This time the German Federal Republic, which had lectured its EU partners during the euro crisis, found itself in a weak position. The tables had turned.

Conclusion

Following Russia's invasion of Ukraine, energy policy has become high politics. Gas supply in particular has become a *Chefsache*, a matter of such domestic salience that it landed on the desks of national leaders. The sudden shift away from Russian gas required a whole series of emergency measures. Although wide-ranging in terms of policy content, politically these moves all pointed to the need for greater state intervention. The measures therefore fit into – and in the case of energy policy accelerate – a wider trend in EU economic policymaking that has been evident since 2017. After decades of cross-sector (horizontal) market regulation, industrial policy is back and strategic (vertical) interventions in specific sectors have returned.

Longstanding differences over climate ambition, nuclear preference and the role of markets versus the state are not going away. After the Ukraine invasion, the division over nuclear energy was exacerbated, with a number of countries following France in planning new nuclear power stations and others, Germany in particular, sticking to nuclear decommissioning. Nevertheless, whether they are betting on renewables or on nuclear energy to achieve net-zero climate goals, all EU states are investing heavily in the green transition. Support for defensive trade measures in strategic sectors has likewise steadily grown. The Union's energy diplomacy can build on this emerging consensus and should be considered as the external arm of Europe's revived industrial

policy. Just as in the US or China, energy diplomacy should be the public complement to private trade relations. In this respect, the energy vulnerability acutely felt after February 2022 may have subsided too quickly. In facing the global scramble for energy resources, the Union will have to muster its 'war economy' spirit. How this should work, the sea-change it represents and who implements what are all issues that will be addressed in the concluding Chapter V.

V Strategy: Europe's new energy diplomacy

Introduction

Energy diplomacy and industrial policy are best viewed as two sides of the same coin. They are different but complementary parts of a single strategy, aimed at securing Europe's energy supply in ways that are both affordable and sustainable. Just as Europe needs a new industrial policy for the domestic development and production of green technologies as well as the mining, refining and recycling of critical materials at home, it will need to deploy new types of strategic energy diplomacy. Both issues require a major reorientation on the EU's part. This concluding chapter focuses on the latter.

In energy diplomacy, change and action are urgent at three levels. At the strategic level, Europe needs to boost its situational awareness, build relationships with new or future energy partners and face up to the reality of doing business in parts of the world that are far from stable or democratic. At the institutional and decision-making level, the EU will have to break down bureaucratic silos and connect the policy dots, get leaders to give the geopolitical steer and increase coherence between efforts in Brussels and national capitals. Thirdly, the EU needs to augment its capacity to act at home and abroad. While some of these changes have been set in motion since 2022 by the pressure of events, others still require a political shake-up or even a revolution in mindset.

New energy arena, new geostrategic priorities

Europe's pivot away from Russia has forced the bloc to urgently find other energy suppliers. In the case of gas, after hesitation on both sides, the Kremlin shut off the spigots first. The US and Qatar stepped in as major LNG suppliers, while Norway, Algeria and Azerbaijan substantially increased pipeline deliveries. In the case of oil, for which the EU embargoed all Russian imports, Norway, the US and Saudi Arabia have gained the most from Russia's exit from the market.

But what happens next? What risks and threats are inherent in this reconfiguration of roles among the cast of fossil fuel suppliers? What can and should Europe do to mitigate those risks? Which countries or regions are

likely to be of importance to Europe because of their role in the production of critical raw materials? To whom should the continent turn to fulfil its future clean hydrogen demand – Morocco, Australia, Saudi Arabia? And how might the best diplomatic conditions be established for energy partnerships with those parts of the world?

Situational awareness

Energy diplomacy begins with geopolitical and situational awareness, knowledge of Europe's interests and of which areas in the world are currently, or will become, of heightened strategic importance. Given the fluidity of the situation, preparing scenarios (what would happen if Iran were to shut the strait of Hormuz or if China were to limit magnesium exports, etc.) is part of this exercise.

To plan effectively, Europe needs to know its actual and potential energy partners intimately: what makes them tick and what can be done to facilitate beneficial business or political partnerships, beyond offering attractive commercial terms? For decades, Europeans invested vast amounts of diplomatic capital in their relationships with Moscow, and this secured them stable and predictable energy supplies, before it turned into a huge geostrategic liability. Some of this diplomatic capital should now be spent on strengthening ties with the key energy suppliers of today and tomorrow.

Achieving that aim is more difficult for Europe than it might appear. Compared to the intelligence and strategic analysis at the disposal of decision-makers in Washington or Beijing, Europe lacks adequate capacity to gather and channel such information (on all domestic and foreign forces at play) into a long-term energy security policy. The EU's global network of ambassadors does not provide the basic up-to-date information the political leadership of the Union is entitled to expect, as noted by the bloc's foreign policy chief Josep Borrell (in comments he made in a less-than-private speech to EU ambassadors in late 2022).[1] Granted, the EU is a union and not a federal state, with 27 independently functioning diplomacies and intelligence services. In addition, the EU's own predilection for high privacy standards means that European public authorities have only limited access to company data, unlike their Chinese counterparts. Nevertheless, there is plenty of scope for improving Europe's capacity to think and act strategically (suggestions follow in the next section).

Understandably, some of Europe's first steps in the new energy arena have been guided by improvisation rather than by a clear set of geostrategic priorities. In the spring of 2022, solutions to the energy crisis induced by Putin's invasion needed to be found. Although ultimately successful, the process began haphazardly. Not all gas suppliers are as reliable as Norway. For instance, just days after Italian Prime Minister Draghi announced new gas deals during a state visit to Algiers in April 2022, Algeria threatened to cut off its gas exports to Spain if Madrid were to resell the gas to Morocco, its regional rival. In September 2022, barely two months after Von der Leyen's announcement of a new gas deal in Baku, Azerbaijani forces invaded Armenian territory to reclaim Nagorno Karabakh, a conflict in the EU's direct neighbourhood over which Europeans have been unable to wield much influence. These two incidents exemplify the unpleasant but unavoidable dilemmas Europe will continue to face in its quest for energy. Huge diplomatic efforts will be needed to create geopolitically stable supply lines, which will be different in character from before the war (the days of phone calls to the Kremlin are over) but could still cause political headaches.

A final point concerns the relationship between energy diplomacy and 'climate diplomacy'. The two practices are partly overlapping and complementary. A case can certainly be made for developing greater synergy between the two, by bringing projects that further the (global) green transition together with plans bolstering (Europe's) energy security, in package deals with international partners, for example. Nevertheless, it must also be recognized that energy and climate diplomacy proceed from two different logics. With its climate diplomacy, Europe seeks to engage the rest of the world in commitments to the Paris Agreement and to accelerate the transition out of fossil fuels. This requires ambitious and bold goals, such as reaching climate neutrality before 2050, and encourages a confident projection into a greener future that will persuade other countries to move in the same direction. Energy diplomacy, by contrast, calls for analysis and contingency planning, as even the best laid plans go awry. It is not the job of strategic planners and national security analysts to champion decarbonization. Their primary duty is to consider and plan for scenarios in which Europe's fossil dependency on foreign suppliers continues for much longer than anticipated, just as it is to address the new opportunities and vulnerabilities to which the green transition will give rise.

The Middle East

A primary arena in which to deploy energy diplomacy will be the Middle East. The region not only remains a crucial energy producer for Europe but is actually gaining in strategic importance. Companies like Total, ENI and Shell have recently concluded significant LNG deals with Qatar that extend beyond the net-zero deadline of 2050. Germany and the Netherlands have agreed hydrogen cooperation partnerships with Saudi Arabia, Oman and the United Arab Emirates. Yet overall, Europe's diplomatic footprint in the Middle East remains weak. Whereas China has increased its authority (not least by brokering a deal improving relations between Riyad and Teheran in early 2023), neither individual European states nor EU institutions have much of a presence. In the Israel–Hamas war, which could have huge repercussions for the continent, Europeans are bystanders. The spate of Houthi attacks on cargo vessels in the Red Sea, backbone of the continent's seaborne trade with the Gulf and East Asia, attests to a sustained and worrying European dependency on US hard power.

Even though, shortly after Russia's Ukraine invasion, the EU's external action service (EEAS) announced a strategic partnership with the Gulf states, and EU presidents Michel and Von der Leyen made diplomatic visits, progress has been limited since.[2] There is no way for Europe to become more effective in the Middle East without a good interplay between Brussels and member state governments (as set out below more generally). When the French president or the German chancellor visits Doha or Abu Dhabi, they will need to place phone calls to Brussels and to each other beforehand, in what should be self-evident diplomatic coordination.

Africa, Latin America and Central Asia

Parts of Africa, Latin America and Central Asia are gaining in relevance as potential suppliers of hydrogen and raw materials. This growing strategic importance necessitates a dramatic overhaul of how the EU relates diplomatically with countries of the Global South. The Union has long been and continues to be the world's biggest donor of development aid. This is the primary policy lens through which the EU has maintained its post-colonial ties with Africa in particular. The green transition, however, encourages diplomatic relationships to become interest-based and transactional, to the benefit of both sides. Europe needs green energy resources, and countries like

Morocco, the Democratic Republic of Congo, Namibia, Bolivia and Chile, many of which have outgrown their previous status as recipients of development aid, possess them.

The profound cultural and mental *volte-face* this entails, certainly for policymaking circles in Brussels and EU capitals, should not be underestimated. Of course, Western private companies, in their quest for commercial gain, continued to work in the world's poorest regions. But in the post-colonial era, European public authorities ostensibly confined their involvement to aid and development (oil and gas pursuits being the notable exceptions). Today's realities challenge that benevolent self-image. The Union must acknowledge that it is no longer a charitable donor acting out of commiseration or post-colonial guilt. Like other powers, it is a commercial party with concrete interests, caught up in a global bidding contest for commodities. In turn, development partners that were once seen as mere aid recipients are becoming valuable actors in new green energy supply chains, increasing their agency.

The realization that a new mindset is required provides much of the political impetus behind Europe's nascent Global Gateway. This little-known but highly strategic initiative is intended to strengthen the Union's connectivity with the Global South. It puts part of Europe's large development funds at the service of the continent's green energy security. Instead of being guided by broad and geographically scattered goals, Global Gateway partnerships introduce strategic focus to Europe's spending abroad, contributing to international value chains on which it can rely for its future economy. Like Europe's historical oil diplomacy, this approach, conceived as answer to China's Belt and Road initiative, requires close collaboration between European governments and businesses.

This pragmatic reorientation will not be to everyone's taste. Investment projects were not meant to be primarily about interests. They were supposed to benefit recipient countries and promote democracy, human rights, sustainability and gender equality. But European paternalism and lecturing have led to extensive frustration in the Global South. Europeans telling Africans how to run their countries inevitably smacks of neo-colonialism. Moreover, hypocrisy lies around the corner, in the energy field too. African governments well remember the EU telling them for years to move away from fossil fuels, before itself going on a gas shopping spree when faced with the

2022 shortages.[3] A more transactional demeanour can introduce a degree of reciprocity and agency into relationships.

Moreover, in the fierce global competition with China and the US for access to raw materials, Europe can turn its value-centred posture into an attractive business case. Investing in local value-added projects rather than seeking exploitative deals will set its offer apart. For instance, by importing not just raw and unprocessed ores (such as lithium, copper and nickel) but also processed ores or even battery precursors, it will be engaging in a deal that can foster local activity. Or similarly, rather than merely importing hydrogen from a country like Mauritania, Europe might in due course also import the 'green steel' or 'green ammonia' that could be produced locally by using that cheaper energy source.[4] With this approach, European investment could achieve three objectives in one go: diversification of supply chains away from China; access to cheap materials or intermediate products; and fostering global development.

Between China and the United States

Energy politics is great power politics, with China and the US vying for global leadership in green technologies. For both, the net zero transition is less about saving the planet than about winning a strategic contest. It is pure *Realpolitik*. Europe's interest is to avoid being squeezed in the global subsidy race that both sides are engaged in. It must not become the victim of the weaponization of energy value chains but must steer a course amid a global trade system with ever more tariffs, export restrictions and other protectionist barriers.

In particular, Europe needs to attract investment and green technology to its own shores, as well as de-risk its supply chains. In the short term, Europe's dependency on China for green tech and raw materials will remain. Whether this introduces strategic vulnerabilities similar to those created by fossil fuels is uncertain. The recent Chinese export restrictions on gallium, germanium and natural graphite did not spook the markets.[5] However, decoupling from Chinese industry (as the US may require of its European allies) and transitioning to a decarbonized economy cannot be achieved simultaneously. This is one of the more daunting strategic dilemmas Europe will face in the years ahead.

Meanwhile the US has re-emerged as a global energy power in its own right, based on a domestic shale revolution in gas and oil as well as the White House's dogged determination to escape from a green tech dependency on China. American LNG has helped save Europe from the direst consequences of decoupling from Russian gas. However, for more than a decade US industries have held a major competitive advantage over their European rivals, undercutting EU competitiveness through their access to cheaper energy. Even now that gas prices have roughly fallen back to pre-invasion levels, they remain around four times higher in Europe.[6] This price differential was a key reason why Germany and other EU states originally preferred Russian over US gas. Although the US remains an indispensable partner for Europe, it is also a fierce economic competitor, using any leverage it can find to beat foreign rivals. A situation that is unlikely to change should Donald Trump be elected president later this year.

The Inflation Reduction Act (IRA), which aims to boost green manufacturing in the US with attractive tax breaks, is causing political headaches too. Although Europe can complain vociferously about market-distorting subsidies from both the US and China, it will need to find ways to live with them, even if this means increasing industrial support measures of its own. The recent investment scheme for Swedish battery maker Northvolt – a staggering €5 billion mix of grants, green loans and private investment for one company[7] – shows that, spurred on by Berlin, Paris and Rome, the Europeans are now entering the global state-aid race. Questions abound as a result: how can disruption to the EU's own single market be avoided and how can such investment be prevented from ending up in the large or richer member states? These questions, soon to be addressed in reports on the EU single market by Enrico Letta and Mario Draghi, will remain a focus of attention in the years ahead.

The European continent

Finally, although it is not a global superpower, the European Union is a regional one. It should use its unique economic and political leverage over its close neighbours and think as a continent when it comes to energy supplies. Despite energy cooperation being a traditional component of the EU's outreach to the Western Balkans and the post-Soviet sphere, it has not always been successful (as illustrated by current discussions on a potential EU withdrawal from the Energy Charter Treaty). Nevertheless, the approach is

more relevant than ever. Revealingly, when gathering at the newly established 'European Political Community' (a diplomatic forum created in the wake of Putin's 2022 invasion), leaders from 40-plus states engaged with greater enthusiasm on energy ties and security than on any other topic.[8] This shows there is space for firmer continental partnerships between the EU and its energy-rich neighbours such as the UK (wind), Norway (gas) and Serbia, Albania or Ukraine (minerals).[9] In this context, two multilateral investment banks, the continental EBRD and the Union's EIB, can increase the focus on the energy transition as part of their investment strategies.

Decision-making

While becoming more strategic is a good starting point, a geopolitical actor also needs the capacity to translate this aptitude into decisions and concrete action. This first requires an institutional setup – both in Brussels and in national capitals – to integrate risk assessments, to make trade-offs among conflicting goals and to allocate an ultimate decision-maker.

Reducing institutional complexity

European integration dealt with energy long before it ventured into diplomacy. Developed under the aegis of market liberalization, energy policy was allocated to the EU Commission. The bloc's market regulator and supervisor infused it with its language of economic efficiency and technocratic expertise. Assessments of power and strategy played no role. As mentioned in Chapter I, the very notion of 'energy diplomacy' was taboo, as it implied encouraging European public actors to intervene and thereby disrupt optimal market conditions. Consequently, the Commission's Directorate-General (DG) for Competition – one of Brussels' most powerful bodies – became a key interlocutor for foreign energy actors, such as Gazprom. A category mistake that could make sense only within the post-1989 'end of history' worldview.

Today the situation has evolved but not become clearer. Behind the front door of the European Commission, a plethora of actors and semi-agencies operate. There is DG Energy, which deals with short-term import contracts for oil and gas. DG Climate steers internal green transition measures but also works on climate diplomacy. DG Trade has a say on climate topics like the carbon adjustment mechanism, a scheme which, as a traditionally liberal department,

it was initially no fan of. In the case of partnerships with countries like Argentina, Chile or Kazakhstan for critical raw materials, industry department DG GROW usually leads the negotiations, whereas DG INTPA, the rebranded development aid branch, develops the concrete projects. This is without even mentioning the EU's diplomatic service EEAS. All these institutional actors have their own interests, cultures and international interlocutors. Moreover, as they often work alongside a variety of actors from the 27 governments, the 'European' position is inevitably confusing to the rest of the world. More worryingly, hardly anyone within the EU institutions has an overview of who does what on energy. No clear energy message emanates from Brussels, nor does a coordinated Union-wide strategy.

Whereas from the 1960s onwards, energy and all its international dimensions entered Brussels policymaking through the prism of the market, diplomacy remained entirely the domain of national governments for decades. It largely remains so today. Acting alone, sometimes in collaboration with a few others, but rarely as full bloc, EU capitals naturally consider *energy* diplomacy to be a national prerogative too. They have each pursued their own individual energy strategies and international partnerships. Notable examples of concerted action are the joint (and failed) Franco-British operation to keep the Suez Canal open for oil in 1956 and the Nord Stream consortium backed by the German, French, Dutch and Austrian governments.[10] More recently, Greece and Cyprus concluded a joint agreement with Israel to bring eastern Mediterranean gas to Europe (excluding neighbouring Turkey) and connect their electricity grids, while also working on plans to connect their grids with Egypt.[11]

Even after the Union started developing its foreign and security policy in the 1990s, international energy issues did not feature in the official conversation. It took Russia's seizure of Crimea in 2014 to bring energy diplomacy formally onto the EU's Foreign Affairs Council's agenda. That council, bringing together the 27 foreign ministers, is the natural forum in which to define Europe's energy diplomacy. In practice, however, foreign ministers do not always find the time or focus to engage in such detail. Usually, the international crisis of the day demands their full attention. Most of the 27 individual member states continue to conduct their own energy diplomacy, with their own energy (and/or climate) envoys.

Effective steering by the EU Council of Ministers is also hampered by its own internal divisions and silos. For instance, the 27 development ministers

meet separately from their 27 foreign ministers – a vestige of a time when development aid and high politics were clearly distinct fields. Although a consensus is growing that this makes little sense today (especially considering the need for green tech partnerships with Africa or Latin America), old habits die hard. Development ministers are not always keen to place the substantial donor funds within their remit at the service of the Union's wider strategic considerations. Such a move entails subsuming not just these funds but also their own mandate under the authority of their foreign minister (or prime minister). Nor does the Foreign Affairs Council have much of a say over the development funds granted under the Commission's multibillion Global Gateway initiative, as was noted last autumn by the mildly confounded German foreign minister, Annalena Baerbock.[12]

While on energy issues these two ministerial bodies deal with the outside world, there is also an Energy Council that brings together the EU's 27 ministers for the economy and/or energy. At heart, it is an internal economic and regulatory forum, used to take decisions on public and private service providers (as its full name, 'Transport, Telecommunications and Energy Council', suggests). The body is remote from foreign policy considerations, even if some of its individual members – such as German minister Robert Habeck – have engaged wholeheartedly in international dealmaking on behalf of their country.

A decision-maker of last resort

Although silos are useful to a degree, they become dysfunctional when there is no opportunity to bring all views together. Strategic dilemmas need to be resolved and priorities set. Should climate goals trump competitiveness concerns? Could gas import needs require the adjustment of a pro-Israel stance in the Middle East? In a national context, the hierarchies and responsibilities within a government foster the necessary coherence. When those priorities and views cause clashes between departments or ministers, the president, the prime minister or even a full cabinet meeting should act as decision-maker of last resort.

In the Brussels machinery, the Commission president plays this role to some extent (and in her Commission, Von der Leyen also uses a system of vice-presidents to increase coherence). But the Commission is not a government and, crucially when it comes to security and diplomatic issues, it cannot speak for the whole European Union on the world stage.

Here lies the strategic importance of the European Council, the body that brings together the 27 national leaders plus its own chair and the Commission president. EU summits are the only opportunities to bind both the 27 governments and the EU institutions at the highest political level. This major asset, however, remains underexploited. In recent years, the European Council has grown to become the Union's crisis manager *par excellence*, a role it played when the 2022 energy crisis struck after Russia's Ukraine invasion. The downside, however, is that it is indeed an event-driven institution. The leaders have a limited attention span for topics that are merely 'important' rather than 'urgent'. Furthermore, the European Council has not always proven capable of follow-up. A much better interplay can and should be found, during the next EU political cycle, between strategic decision-taking at leaders' level and consecutive execution by national ministries and/or Commission departments.

For instance, in an annual discussion of strategic energy priorities, the European Council could agree on a priority list of supplies – fossil fuels, critical raw materials or green tech components – and task the foreign ministers and energy ministers with dividing the labour, both among themselves and with the Commission, to secure and facilitate the meeting of agreed import needs. The national governments participating in such joint endeavours should still be able to conclude their own bilateral arrangements. One for the team and one for themselves. Another approach could be to follow the logic of the gas purchase platform established in 2022 for hydrogen and critical materials, as the Commission proposes (see Chapter IV).[13]

To increase strategic convergence, the European Union could also arrange an advisory council to look at energy security in the full cross-cutting and strategic sense. This new body should sit close to the joint leaders, making it akin to the National Security Council in Washington DC that advises the US president on matters both domestic and foreign (and it would ideally be part of such a wider council).

A strategic body of this kind for energy presupposes an analytical capacity the Brussels institutions currently do not possess. Within the Commission, a handful of desk officers have been upgraded to form the Clean Energy Technology Observatory, but in practice they still need to outsource much of the work to private consultants. Drawing on the US example of the Energy Information Administration created after the 1973 oil crisis, the EU could establish a centre of excellence providing current data for fact-based policies,

in a collaboration between Brussels institutions (the Commission's DG Energy), national energy regulators and international bodies such as the IEA. Only such fact-based analyses allow for informed strategic choices.[14]

Team Europe?

Improved coordination on the world stage between EU decision-making and national governments is imperative for energy diplomacy. Although the presidents of the European Council and Commission as well as the High Representative can speak on behalf of 'Europe', they do so credibly only with the backing of (in most cases, all) member states. For the foreseeable future the leaders and foreign ministers of member states, certainly of the largest among them, will likewise continue in this role. In fact, the Union needs their geopolitical muscle to make major foreign powers listen at all.

This is the case beyond the indispensable part played by Paris and Berlin. For instance, when it comes to diplomatic relations with Morocco, Madrid is well placed to take up an EU case in Rabat. The same is true for Rome and Libya or Lisbon and Brazil. Such historical and neighbourly relations are a collective asset. The mission is to inscribe these national bonds into a common framework. An upcoming test will be the fate of Italy's recently announced 'Mattei Plan for Africa', an international cooperation effort named after the founder of national energy giant ENI. A first Rome summit in early 2024, hosted by Prime Minister Giorgia Meloni, was attended by 25 African leaders and the presidents of three EU institutions.[15]

Acknowledging this need for interplay between Brussels and the capitals, the Commission started speaking of 'Team Europe' in the context of the global vaccine roll-out during the Covid pandemic. So far, however, this approach has been more of a laudable aspiration than a reality.

Finally, although a united European energy stance on the world stage ultimately depends on a greater strategic convergence of national interests within the bloc, the EU legal and institutional framework is of increasing relevance. In 2017, amid the Nord Stream 2 controversy, the Commission created a tool by which member states had to notify the institution of each intergovernmental agreement they forged on energy supply. The arrangement applies only to oil, gas and electricity. In the current context, there are ample grounds for expanding it to cover critical raw materials and hydrogen.

In another, fascinating legal development in 2021, the European Court of Justice sided with Poland against Germany on the issue of 'energy solidarity'. The judgement is known as the 'Opal case', after the eponymous pipeline linking Nord Stream 1 from its arrival point in northern Germany southwards into Czechia. The judges concluded that Poland, supported by Latvia and Lithuania, had rightfully appealed against the Commission's 2016 decision to allow Gazprom to double gas flows in the pipeline, on the grounds that this violated the 'solidarity provision' within the Lisbon Treaty (Art. 194 TFEU). The three saw long-term reliance on Russian gas as a threat to regional security. Germany, for its part, argued that the clause was more a political concept than a legal criterion. By dismissing that defensive line in this politically highly charged case, the Court of Justice gave Europe's energy solidarity both more legal bite and explicit geostrategic significance.[16]

A greater capacity to act

To secure supplies and achieve its other energy goals, Europe also needs to step up its capacity to act. Whereas the EU traditionally excels at adopting legislation, setting targets and issuing political declarations, it has learned through experience that it must also actually *do* things (or make sure they get done). Every single crisis in recent years has hammered this point home. In the euro turmoil, for instance, going beyond overseeing national deficits and debt rules, the Union had to save its currency by building rescue mechanisms and providing *ad hoc* loans to member governments. In the migration crisis, there was a similarly urgent need for the EU institutions to step in and get stuff done, by helping capitals to protect the Union's external borders and to shelter asylum seekers. Energy supplies require a comparable capacity to act. In particular, the EU could provide finance, protect energy infrastructure, and ensure policy decisions can be implemented in practice.

Investing at home and overseas

A first way for the Union to act and project power in the energy field is by mobilizing investments. Domestically, this is already part of its newly redeployed industrial policy (see Chapter IV). In this respect, energy-related domestic priorities for the next EU budget could include a continental supergrid for electricity (an investment that will in turn reduce the cost of renewable energy production)[17] and strategically selected mining projects

for the sake of diversification (in public–private partnerships). Both initiatives would make the continent more resilient to energy shocks.

With regard to relaxing state-aid rules or identifying common investment pots, in principle it is not essential to protect energy-intensive industries in Europe. However, Europe will need a steel industry for the defence sector, just as it will need fertilizer production for food security. In green tech manufacture, the EU maintains a strong position in wind turbines and heat pumps, which it must retain.[18] In solar, by contrast, European producers have lost their market share to China.[19] This will be hard to regain, although since it is a low-tech, low-profit and dispersed business, it presents no major strategic or economic risk.[20] However, in solar and wind as well as in the manufacture of other critical energy components, it will be important to maintain at least one production centre in Europe, even if it is foreign owned. The Covid pandemic demonstrated the importance of local production in times of crisis.

Overseas strategic investment should guide diplomatic outreach. The Global Gateway initiative expresses this pragmatic turn within the EU Commission, as it aims to make available €300 billion in investment through to 2027. In some member states with a strong development aid tradition, the same shift is underway, while in others it could yet be increased. Securing the next round of Global Gateway funding should be a priority for the incoming EU Commission and the forthcoming budgetary cycle (2028-2034).

Protecting infrastructure

A second priority in deploying its public power, in addition to investment, is for Europe to show a readiness to protect energy infrastructure or transport, whether far afield or closer to home. In 2008 the Union took an important initiative to secure Europe–Asia shipping with an anti-piracy mission off the coast of Somalia. Faced with a comparable situation fifteen years later during the Gaza war, the Europeans sat back and, for weeks, left the security of the Strait of Hormuz and its supply lines to the US.

Disruptive violence is also moving closer to home. While stabilizing the Middle East was a vital mission of twentieth-century energy diplomacy (before the baton was handed to the US), today it is increasingly about European states protecting the continent's own territories, pipelines and grids. During its war in Ukraine, Russia has systematically launched attacks on Ukrainian energy

infrastructure, including power stations and transmission lines. Fighting has occurred near the Zaporizhzhia nuclear power station, while the Nova Kakhovka Dam near Kherson, the site of an important hydroelectric power station, was breached. Although evidence is lacking, Ukraine may well have had a role in the Nord Stream blasts of September 2022, explosions that put a definitive end to the long saga of Russian–German gas relations.

Subsequently, NATO established a unit to address vulnerabilities of undersea infrastructure. It also boosted battleship and aircraft patrols of the Baltic and the North Sea. In 2023, NATO and the EU jointly set up a task force focusing on resilience of critical infrastructure.[21] But the EU on its own should also be better prepared to deal with energy security threats. Its mutual defence clause (Art. 42(7) TEU), decreeing that an attack on one is an attack on all (echoing NATO's Article 5), offers a model. It should be self-evident that member states will come to each other's aid in case of attacks on pipelines, transmission cables or other energy infrastructure whether physical or cyber. The treaty provision stipulating that member states act jointly when one falls victim to a natural or man-made disaster (Art. 222 TFEU) could serve as the legal vehicle for such a solidarity clause.

Implementation

A final way of strengthening the Union's capacity to act lies in ensuring political decisions are effectively followed up and implemented. This is less straightforward than it seems.

In recent years, the EU has set a number of ambitious energy transition goals, from clean tech manufacturing to the deployment of renewables and the onshoring of critical raw materials production. These targets are not binding, and their practical implementation often lags behind. For instance, when it comes to deploying wind turbines, heat pumps and electrolysers, the EU falls short of meeting the annual targets set out in its 2022 REPowerEU plan.[22] Worse, it is likely to miss most of its binding Green Deal energy goals for 2030.[23]

Some benchmarks are hard to verify due to the absence of reliable data. For instance, the Critical Raw Materials (CRM) Act aims to bolster the EU's share of extraction, processing and recycling of such materials to respectively 10, 40 and 25 per cent of consumption needs. But timely, transparent and

comprehensive data are as yet not available on the current status of these parameters, making it hard to monitor progress.

Aspirational goals are more often the result of political logic than of detailed techno-economic modelling. The 2030 hydrogen production and import goals, for instance, derived from the lobby organization Hydrogen Europe, are now widely regarded as practically unfeasible. Similarly, the European Parliament raised the ambition for the domestic recycling of critical raw materials from 15 to 25 per cent despite a strong endorsement of the original targets by the European recyclers' association.[24]

While the Brussels mindset tends to interpret weak implementation as the fault of national governments and to look for further ways to ensure member states' compliance with common objectives, this will not suffice. In fact, the implementation gap also points to weak planning and a lack of sequencing capacity. For instance, it seems hardly possible to fulfil all the policy objectives of the Green Deal simultaneously, something policymakers only admit *sotto voce*. What is needed is a proper *strategy* for climate objectives, engaging with real-life constraints, which would then form the basis for the Union's energy diplomacy objectives as well.

In essence, Europe needs to embrace the opportunity Putin's energy crisis has precipitated. It needs to afford Europe's energy future the same focus as it applied to saving the euro, dealing with the migration crisis and defeating Covid-19, looking beyond the immediate crisis. This means following up its haphazard emergency solution of knocking desperately on the doors of old and new suppliers by establishing long-term energy partnerships that will enable it to secure its supplies throughout the green energy transition and beyond. This mission can succeed only in a Union with the overall political and diplomatic frameworks capable of taking joint decisions strategically and of deploying public power forcefully, while ensuring broad support.

VI Conclusion

Energy matters will occupy European policymaking for decades to come. With Russia's invasion of Ukraine disrupting gas supplies and markets worldwide, and with the transition away from fossil fuels requiring a profound change of habits, our societies are rediscovering that 'the metabolism of the Western world' (as George Orwell called it) depends on a stable and secure supply of energy. Political leaders should build on this new public awareness.

This study, investigating energy through the double lens of geopolitics and energy diplomacy, barely scratches the surface. It is meant as a programmatic analysis, not as a detailed policy brief. Europe's current predicament does not call for more technical 'expertise' but for a bolder strategic focus and greater public understanding that the stakes are high. To survive and thrive amid today's scramble for energy resources, Europeans will need to do hard political work, make clear-eyed decisions and adopt more of a moon-shot mentality than anything currently on offer. While steering the ship through the green transition will be challenging, the shared reward will be to achieve a level of energy independence the continent last enjoyed in the age of coal.

Until recently, energy was almost invisible and could be taken for granted. This blissful privilege has bred complacency and naivety. That period was ended by Russia's 2022 invasion of Ukraine. The turn to renewables functions as a second wake-up call. The sight of wind turbines, solar panels, new mines as well as nuclear cooling towers all bring home the fact that energy is not available just by flipping a switch. What some decry as 'visual pollution' (or resist out of 'nimby' concerns) is only a return to normality, the end of a hundred-year parenthesis when energy extraction disappeared from European landscapes and was largely outsourced overseas.[1]

This restored visibility of energy production will also increase public awareness of the risks and costs of energy sources, in terms of climate, sustainability, finances and/or strategic dependencies. There are no magic solutions, creating supplies that would be green, cost-competitive, reliable and without local impact all at the same time. Debates on energy and climate goals will no doubt remain heated in the years ahead, as trade-offs sharpen, priorities clash and voters feel the pain. But there is no way around political volatility as a prelude to change of this magnitude, which requires the firm support of public opinion. This strategic reorientation on energy issues

requires politicians, markets actors and the broader public to come to terms with at least seven new political and strategic realities.

One. Energy security comes first

Any strategy requires prioritization. For years, EU policymakers aimed for a balance between the triple goals of affordable, secure and sustainable energy. While all three remain valid and important, Russia's war clarified this trilemma: ultimately, we know now, security of supply comes first. This is not surprising. Having energy is more important than having *green* energy. The 2022 gas crisis – when Europe collectively spent the staggering amount of close to €400 billion on natural gas imports instead of the annual average of €70 to 80 billion[2] – demonstrated that, notwithstanding the distress and outcry over energy bills, our states and societies are willing and able to pay up for whichever energy source they can lay their hands on when needed. Strategic planners should and will factor this in as they draw up plans for domestic energy production and international partnerships. The rest of the world no doubt took notice too.

Two. Cost of energy remains a concern

After the security of supplies, should sustainability or affordability of energy take precedence? With the spectacular fall in the cost of solar- and wind-based electricity, this dilemma is less stark than just a few years ago, but it has not vanished. For business and most consumers, being able to pay the energy bill is more relevant than whether that energy is green. State subsidies still nudge industry and citizens to purchase EVs, solar panels and heat pumps – at the expense of other budgetary priorities. Moreover, not all gas- or oil-based industry and transport can be easily electrified, while hydrogen is a far cry from being competitive. Despite gas prices falling back to pre-2022 levels, European industry is paying three to five times more than its US competitors. As a result, some energy-intensive firms are considering moving to locations with cheaper energy, renewable or otherwise. Is this an issue? While it would certainly help to green Europe's economy, it would also lead to job losses and strategic dependency on other powers, even for essential products such as steel. All along the green transition and probably well beyond 2050, European public actors will need to work hard to secure enough energy – whether renewable, fossil or nuclear – at affordable prices.

Three. For climate's sake, abandon hopes for green autarky

In terms of domestic supplies, the last time Europe was geologically lucky was during the age of *coal*. With the advent of oil, the continent lost its strategic primacy to the US and Soviet Russia. A century on and Europe imports more than half of the energy it needs. This reliance on foreign suppliers will decrease substantially with the green transition, but it will not end completely. Moreover, as this report sets out, green technology brings its own kind of trade dependencies and strategic vulnerabilities. Reshoring green tech industry can mitigate some of these risks, albeit with efficiency costs. In the case of solar PVs, where China outcompetes all other manufacturers, reducing imports would actually slow Europe's green transition. In the near term, China also has a quasi-monopoly as supplier of rare earths. With green autarky an illusory ambition and global markets increasingly prone to disruption, securing the right kind and quantity of supplies entails a skilled balancing act, with robust energy diplomacy at its core.

Four. Accept the return of the state as actor and investor

Domestic energy production and the securing of supplies from overseas require a public capacity to act and invest. For decades, the EU relied on the internal energy market and on exporting its rules to energy suppliers near and far. Today, the state is back as key energy actor, getting involved in markets, capping prices, investing in green tech. This reversal is part of a wider shift in all major economies. All of them focus on bolstering strategic industries with massive state aid, R&D and defensive trade measures. For China and the US, industrial policy has become intertwined with foreign policy objectives. Green technology is one area where both powers are competing for foreign markets out of both commercial and strategic motives. Although the EU (despite its earlier coal-and-steel incarnation) was not designed to conduct industrial planning, let alone to act as a state, it has started to adjust to the new era with a series of *ad hoc* initiatives. To put this improvised industrial strategy on a surer footing, the next Commission (2024-29) must address the concern that only large member states end up benefitting and propose bolder joint strategic investments. For instance, the next EU budgetary cycle (2028-34) could commit dedicated funds to a continent-wide electricity grid.

Five. Improve EU strategic decision-making

American and Chinese strategists successfully integrate economic, political and strategic considerations into their respective industrial and energy policies. European policymakers should increase that same capacity, both at the level of the EU institutions and within national governments. It starts with better embedding the strategic dimension all along the decision-making chain – from consistent data collecting, via improved geo-economic and security analyses to strategic risk assessments, to final decision-making at the political levels and achievable follow-up. For instance, it is worth exploring the idea of a European advisory council on internal and external security, situated close to leaders' level. When dealing with international partners, a choreographed interplay between EU institutional actors and national politicians speaking for Europe will likewise be essential. Only then can the notion of 'Team Europe' become a reality.

Six. Engage with new energy partners in the world

In the wake of Europe's decades-long gas and oil dependency on Russia, new and old fossil fuel partnerships have been concluded or rekindled with Norway, the US, countries in the Middle East and North Africa, and Azerbaijan. Consequently, Europe's fossil fuel cartography has been redrawn – gas now flows from the continent's northern, western and southern shores to the centre and east, rather than vice versa. Diplomatic engagement with suppliers needs to follow suit. At the same time, a strategic reorientation is taking place in renewable energy. The EU has realized it needs to improve its partnership offers vis-à-vis states in Africa, Latin America and Central Asia, not least to secure the critical materials for its green tech industry. Such a pragmatic approach towards the Global South, a break with development-aid practices and mentalities, requires a sustained diplomatic endeavour and tight public–private collaboration, including with local partners. The EU's Global Gateway initiative, embodying this mindset, requires due strategic attention and funding beyond its current end-date of 2027.

Seven. Energy politics is (great) power politics

In the global energy scramble, European countries have counted on their wealth and reliability as customers to give them market leverage. But clearly such a presumption will not always suffice in current times. Just as in the era

of imperial oil diplomacy, when state power backed the ventures of American, British, French and other energy companies, European authorities today will need to help secure overseas supplies – the more so since many vendors are states or state-owned companies themselves. Europeans also need to recognize that strategic actors like Russia, China and the US not only use foreign policy to achieve domestic energy goals (in acts of energy diplomacy proper), they also use their strength in energy supply-chains for broader strategic and foreign-policy goals (in acts of 'energy statecraft'). Of course, in its customer role the EU can resort to economic boycotts, as it did vis-à-vis Russian oil and gas, but that tool has it limits. The continent's geological predicament will hardly allow the bloc to use energy politics as a tool of power politics. That is why, even if trade links and energy diplomacy remain inevitable, after a century of fossil fuel vulnerability, the green transition offers Europe a strategic opportunity for greater independence.

Notes to the Introduction

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Notes to the Conclusion

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Authors
Thijs Van de Graaf
Hans Kribbe
Luuk van Middelaar

Research and interviews
Hans Kribbe
Sébastien Lumet
Luuk van Middelaar
Thijs Van de Graaf

Research assistance
Elisa Díaz Gras
Matěj Prášil

Editing
Alison Howson
Sébastien Lumet
Liz Waters

Graphic design
Linda van Deursen
Tomáš Celizna

Maps and figures
Caren Weeks
David Weeks

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Graphius, Ghent

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About the authors

Thijs Van de Graaf is an associate professor in International Politics at Ghent University. His latest book is *Global Energy Politics*, Polity, Cambridge 2020. He was the lead author for two IRENA reports on the geopolitics of the energy transition, on hydrogen (2022) and critical materials (2023). He is a non-resident fellow of the Brussels Institute for Geopolitics.

Hans Kribbe is co-director of the Brussels Institute for Geopolitics. He authored *The Strongmen: European encounters with Sovereign Power*, Agenda Publishing, Newcastle upon Tyne 2020.

Luuk van Middelaar is co-director of the Brussels Institute for Geopolitics. His recent publications include *Alarums & Excursions: Improvising politics on the European stage*, Agenda Publishing, Newcastle upon Tyne 2019.

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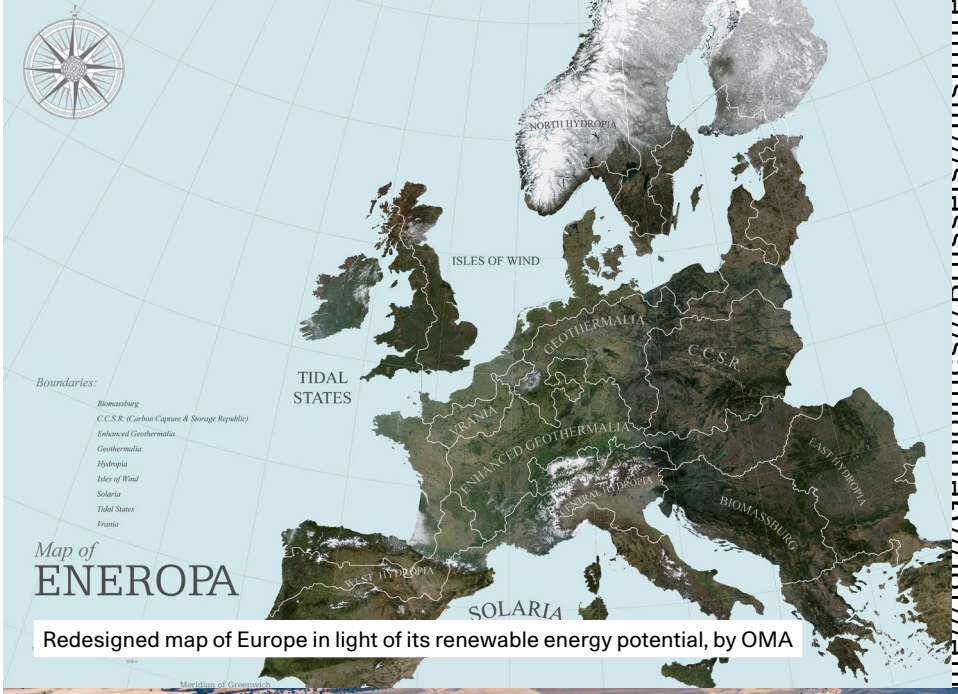
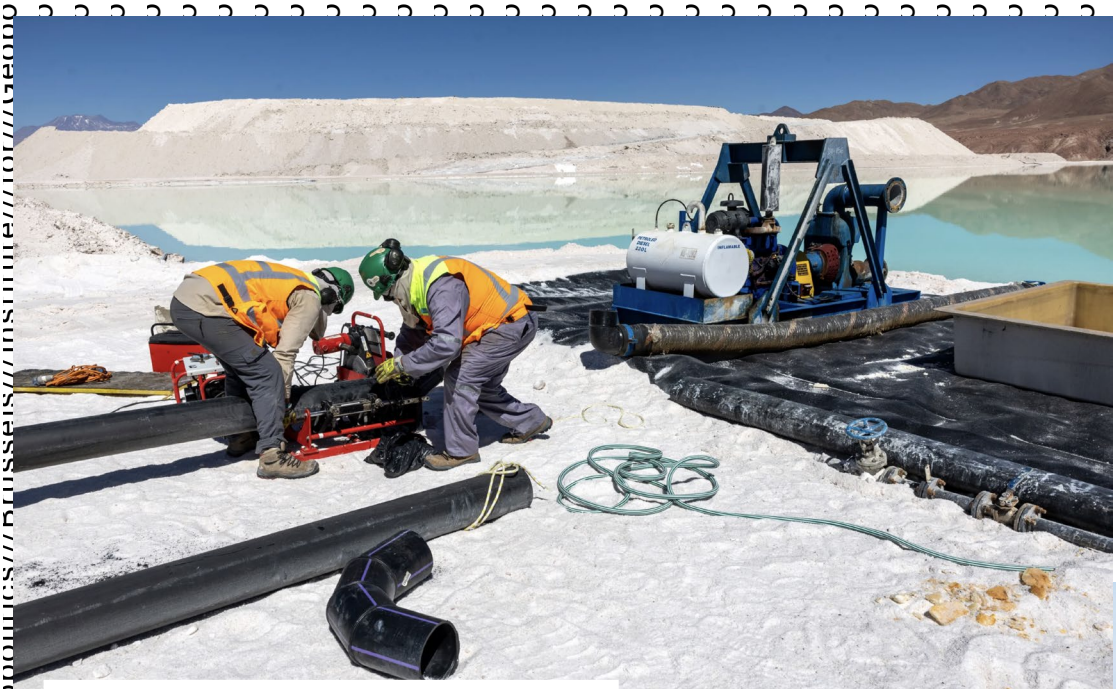


Redesigned map of Europe in light of its renewable energy potential, by OMA

Spanish solar thermal power plant, using molten salt for heat storage

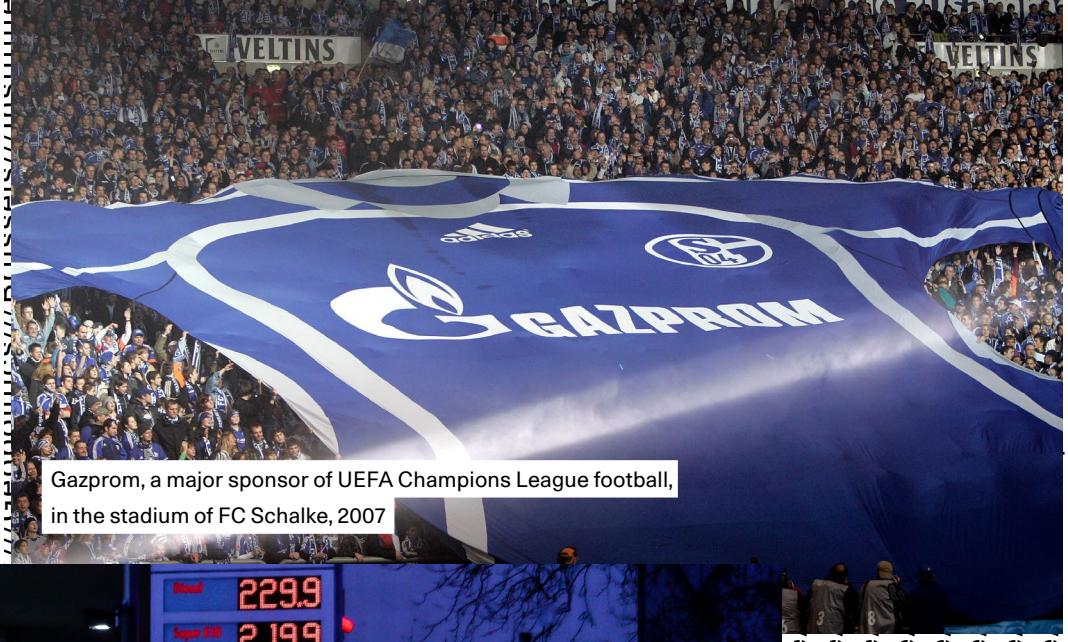
Two generations of wind turbines bordering a Dutch polder

Aerial view of a road stretching through a rare-earth mine in Xinjiang, China



Maintenance work at a lithium mine in the Chilean desert

LNG transportation

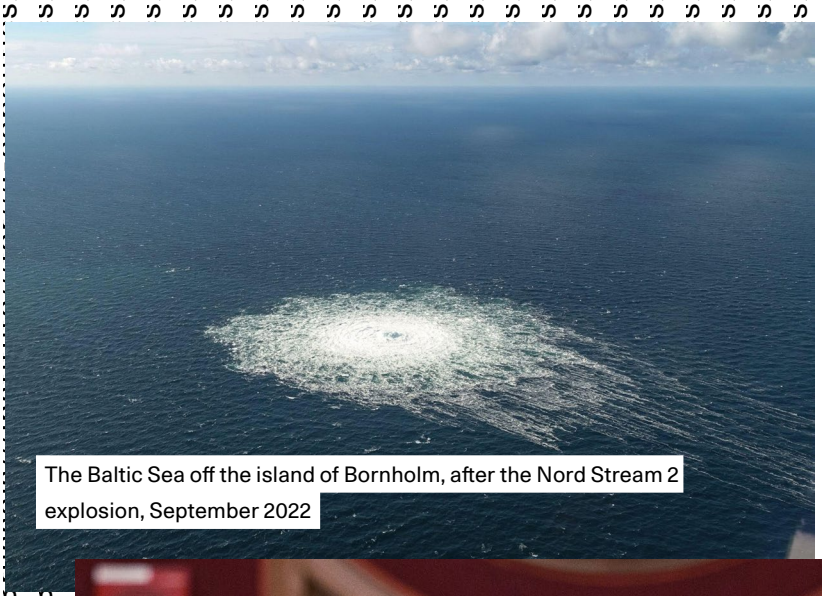


Gazprom, a major sponsor of UEFA Champions League football, in the stadium of FC Schalke, 2007

Fuel prices at a Berlin filling station reaching unprecedented levels in 2022

German Federal Chancellor Olaf Scholz visiting the governor of Mecca Khalid Bin Faisal Al Saud, in Saudi Arabia, 2022

Yellow vests protest in Bordeaux after a fuel tax rise, 2018

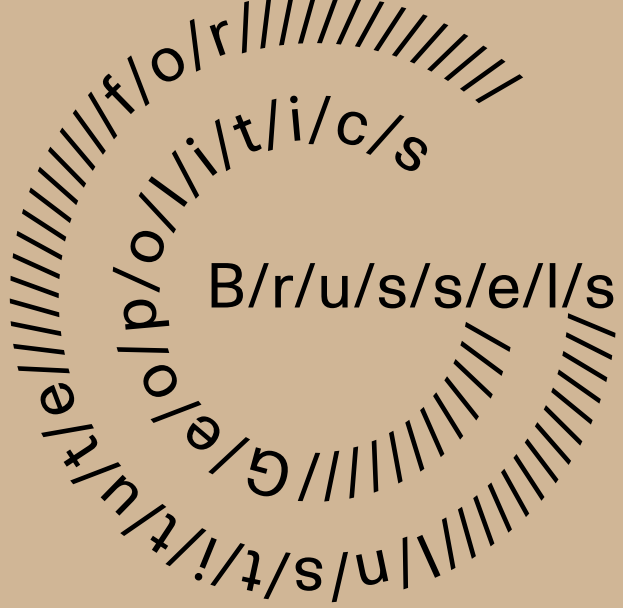


The Baltic Sea off the island of Bornholm, after the Nord Stream 2 explosion, September 2022

Global media recording Prince Abdulaziz bin Salman, energy minister of Saudi Arabia

For over a century, Europe has been dependent on imported energy and therefore in need of strategic energy diplomacy to secure supplies, mainly from the Middle East and Russia. The transition to green sources of energy should decrease this dependency. The sun shines in Europe. Gales batter its shores. The continent's nuclear fleet can be renewed and expanded. Industrial policy, moreover, can enhance Europe's position as a manufacturer of green technologies. Nevertheless, foreign energy dependencies new and old will inevitably remain an important aspect of European energy security.

Geopolitics, moreover, will continue to shape the energy landscape. The 2022 gas crisis that followed Russia's invasion of Ukraine is behind us, but volatilities and economic risks abound. In this uncertain context, Europe will need to both secure its fossil supplies throughout the green transition and smoothen the path towards the energy sources of the future. It urgently needs a robust energy diplomacy, the indispensable external arm of Europe's new industrial policy. Mission: powering Europe.



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