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After Brexit: Scenarios for Clean and Secure Energy in a New World

Briefing Paper

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Introduction

UK and European energy and climate change policy and politics have changed significantly over the past few years. In this paper we present three scenarios for how UK energy and climate change policy and politics, and its relationship with the European Union, might evolve between now and 2035. We do so whilst considering rapidly changing energy contexts at a time when urgent climate action is required.

Political strategies in response to Russia's invasion of Ukraine and rapid and significant price rises have served as prescient reminders that energy remains the lifeblood of modern society and that changes in availability and affordability have far-reaching consequences. Energy security has always featured high on UK and EU energy policy agendas, but how it is defined is also changing. Indeed, even before the invasion of Ukraine more than two thirds of Europeans surveyed thought that *reducing* fossil fuel imports can increase energy security and benefit the EU economically.[2] As explored in more detail below, questions of how energy security and affordability can better support one another are high on political agendas as the UK and Europe face a largely energy-induced cost-of-living crisis with winter approaching.

At the same time, the impacts of climate change are becoming more apparent in the UK, Europe and globally. The last seven years were the warmest on record globally, and Europe experienced its warmest summer on record in 2022.[3] It is highly likely that this year will continue to break a whole range of temperature and extreme weather records across the continent, and beyond. The public is increasingly aware of the implications of climate change – a survey of EU citizens, published in 2021, noted that 93% of respondents consider climate change to be a serious problem.[4] A survey undertaken in February 2022, prior to Russia's invasion of Ukraine, found that citizens felt that the two most important issues facing the EU were the environment and climate change (26%) and rising prices, inflation, and cost of living (24%).[5] In the most recent UK survey, carried out in July 2022, 67% of the population were very or fairly worried by climate change.[6]

The latest scientific results from the UN Intergovernmental Panel on Climate Change and growing public concerns have been reflected in political commitments.[7] The UNFCCC's Conference of the Parties (COP) 26, which met in Glasgow, resulted in many countries raising the ambition of their greenhouse gas emissions reduction plans. The EU revised its UN nationally determined contribution (NDC) to at least 55% reduction in GHG emissions by 2030 from 1990 levels, up from 40%, whilst the UK is targeting a 68% reduction. This will require a rapid revision of policies and measures if new targets and timelines are to be met. In the approach to, and during, COP26 there was increased public and political attention on climate change, whilst significant evidence of climate change over the summer of 2022, including heatwaves, droughts and floods, have continued to sharpen public support.

This paper is primarily concerned, however, with how Brexit has shaped UK energy and climate change politics and policy as a basis for thinking forward and producing scenarios. Energy and climate change were not prominent in the UK's Brexit referendum, partly because neither policy area was considered particularly problematic by proponents of Brexit.[8] Yet the decision to leave the EU has already, and will continue to have, specific implications for these policy areas.

On 29th March 2017, Theresa May, the then Prime Minister triggered Article 50, which started a formal two-year process for the UK to leave the EU. At the request of the UK, the final leaving date was extended three times. Following a general election Boris Johnson became Prime Minister on a pledge to 'get Brexit done' and the UK formally left at the end of January 2020. This led to the start of the transition period, which lasted until the end of December 2020, during which time EU rules continued to apply and the future UK-EU relationship was negotiated.[9] In late December negotiations were concluded, just in the nick of time, resulting in the EU-UK Trade and Cooperation Agreement (TCA), which included the Northern Ireland (NI) Protocol.[10]

Key to the functioning of the current energy relationship between the EU and the UK is Title VIII of the TCA. It sets out the principle that each party has the right to pursue measures to ensure public policy objectives—such as environmental protection, security of supply, and protecting society—are met. Title VIII notably includes the establishment of a Specialised Committee on Energy, which is tasked with monitoring the effectiveness of the relationship and making recommendations for future action.[11]

The first meeting of the Committee occurred in July 2021, the second and latest took place in March 2022.[12] [13] The minutes of the March meeting record three main areas of ongoing discussion: co-operation on security of supply, offshore renewable energy co-operation, and a way forward for electricity trading arrangements.

As with some other sectors, overall rules for the relationship are time-limited – although an extension is possible – until 30 June 2026. Rules on the trading of gas and electricity across the interconnectors can be revised, which the UK is keen to do as current arrangements are sub-optimal, not allowing for implicit trading across the interconnectors. It is, however, clear that negotiations and exchange of information are proceeding much more slowly than anticipated – particularly from the UK's perspective – and deadlines have not been met.[14] In a bizarre twist, agreement on new gas and electricity trading and interconnection principles are expected to be implicitly tied to agreements on fishing, a far more contested sector, as they are both up for review at the same time.[15] Therefore, it is less likely that there will be a deal on energy without a deal on fisheries.

Political contexts affecting the UK-EU relationship

The complexity of the political, energy and climate change context has only increased over the past year. In this section, before moving on to outline our scenarios, we consider how energy politics and policy is being affected by two, major political factors: the war in Ukraine and negotiations over the Northern Ireland Protocol. They are very different, of course, but both are impacting energy policymaking in the UK.

War in Ukraine

Even before Russia's second invasion of Ukraine, energy prices were spiralling upwards due to a supply-demand mismatch that emerged as economies restarted after COVID-19 lockdowns. Social distancing, one of many policies implemented around the world, contributed to a reduction in the consumption and price of fossil fuel energy and further reduced investment in new capacity. Then, as social restrictions were removed, energy demand rebounded, leading to bottlenecks and shortages on global energy markets. This caused higher energy prices and the emergence of a cost-of-living crisis in the UK and Europe.

Russia's invasion of Ukraine has re-prioritised energy security and affordability issues to the top of the political agenda and has also revealed the socially destructive impacts of higher energy prices. Prices were already high before the invasion, but the actions of Russia and the imperative of a strong European response have made a difficult situation a lot worse.

This is largely because Russia is responsible for about 10% of global energy production.[16] It is a major exporter of all fossil fuels, accounting (by volume) for around 15% of the global coal trade, 10% of global oil trade and 8% of global gas trade in 2020.

The EU imports 90% of its total gas consumption, with Russia providing 41% of the bloc's gas imports in 2021 as well as 27% of imported oil and 47% of coal.[17] In comparison, the UK is far less dependent on Russian energy exports, with only 4% of its gas consumption, in the form of Liquified Natural Gas (LNG) from the Yamal in West Siberia, and 8% of oil consumption being imported from Russia.[18] But it is important to note that the UK is not protected from higher prices as, despite being outside the EU's Internal Energy Market, it is effectively part of the European market price zone.

The EU's objective, in response to the war in Ukraine, is to reduce Russian gas imports by two-thirds this year and to phase them out fully "well before" 2030. This is a tall order; the EU consumes around 400 billion cubic meters (bcm) per annum of natural gas. Of this about 155 bcm is supplied by Russia via pipeline and LNG. The European Commission's proposal of March 2022 envisages to reduce its dependency on Russian gas rapidly and significantly, including by receiving approximately 50 bcm more of LNG from global sources in 2022 and filling gas stores to 80% of their capacity by November[19] - gas storage supplies 25-30% of gas consumed in winter. As of early September, gas stores were 84% full and the contribution of Russian pipeline gas had fallen to 9%.[20]

To facilitate its objective to rapidly reduce dependency on Russian energy, the European Commission published a significant new energy plan called REPowerEU in May 2022, whilst a series of updates and further provisions have followed.[21] It sets out how the EU proposes to reduce dependency on Russia in both the short term – in a year – and by 2030. Effectively, there are three central pillars to its approach: increasing renewable energy investment and deployment; accelerating energy savings; and diversifying energy supplies (with some emphasis on geographic diversification of gas imports).[22]

One of the three central pillars of the new plan is, as the name suggests, to "accelerate the clean energy transition" and to rapidly increase renewable energy deployment, with an ambition that renewables should provide 45% of the EU's energy by 2030, more than double its current contribution. In 2021, renewable sources in the EU accounted for around 20% of energy, and 37% of electricity production, up from 34% in 2019. If the new European energy policy is fully implemented, the EU will have a power sector that is fundamentally dominated by renewable energy. The faster the production and dissemination of new renewable energy alternatives, the more likely it is that the EU can phase out Russian fossil fuel imports whilst maintaining security of supply.

On the demand side, the Commission states that energy savings are the quickest and cheapest way to increase energy independence and reduce both bills and emissions. They have proposed an increase in efficiency from 9% below the 2020 forecast for 2030 to 13%, including through behavioural change measures such as asking citizens to turn down their heating by 1 degree. In July, the European Commission proposed new legislation, the European Gas Demand Reduction Plan, that has agreed a target for all Member States to reduce gas demand by 15% between 1 August 2022 and 31 March 2023. All consumers, public administrations, households, owners of public buildings, power suppliers and industry are expected to act, although member states should prioritise meeting household demand.[23] It should also be noted that Ireland, Malta and Cyprus secured a derogation to this agreement on the basis of a lack of direct physical gas pipeline interconnectivity to the EU,[24] although Ireland continues to prepare for voluntary burden sharing. The Commission has also highlighted the need for electricity consumption to be reduced, especially at peak times and has proposed measures aiming for a 10% decline in demand by March 31 2023.[25]

The EU and Member States are seeking to shield consumers from the most extreme impacts of record-high energy wholesale prices. The EU has proposed that this is funded and organised at the member state level through a temporary revenue cap on 'inframarginal' electricity producers, notably renewables and nuclear, and a temporary 'solidarity contribution' by fossil fuel companies based on their taxable surplus (or, windfall) profits. Both schemes combined are expected to generate €140 billion in public revenues.[26]

The third pillar, energy supply diversification, focuses on replacing Russian natural gas imports with LNG imports from elsewhere. A new LNG agreement has been signed with the USA, whilst the EU, and European member states, are seeking agreements with a wide range of other countries. Whilst LNG is a key short-term strategic stop-gap, this approach is limited in its possibilities, partly due to existing

contracts and infrastructure and knock-on effects on emissions. It has already had an impact on the global LNG market, pushing up the price of LNG, leading to a reduction in consumption, and a consequential rise in coal use in some regions of the world, for example in Pakistan[27] and Bangladesh, and greater oil use in Thailand.

An increase in coal is not just expected in other parts of the world. Austria, France, Germany, the Netherlands, and the UK have all stated that they may extend and expand the operating hours of some of their coal plants.[28] It is abundantly clear that energy supply and affordability are significant problems for the EU, and that it is likely to escalate in its severity this winter. Not least as Russia reduced the flow of gas to Europe over the Summer - initially because of maintenance and repairs but Nord Stream 1 was closed in September indefinitely and the subsequent series of leaks make operation now impossible. This has affected the EU's ability to build up crucial reserves to support demand over the winter.

Despite the UK only importing 4% of its gas and 8% of its oil from Russia, security and affordability concerns now dominate UK energy policy. In 2021 the UK set one of the most ambitious emissions reduction targets in the world, committing to a 68% reduction from 1990 levels by 2030 and 78% by 2035 – compared to 50% below in 2020 – and to a zero-emission power sector by 2035.[29] As in the EU, emissions reduction targets have led to much greater deployment of renewable energy. The use of renewables has risen dramatically from 9.9 TWh in 2000 to 134 TWh in 2020, now providing 43% of the UK's total electricity. This remarkable level of production is because of clear policies and rapid falls in technology costs.

Party-political issues and the election of Liz Truss as leader of the Conservative Party and the new Prime Minister have, however, blunted the UK government's response to the Ukraine crisis and mark somewhat of a turn away from the EU's direction of travel. The UK has committed to phasing out Russian fossil fuel imports but, instead of setting binding and ambitious targets for solar, onshore wind and energy efficiency, the government's 'British Energy Security Strategy', introduced under Prime Minister Johnson, prioritises support for technologies, like nuclear and hydrogen, with far longer lead times.[30] Furthermore, not all its alternatives are affordable or low carbon, given the focus on further North Sea oil and gas exploration, blue hydrogen, and recent announcements on the overturning of the suspension of fracking.[31] Offshore wind and nuclear power both have long-lead times which will do little to alleviate security and price concerns over the winter. In the case of the latter, the higher costs and an extremely poor delivery record associated with nuclear has further implications for affordability and rapidity of response.

The incoming UK Government's response to the higher bills of energy has been to put on the cap for both domestic (two years) and businesses customers (six months). The average household will now pay £2500 per year, which along with similar measures for business consumers is forecast by the Institute for Fiscal Studies to costs £100 billion in 2023. They further assess that for every additional £1 that consumers pay the taxpayer will contribute an additional £0.75.[32] In her first Parliamentary session as Prime Minister Liz Truss ruled out the further use of taxation on energy companies saying, "I am against a windfall tax. I believe it is the wrong thing to be putting companies off investing in the United Kingdom just when we need to be growing the economy.[33]

This is both a real missed opportunity to build on the momentum generated by hosting COP26 and a sign of further divergence from the EU. Furthermore, given the political impact of higher energy prices and the possibility that despite the new measures there will still be about a quarter of households being in energy poverty by the end of the year, spending more than 10% of their income on energy services, not offering greater support for energy efficiency is akin to missing an open political goal.

Table 1. A comparison of some of the key climate and energy metrics of the UK and the EU

	UK	EU
Primary energy consumption (2020):		
Oil	35%	36%
Natural gas	38%	25%
Coal	2.8%	11%
Nuclear	6.5%	11%
Hydro	0.8%	5.5%
Renewables	17%	13%
Energy import dependency rate	38% (2021)	58% (2020)
Emissions reduction target (compared to 1990 benchmark):		
2030	-68 %	- 55%
2050	Net-zero	Net-zero
2030 Renewable targets	95% of electricity – from low carbon sources (including nuclear)	45% of energy - 95% of electricity
2030 Offshore wind target	50 GW	at least 60 GW

Northern Ireland Protocol

Energy and climate policy and politics have also been influenced by the worsening relationship between the UK and EU over the Northern Ireland Protocol. As part of the wider agreement on the new relationship between the EU and UK, a Northern Ireland Protocol was adopted (as suggested by then Prime Minister Boris Johnson). The aim of the protocol was to avoid a hard border between Northern Ireland (NI) and Ireland, to ensure continued peace in Northern Ireland while maintaining the integrity of the EU's single market, and ensuring unfettered access of NI goods to the Great Britain (GB) market. As a result, NI has effectively remained in the EU's single market for goods, while also retaining full access to the GB market for goods. Consequently, inspections and document checks are taking place on goods from GB coming into NI ports.

In relation to energy markets specifically, when the UK left the EU, it was Great Britain (England, Scotland and Wales) that left the Internal Energy Market (IEM). Northern Ireland remained part of both the IEM, through the Single Energy Market (SEM) operating across the island of Ireland, and also remains part of the EU Emissions Trading System (ETS). As such, along with differing powers, critical differences have emerged within the roles of the devolved administrations.

In 2022 the UK Government announced the Northern Ireland Protocol Bill,[34] which proposes changes to the protocol signed with the EU, amounting to a unilateral change to an

international treaty. The bill states that goods coming from and staying in NI would go in a Green Lane: In practise, this mean that if backed by commercial data and using a trusted trader, they would be exempt from customs processes. Other goods, including those going onto the EU, would still require customs checks. The Bill would also bring Northern Ireland under the UK's new subsidy control, rather than as is currently the case remaining under the EU State Aid regime.[35] This may have implications for the energy sector, as there remains a common regulatory framework for the operation of the wholesale electricity market, also known as the integrated Single Electricity Market or ISEM, operating across both jurisdictions.

As of September 2022, the Bill had passed all the necessary stages in the House of Commons and was in the upper chamber, the House of Lords. Therefore, unless the Government wishes to change it, it is likely to be adopted in the Autumn.[36] In response to the proposals the EU began infringement procedures against the UK in March 2022 and then again in July.[37]

If approved, the NI Protocol Bill would also remove the jurisdiction of the European Court of Justice over the Protocol. Therefore, it is possible that the UK government will choose to ignore the infringement proceedings all together. Either way, the case before the European Court of Justice may take a year or longer.[38] Meanwhile, a very frustrated EU views the UK as having rowed back on international agreements, proposed by the UK, despite the range of workable solutions recently offered by the EU.[39]

This dispute, and the ways in which it has impacted how the EU sees the UK, has already had negative implications for the energy relationship between the UK and the EU.[40] For example, the UK-EU TCA includes provisions for the UK to continue participation in EU programmes such as on research, but a final agreement to this has yet to be reached. The UK is also keen to negotiate new gas and electricity trading and interconnection rules to replace the 'default' rules in the TCA, not least as default rules are less efficient and could hold renewable development and grid integration back, but the EU is reluctant to reach a new agreement with a negotiating partner that is prepared to go back on previous agreements. In addition, another consequence of the dispute is that no further negotiations will be taking place on the UK's participation in the EU's multi-billion Euro research and development programmes, such as Horizon Europe, Copernicus (for space) and Euratom for nuclear fission and fusion research.[41] This has led to UK based researchers having to forfeit previously confirmed European Research Council funding – part of Horizon Europe.[42]

Methodology and scenarios

In this section we set out three scenarios, Foxes Skulking, Dogs Howling, and Meercats Mobbing, of how the UK-EU energy and climate relationship might develop in the medium-term, i.e. between now and 2035 when existing investment decisions are likely to come to fruition.

Overall, the scenarios represent more or less co-operative relations between the UK and the EU – although they differ in a number of ways, including extents of UK de-integration from the EU and prioritisation of climate policy. A detailed summary of the main differences between scenarios is provided in Table 2 below. We also explore what scenarios might mean in relation to current energy and climate policy, thereby helping to inform future policy options for the UK as it seeks to balance the energy trilemma in a fast-changing world.

The scenarios were developed in three stages. We organised research from our Brexit briefing papers, from June 2021 and January 2022, into a number of key implications for UK energy and climate change policy and politics. These then informed our thinking around possible future scenarios and their key traits. These ideas were then presented, discussed and debated at a workshop in May 2022, with a wide range of UK and EU stakeholders directly or indirectly involved in Brexit analysis and/or negotiations – including government representatives, civil servants, industry representatives, think tanks and academics. We then adjusted the scenarios to take on board insights from the workshop and to reflect further political developments since then.

While it is not envisaged, at least prior to 2035, that the UK will re-join the EU, there will undoubtedly be further movements in the type of energy and climate relationship that develop and associated policies and regulatory frameworks. This will be determined by two factors: first, what is happening in energy and climate, such as energy security concerns and subsequent spikes in energy prices or changing concerns on climate change affecting the rate of the energy transition. Second, the overall EU-UK relationship.

Although energy and climate were not initially seen as controversial, they can, as we have already seen, be affected by negotiations in other areas. There is also the possibility that they will become contentious this winter if the EU or the UK takes actions that restrict trade in gas and electricity.

The COVID-19 pandemic impacted on the production and the use of energy, contributing towards a global price crisis, a situation that has now been dramatically amplified by Russia's invasion of the Ukraine. These factors have also pushed energy security up the political agenda, highlighting the vital need to balance security with energy decarbonisation and affordability objectives. Though there will continue to be many international drivers of European energy and climate policy, the workshop focused on only those that affect the EU-UK relationship.

The three scenarios

Foxes Skulking:
The UK moves even further away from the EU. For domestic political and energy security reasons, the UK in particular engages in a relative rolling back on existing climate change commitments and/or policies. This scenario has become more probable since Liz Truss became Prime Minister, her choice of Jacob Reece-Mogg as Secretary of State for BEIS, who was recently quoted as saying 'We need to be thinking about extracting every last cubic inch of gas from the North Sea. We are not going for net zero tomorrow – 2050 is a long way off'.[43]

Certain elements of this scenario have already become more a reality since we held the scenario workshop in May, given the Russian invasion of Ukraine, the securitisation of energy policy, the opening up of more oil and gas licenses in the North Sea, and evidence of a relative de-prioritisation of climate change versus security goals.[44] For the UK, this has already resulted in a reversal of the decision on gas fracking, push back against the 2035 goal of a zero carbon emission power sector, and commitments to further offshore exploration of gas and to recommissioning of coal plants in 'extraordinary' circumstances. While each of these raises their own technical, economic and in particular timing issues – not having an impact for many years from the initial decision – they do signal the direction of travel. In addition, it looks as if the Northern Ireland Protocol bill will pass – again sowing the seeds for further, medium-term disagreement.

Under this scenario we also envisage that the UK does not seek to replace EU green financing from domestic state sources and consequently dedicated funding streams are reduced and the cost of capital rises. While the UK maintains a domestic emissions trading system, it operates without linkage to the EU's resulting in a price divergence due to different caps and covered sectors.

As a result of this, and due to shifts in national levies and taxes, it becomes clear that the UK is not on track to meet its existing carbon and energy transition commitments and, rather than accelerate action, the government pushes back on domestic targets and calls for a longer energy transition, citing higher costs and energy security. To stimulate further innovation and investment the government alters the UK's state financing rules which no longer align with those from the EU, whilst the UK does not commit to a Common Border Adjustment mechanism or other common international tariffs.

Changing government involvement in the investment and carbon trading rules, along with no rapprochement on the involvement of the European Court of Justice, means that the UK remains outside the IEM and associated infrastructure and legal framework. This means that the UK continues to trade with the EU on an *explicit*, default basis leading, among other things, to a further deterioration in possibilities for renewable energy cooperation in the North Sea. Energy trading with Member and Associate States, however, continues.

As the general political atmosphere and relationship, including those relating to energy and climate, do not improve and there is increasing regulatory divergence, the UK aligns its climate and energy approach to countries potentially in Latin America (like Brazil) and South-East Asia (like Indonesia), as it harmonises with other strategic shifts, such as the 2021 Integrated Review with its 'tilt to the Indo-Pacific',[45] this could lead to joint research and development activities or increased focus of the UK development financial institution.

One of the consequences of the UK shift in relative de-prioritisation of climate is further political and public divergence with the devolved administrations and the citizens in Northern Ireland, Scotland and Wales and increasing calls and support for independence referendums.

Dogs Howling:
In this scenario, which is arguably most similar to the current position, the EU and the UK continue to diverge on climate and energy issues, but both continue to maintain current climate commitments.

Importantly, the UK remains committed to its climate targets, a reduction of 68% of GHG emissions by 2030 from 1990 levels and a 78% reduction by 2035, which are slightly higher than those of the EU, which has set a target for GHG reductions of 55% below 1990 levels by 2030. These are both ambitious, easier to meet with active co-operation with the EU, and require similar structure and market changes to be met, therefore there is 'alignment by default' in some areas of climate and energy policy.

Despite this, the UK maintains its own emissions trading system which, unlike other countries such as Switzerland, it does not link to the EU ETS. This avoids a more direct harmonisation of policies or measures. While establishing the UK ETS the government said that the goal was to make it the 'world's first net zero consistent cap and trade market',[46] the implications of which will become clearer in 2024 if and when the expected implementation of this commitment goes ahead.[47] Furthermore, when the Carbon Border Tax Adjustment Mechanism (CBAM) is introduced by the EU, fees placed upon UK goods cannot be ruled out. As of early September 2022, the price of carbon in the EU ETS was about €70/tonne and £80/tonne in the UK ETS.[48] If the UK linked its ETS to the EU one, it could bypass CBAM bureaucracy and costs. The UK introduces its own Green Taxonomy, including the inclusion of nuclear power and natural gas – with different technical standards to the EU, although the headline requirements are the same.

The UK continues to explore opportunities for co-operation outside of Europe and its continual commitment to climate action leads to an active involvement in discussions about the establishment of carbon clubs with third countries, including South Africa and Japan. Outside the EU's research programmes, the UK seeks to collaborate with research programmes particularly in Asia, such as India, Japan and Korea, and North America, as well as with major global initiatives such as the Glasgow Financial Alliance for Net Zero (GFANZ).

The UK remains outside the EU's Internal Energy Market and continues to trade electricity and gas *explicitly* across the interconnectors, with attendant trading and co-operation inefficiencies. The expansion of electricity interconnectors continues, but primarily to Northern Europe, including Norway and Germany, but projects remain stalled with France. The UK also remains outside the European network organisations and European research funding bodies, preferring to engage in bilateral sector specific collaboration agreements. The UK seeks to set its own, distinct, rules for state support for investment and operation, further diverging from EU state aid rules, especially in the energy sector as energy security concerns remain high on the political and public agenda. Despite an increase in electricity interconnectors, the UK remains outside the body co-ordinating a European approach to North Sea Grid. Together with the lack of a new electricity (and gas) trading agreement to replace current 'default' arrangements, this slows development and reduces its efficiency.

Meerkats Mobbing:
This scenario is most like the relationship between the EU and Norway and reflects a warming of the relationship versus today's position. It would be more probable with a political shift in the UK towards the centre ground in the years to come.

This scenario assumes that the political fallout from the Brexit process starts to settle – for example, if contentious issues, such as the Northern Ireland Protocol, are settled allowing for the mood music between Brussels (and the Member States) and London to improve. Prime Minister Truss's agreement to attend the inaugural meeting of the European Political Community in Prague in October 2022 is one very small indication that the relationship may be thawing. This would also infer the possibility that regulatory harmonisation could become more overt. The UK government seeks to replace European green financial sources with domestic, ensuring a steady flow of finance for the clean energy transition and more rapid phase out of North Sea oil and gas.

Under this scenario the UK maintains its own ETS but agrees to link it to the EU ETS. This enables the trade of certificates and requires a harmonisation of the scope and ceilings of the systems now and in the future. The harmonisation of climate policies and measures leads to directly comparable green taxonomy guidance and regulation between the EU and the UK. Furthermore, linking the two systems ensures that the UK becomes part of the EU's 'carbon club', and consequently, there are no CBAM tariffs.

Furthermore, while the UK maintains a separate NDC to the UNFCCC, there is a more co-ordinated approach to international climate diplomacy.

Within the energy sector there are clear moves towards harmonisation and in some areas re-integration of regulatory regimes and institutions. For example, the UK re-joins the EU's *implicit* market trading across the interconnectors and becomes associate members/observers of the European network organisations. This enables more efficient gas and electricity trading and further engagement of the UK in the Connecting Europe Facility and in the North Sea Grids initiative, resulting in a much more co-ordinated approach to the development of continental energy networks. This is seen as a clear win-win for the EU and UK as the importance of offshore wind increases, with the phase-out of Russian fossil fuel imports, whilst it would also better facilitate the UK's plans to become an exporter of energy.

Table 2: Key traits of the three scenarios

		Foxes Skulking	Dogs Howling	Meerkats Mobbing
Climate change	Emissions Trading System	Full independent ETS	Full independent ETS	Linked UK and EU ETS
	Carbon Border Tax Adjustment	EU CBAMs apply to UK across all sectors	No CBAM and common international tariffs	No CBAM and common international tariffs
	Working with 3rd countries	3rd country cooperation prioritised	Equal Efforts to work with EU and 3rd countries	EU co-operation is prioritised
	Green taxonomies	Divergent	Fully independent taxonomies	Harmonised taxonomies
	Mitigation ambition	Divergent	Fully independent taxonomies	Harmonised taxonomies
Energy	International Energy Market	UK remains outside the IEM, some risk that the Single Energy Market ceases to exist.	UK remains outside the IEM, except for N Ireland	UK re-joins the IEM - as per Norway
	Co-operation of interconnectors	UK/EU: explicit market trading rules remain	UK/EU: explicit market trading rules remain	UK/EU: implicit market rules
	Research funding	UK remains outside EU framework programme	UK remains outside EU framework programme	UK becomes part of EU framework programme
	Institutions and governance	Remain outside institutions	Remain outside institutions	Re-join ENTSOE/G
	Joint infrastructure	Limited co-ordination	Limited co-ordination	UK considered member state in infrastructure development
	Finance	UK does not replace EU green finance	UK establishes Energy Transition Funds	UK establishes Energy Transition Funds

Signposts and tipping points

There are a number of signposts, or indicators, to watch out for which would signal changes in the type of energy and climate relationship between the EU and the UK, as well as potential tipping points which may move the relationship towards greater co-operation and harmonisation or to one which is more distant. These signposts and tipping points are not fixed given the degree to which the energy and climate landscape in Europe is changing.

Signposts

Here we identify the issues and opportunities worth watching closely, in that how they play out will signal specific ways in which the energy and climate relationship between the UK and the EU is developing.

UN COP27: The joint presidency of COP26 with the Italian and UK governments was a clear demonstration of the potential for ongoing co-operation between the EU and UK, which was further assisted by the UK hosting the G7 and Italy the G20 in 2021. Since then, despite the increased attention of energy security, the general thrust of the UK and EU seems to be to stick to the existing emissions reduction targets, although the EU has raised its ambitions on renewable energy and energy efficiency. Consequently, international climate action remains an area to watch, for example to see if new co-operation opportunities arise given that a common approach remains mutually beneficial. In turn, this would increase the likelihood of a more Meerkat approach to climate issues.

Notably, COP27 will be presided by Egypt, with the UK heavily involved in its preparation. Two major themes are likely to dominate the agenda. As it is the first COP since 2016 not held on European soil, the focus will likely be on North-South relations and long-standing debate around equity, including Loss and Damage, and securing a 'just transition' on a global scale. Second, and related, much debate will be centred around how to secure accelerated climate action in a context of global energy crisis. Some may point to European hypocrisy, as the European 'scramble for gas' is depriving developing countries of LNG (thereby forcing the latter to switch back to coal for power generation or risk large-scale black-outs), while in Europe, coal-fired power generation is up as well.[50] They may also point to UK hyprocrisy given this government's statements on restarting fracking and extracting as much oil and gas as possible from the North Sea.

Emissions Trading Systems: The UK ETS operates independently and without exchange with the EU ETS, although the EU does have a mechanism to enable linking with third countries, as in the case of Switzerland, which brings several advantages such as giving greater market stability.[51] While a UK-EU link is unlikely, and would indicate a significant shift in the relationship, smaller policy shifts over the coming years will be important indicators of the direction of travel. Most significant will be the final shape of the UK ETS and which sectors are included. It seems unlikely that this will include agriculture, more likely is the inclusion of some greenhouse gas removal technologies and how future caps are adjusted for net zero commitments. While the EU's current (the fourth) commitment period ends in 2030 and so further adjustment to its scope and cap will be made at that time.

Taxonomies: The UK and EU are separately developing taxonomies to aid green investments, controversially with both paying particular attention on the role of natural gas and nuclear power. The EU's taxonomy was adopted in Summer 2022 while the UK is still carrying out consultations. Harmonising or ensuring the compatibility of these taxonomies would indicate a degree of co-operation. At the same time, the inclusion of natural gas in the

EU's scheme, given the war in Ukraine and the desire to rapidly replace the large share of gas from Russia would, beyond some LNG import capacity and strengthening of various parts of the EU grid, make this seem highly unlikely.

Research: The UK being outside of the EU's research and development funding framework is to the detriment of science and technological innovation. The exclusion of the UK is one clear example of the policy fallout from the UK's decision to exit the EU cascading across sectors. The UK government has committed to funding UK based researchers within the EU's research programmes, as many other countries do, but without further political progress on the Northern Ireland Protocol, these negotiations, as is the case with so many others, will not take place. The inclusion of the UK in the EU's research programme will increase energy and climate co-operation and help maintain longer term cohesion a move toward the Meerkats scenario.

Tipping points

We include the below listed 'tipping points' as a way of thinking through what key climate and energy events, (dis-)agreements and issue areas might cause significant change in UK-EU relations.

Northern Ireland Protocol: The Protocol remains the over-riding political issue that will affect not only the political atmosphere but also the degree of co-operation and engagement between the EU and the UK. Infringement procedures have already been taken by the EU and these are materially affecting the relationship between both parties to the TCA. It will further affect the relationship between the UK and Ireland and the operation of the SEM across both jurisdictions on the island of Ireland. While this issue could get resolved in 2023, it could also continue for years in the courts. If the UK stays on its current course it makes 'Foxes Skulking' a relatively more likely scenario in that the rift may become harder to mend.

Co-operation on electricity and gas flows: The coming 2022/23 winter, and those of subsequent years, are likely to be extremely difficult for gas supply and affordability across the EU and UK, due to commitments to phase out Russian fossil fuel imports as part of a wider package of sanctions. Russia's decision to severely restrict or stop the flow of gas to Europe will maintain higher prices, resulting in further attempts to reduce demand and import gas from elsewhere. The UK has the largest LNG import infrastructure in Western Europe and is likely to continue to be important for the EU, whilst there have been high levels of cooperation on gas storage for winter 2022. However, with limited domestic storage the UK also needs to ensure its own supply is no longer bound by the EU's solidarity mechanism, whilst there are emergency measures in place which would allow National Grid to cut gas supplies to Europe in an extreme winter scenario. Therefore, the extent of coordination of gas flows between the UK and EU members states will make both a material difference to gas pricing and availability, and given its political importance, *will affect the direction and warmth of the relationship in the short to medium term.* Over the summer of 2022 the UK has been a net exporter of electricity to EU Member States, particularly France. The continual operation of the electricity interconnectors, which will play an ever more important contribution in a renewable energy dominated system, will be an important test of future cooperation. The opportunity for greater co-operation on energy was been noted by French President Emanuel Macron who, on the election of Liz Truss said 'we must on the subject of energy, as on others, have strengthened co-operation'.

North Sea Grids: Offshore wind is a priority for the UK and the EU. The UK has a target of 50 GW by 2030 and four EU countries (Belgium, Denmark, Germany and the Netherlands) propose to have at least 60 GW in the North Sea by 2030. That the UK withdrew from the now nine-country North Seas Energy Cooperation (NSEC) initiative, however, highlights Brexit associated barriers to co-operation. The revision of the EU's 2030 renewable energy targets due to the war in Ukraine means that there needs to be acceleration of deployment, with investment decisions taken in the next few years. The construction and operation of such a large volume of offshore wind will be slower and more expensive without co-ordination and co-operation. At the second meeting of the EU-UK Specialist Committee on Energy, it was noted that 'parties confirmed the intention to cooperate on development of offshore renewable capacity in the North Seas'. Consequently, the further development of a North Sea Grid and an offshore wind hub offers an opportunity for practical co-operation with significant mutual benefits, but a move back to implicit trading is understood as crucial to optimising trade and interconnection of offshore wind negotiations over which have been stalled by NI Protocol disagreements.

Internal Energy Market: The UK has left the EU's Internal Energy Market, as it has left the EU's Internal Market for goods. Re-joining the IEM would require the UK to adhere to many institutional rules and governance and enforcement mechanisms that are currently politically unlikely. However, were this to occur it would undoubtedly lead to more efficient trading across interconnectors, greater co-operation in network planning, and regulatory harmonisation. However, a change in the relationship is unlikely, although a renewal of the relationship in 2026 offers a clear opportunity to review the current arrangements.

Conclusions

The UK-EU Trade & Cooperation Agreement (TCA) was finally agreed in December 2020, and as far as the majority of the general public and many working on policy are concerned, the relationship between the EU and the UK is now largely agreed. However, there are multiple areas of challenge remaining, some of which are highly contested and may have implications for other issues and sectors as the political dynamic unfolds.

Time will show the extent to which the EU and UK's energy and climate action moves in lock step as they both seek to enhance their energy security and meet their decarbonisation objectives (closer to the Meerkat scenario) or as domestic policies and politics change the two diverge. Events, external to energy and climate, are likely to be causes of divergence between the EU and UK, rather than the issues themselves. The clearest example is the UK's proposed revision to the Northern Ireland Protocol, which the European Commission – and Member States – have opposed and infringement procedures have begun, a process that might take years to resolve. As such, one way forward for the UK to improve cooperation with the EU in the short term is to explicitly decouple outstanding issues around the Northern Ireland Protocol from energy and climate issues.

However, energy has risen up the political agenda and energy access and affordability are likely to be key topics for several years to come and clear fault-lines between the EU and UK may develop, especially with Prime Minister Truss's new pro-oil and gas development and shale gas proposals. Furthermore, the different approaches on windfall taxes for the energy industry, to help pay for government market interventions may affect cross border activities. Currently, energy security driven by the invasion of Ukraine will affect relations and whatever unfolds this winter, with traditionally higher gas demand for heating, will be critical for international co-operation.

Maintaining an entente cordiale with France and the wider EU on energy is not only essential for ensuring supply but offers an opportunity to demonstrate the mutually beneficial value of and means of greater co-operation. In that respect, president Macron's recent comments on Truss' election may be encouraging. Political rapprochement from both sides will be essential in paving the way for solving issues such as optimising the gas and electricity infrastructure, which is largely owned by private companies. Realising this, to their mutual benefit, will require careful advanced planning. In September 2022, members of the North Seas Energy Cooperation (NSEC), a group of eight EU countries and Norway, announced ambitious new aggregate targets of reaching at least 260 GW of offshore wind energy by 2050. The UK is no longer a member since Brexit in January 2020, although NSEC and the UK are now discussing the establishment of a memorandum of understanding. Cooperation within these types of institutions will allow the UK to benefit from best practices in other countries that are investing considerably in offshore wind.

The war has also highlighted the importance of and reliance on *global* co-operation, with the EU looking to diversify its sources of LNG. However, the EU re-directing its supply has implications for other countries, with Bangladesh, for example, being forced to burn more coal to replace the gas which it would have used being sent to Europe. Furthermore, encouraging the development of additional new LNG production around the world will have long term implications for carbon emissions and needs to be tested against short term (2030) and net zero carbon mitigation targets.

The EU and UK co-operated effectively during the joint (Italian and UK) presidency of COP26 and both raised their 2030 carbon reduction targets. This should, despite separate Emissions Trading Systems, maintain closely aligned climate change policies, as long as both parties keep to and then meet their targets. Although the direction of travel for the EU is clearer with the RePowerEU plan proposing an acceleration of renewable energy deployment and increased energy efficiency and saving, while the UK is less committed to either of these energy security and decarbonisation plans.

Major infrastructure projects, such as a North Sea Hub, could and should play an important part in meeting climate and energy security objectives and could be a driver of greater regulatory harmonisation and joint investment, although there is less co-operation between the EU's Member States and the UK than is optimal currently. A North Sea Hub could be an important example of co-operation and the extent to which technocrats will run the systems. Regardless of which scenario prevails, this is likely to be beneficial to energy and climate delivery.

Future administrations are likely to be more amenable to future co-operation on energy and climate issues and this offers important opportunities and underscores the need for continued engagement with all working towards securing energy supply and achieving net-zero.

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