

## The Impact of Brexit on the EU Energy System

### KEY FINDINGS

- **On aggregate, the energy system related impact of Brexit on EU citizens and companies will be limited.** With or without the UK, the EU will be able to pursue its energy and climate policy goals relatively unaltered.
- **An immense number of very important details will need to be resolved in a short period of time.** The UK's status in EU regulatory authorities, a potential linkage of emission trading systems and the valuation of nuclear material are only three of the complex legal and political issues.
- **Special attention should be paid to the impact of Brexit on the Irish energy system.** The dependence of Ireland on energy trade with the UK and the joint electricity market with Northern Ireland make the Republic of Ireland particularly exposed to Brexit.
- **After Brexit, the EU might choose to recalibrate its 2030 greenhouse gas emissions (non-ETS) and 2020 renewables targets.** Depending on the methodology chosen, this could imply a shift in the burden between Member States or a change in the EU's overall level of ambition.
- **Brexit might imply higher emission allowance prices in the longer term.** In the very near term, however, the off-loading of allowances held in the UK might cause prices to dip.

The Committee on Industry, Research and Energy (ITRE) of the European Parliament called for this study in light of the Brexit referendum. The study focuses on the possible effects of Brexit on EU citizens and companies in order to inform the Brexit negotiations from an EU perspective.

We address eight key issues concerning the potential impact of Brexit on the EU energy system: (i) Future of UK access to the European Energy Market, (ii) Availability of EU funds for energy projects, (iii) Participation in regulatory bodies, (iv) Revisiting EU energy and climate targets, (v) Rules for security of electricity and gas supplies, (vi) Future relationship with Euratom, (vii) Impact on energy markets for UK and EU companies, and (viii) Impact of the UK withdrawal on Ireland.

The study provides an assessment of possible implications of Brexit in these areas. It does not provide recommendations on what approach the Parliament should prefer, but rather seeks to inform those decisions.

The study is based on extensive desk research, backed up by stakeholder interviews to cross check and substantiate our findings.

A tacit assumption in all findings is that the UK will in fact withdraw from the EU.

## 1. Overall Impact

On aggregate, the energy system related impact of Brexit on EU citizens and companies will be limited. With or without the UK, the EU will be able to complete its market, to achieve its climate and energy targets with feasible readjustments, and to maintain supply security. In addition, we do not expect that it will be in the UK's interest to seek a competitive advantage for its companies by discriminating against the EU energy companies operating in the UK, or by competing with the EU's manufacturing industry by lowering energy taxes or environmental standards.

Despite our belief that the negative impact of Brexit on the EU energy system is manageable, our analysis demonstrates the immense number and sizable impact of important details that will need to be resolved in a short period of time. Moreover, our analysis shows that special attention should be paid to the impact of Brexit on the Irish energy system.

## 2. The future of UK access to the European Energy Market

The UK imports electricity and gas from the EU27 and the EEA. It also serves as a transit country for electricity and gas between Ireland and the EU26 (EU 27 minus Ireland), as well as a transit country for gas between Norway (an EEA country that is not an EU Member State) and the EU27.

More than 80 percent of the value in EU27/UK electricity and gas trade in 2015 was for natural gas (some EUR 6 billion). In addition, the UK imported natural gas worth EUR 10 billion from Norway.

As a member of the World Trade Organization (WTO), the UK will likely be granted the right to import and export energy free of tariffs from and to other WTO members. The EU has shown flexibility with respect to the rules governing the usage of electricity and gas interconnectors with third parties. Given their mutual interest, the UK and the EU can likely find arrangements that will enable continued energy exchanges.

However, gas and electricity markets are complex service markets, not simple commodity markets, and the EU is in the process of streamlining the interface between national market designs to create a single energy market. The key question is hence whether the UK will remain part of the internal energy market, and what arrangements will be negotiated if it does not. As the internal energy market is based on a complex and dynamic set of enforceable rules, a stable set of institutions is needed to make it work. Hence, it is not conceivable that a country can participate in the internal energy market when it does not accept the powers of super-national institutions (e.g. ACER, ENTSO, the ROCs, and the European Commission) over its own energy system.

A UK departure from the internal energy market would not imply an end to energy trading between the EU27 and the UK, although it would substantially reduce the sophistication of trading arrangements. As a result, we expect that trade gains from an internal market that jointly optimises the electricity systems (both in terms of dispatch and investments) in the UK and the EU27 will diminish. The effects will be asymmetrical. The UK will require costly domestic overcapacities to ensure system adequacy, if it cannot rely on the Continent for compensating domestic shortfalls. In addition, UK wholesale prices will increase and will become more volatile due to decreasing competition and falling liquidity. Similar but smaller effects can be expected on the EU26. In the event of a UK departure from the internal energy market, the EU should make sure that UK overcapacities (which are supported

through mechanisms that are unavailable for market participants in the EU27) do not undermine investment or dispatch decisions in the EU27.

Given that UK energy taxes are in practice not bound by the EU's minimum energy taxation rules, Brexit is unlikely to have any direct impact on the UK's energy taxes.

**Table 1: Which arrangements allow a country to enjoy tariff-free energy exchanges and/or joint optimisation of dispatch with the EU?**

	Tariff-free energy exchanges	Joint optimisation of dispatch
EU Member State (e.g. France)	Yes	Yes
EEA (e.g. Norway)	Yes	Yes
Energy Community (e.g. Ukraine)	Yes	Case-by-case
Bilateral Treaty (e.g. Switzerland)	Yes	Case-by-case
WTO (e.g. Morocco)	Yes	No

Source: Bruegel.

### 3. Availability of EU funds for energy projects

As an EU member, the UK enjoys access to EU-based finance for energy projects from the European Investment Bank (EIB), the European Fund for Strategic Investment (EFSI), the Connecting Europe Facility (CEF), the EU Horizon 2020 programme (H2020) and the European Energy Programme for Recovery (EEPR). After Brexit, the UK might have more limited access to these sources of funding. This might have a substantial impact on the UK, given the large amounts that these programs currently commit for energy projects in which the UK participates.

- The EIB provided about EUR 9 billion between 2012 and 2017.
- The EFSI has signed financing worth EUR 1.4 billion since 2015, and approved another EUR 410 million.
- The EEPR has provided grants for a total of EUR 330 million.
- The CEF has funded EUR 125.6 million, and additional funding of EUR 90 million is in the pipeline. Of the current EU projects of common interest (PCIs), 16 are UK-related.
- The H2020 programme currently funds more than 90 projects, for a total commitment of EUR 160 million.

The future availability of EU funds for UK energy projects is heavily dependent on the type of settlement (if any) ultimately negotiated between the EU27 and the UK. This is particularly the case for the EIB, given the Bank's financial and political peculiarities, and given the UK's substantial involvement in its capital. After the withdrawal, the UK may presumably have more limited access to funding from the EFSI, CEF (should projects be considered strategic by the European Commission), H2020 (should the UK sign a corresponding Association Agreement), and EEPR.

The running programmes do not entail extraordinary benefits to EU27 citizens and companies that the EU unconditionally needs to protect. The EU should nonetheless seek to keep a window open for projects that are to the benefit of EU27 citizens and companies, as it does for other third countries.

**Table 2: Which arrangements allow a country access to EU funding mechanisms?**

	EIB	EFSD	CEF	H2020	ERDF
EU Member State (e.g. France)	Access	Access	Access	Access	Access
EEA (e.g. Norway)	Possible access	Possible access	Possible access	Possible access	Possible access
Energy Community (e.g. Ukraine)	Possible access	Possible access	Possible access	Possible access	Possible access
Bilateral Treaty (e.g. Switzerland)	Possible access	Possible access	Possible access	Possible access	Possible access
WTO (e.g. Morocco)	Possible access	Possible access	Possible access	Possible access	Possible access

Source: Bruegel.

#### 4. Participation in regulatory bodies

Regulatory bodies such as the Agency for the Cooperation of Energy Regulators (ACER) and the European Networks of Transmission System Operators for Electricity and Gas (ENTSO-E and ENTSOG) play an important role in the functioning of the EU internal energy market. After Brexit, the status of any UK representatives in ACER and the ENTSOs will change. Depending on the future arrangements, UK representatives might still remain as observers, but current rules would not allow non-EU members to vote on crucial market design issues.

The UK's withdrawal will have no substantive impact on the voting shares and the functioning of the EU regulatory bodies that oversee the functioning of the EU internal energy market, such as ACER, ENTSO-E and ENTSOG. Should the UK seek, however, to continue its participation in the internal energy market, it will have to comply with decisions taken by these regulatory bodies while having little or no influence over them.

From an EU27 perspective, there seem to be no critical issues emerging from the UK withdrawal as far as these regulatory bodies are concerned. By contrast, the UK is likely to face a series of critical issues if it withdraws from these regulatory bodies (or is otherwise unable to continue to participate). In fact, any non-EU Member States that is part of the EU IEM must, by default, accept the decisions of ACER, ENTSO-E and ENTSOG, while holding very limited power to influence them. However, the high level of expertise of UK representatives in those bodies will be missed if they no longer participate.

**Table 3: How can countries participate in EU regulatory bodies under different arrangements?**

	ACER	CEER	ENTSO-E	ENTSOG
EU Member State (e.g. France)	Membership possible	Membership possible	Membership possible	Membership possible
EEA (e.g. Norway)	Associate member theoretically possible, but agreement with EU necessary*	Membership possible	Membership possible, but agreement with EU necessary	Membership possible, but agreement with EU necessary*
Energy Community (e.g. Ukraine)	Associate member theoretically possible, but agreement with EU necessary*	Associate membership possible**	Membership possible, but agreement with EU necessary	Membership possible, but agreement with EU necessary*
Bilateral Treaty (e.g. Switzerland)	Associate member theoretically possible, but agreement with EU necessary*	Associate membership possible**	Membership possible, but agreement with EU necessary	Membership possible, but agreement with EU necessary*
WTO (e.g. Morocco)	Associate member theoretically possible, but agreement with EU necessary*	Associate membership possible**	Membership possible, but agreement with EU necessary	Membership possible, but agreement with EU necessary*

**Source:** Bruegel.

**Note:** \* No such agreement has ever been adopted by the EU with any country; \*\* Under current rules, this would appear to be realistically possible only if the UK were to re-join the EFTA.

## 5. Revisiting EU energy and climate targets

If the UK agrees to maintain the EU energy and climate targets (for instance as a condition of retaining access to the internal market), it might possibly be required to participate in the new Energy Union governance structure. That is, the UK might have to regularly report on renewables, energy efficiency, energy infrastructure and greenhouse gas emissions to show that it is in line with the EU policy goals for 2030 and beyond. In turn, the EU would provide guidance to make sure the proposed EU-wide targets on renewables and energy efficiency are met.

If the UK does not commit to the EU energy and climate targets, a political decision in the EU will be needed on how to adjust these targets after Brexit. For the 2020 renewables and 2030 emissions targets (for emissions outside the union-wide trading system), we see three options:

1. Member States keep their national targets unchanged leading to deviations of the resulting EU27 targets from the initially planned EU targets. It would imply that the EU total 2020 RES target becomes more ambitious while the EU 2030 non-ETS target becomes less ambitious.
2. Member States adjust their targets so that the EU27 achieves the EU28 targets in absolute terms, even if the UK does not deliver. This would imply that the Member States' 2020 RES targets and 2030 non-ETS targets generally become more ambitious.

3. Member States adjust their targets so that the EU27 targets are the same in percentage terms as the initially planned EU28 targets. This will mean that the Member States need to do less or the same with respect to increasing the share of renewable energy, but more with respect to reducing non-ETS emissions.

The last two options will also affect the relative burden of the Member States. As the energy efficiency target is defined as a reduction compared to a baseline we suppose that each Member State is essentially asked to reduce consumption compared to the baseline by exactly the same share (e.g. 30%). Hence, Brexit would not imply a change in the national contributions to meet the EU-wide energy efficiency target.

Given that the UK targets were close to the EU average targets, possible adjustments to EU or Member States would not be dramatic, but they could still be significant for individual EU countries.

## 6. Emission Trading System (ETS)

A UK exit from the EU ETS may cause a short-term surplus of allowances, because UK installations may sell off the stock of allowances they purchased for future compliance when it becomes clear that they will no longer need them. In the longer term, Brexit will most likely lead to a tightening of the system. If the UK could stay within the system until the end of its third phase in 2020, this could reduce disruption.

If the UK would not stay in the ETS after Brexit, the Swiss model of linking a national emission trading system with the EU trading system can be a blueprint for future collaboration. A key political question would then be how the UK cap would be determined.

**Table 4: Possible means to coordinate a countries energy and climate targets and emission trading system with the EU's under different arrangements**

	RES target	Non-ETS target	ETS membership	EE target
EU Member State (e.g. France)	Joint EU target under EU governance	National targets under EU law	Membership possible	Joint EU target under EU governance
EEA (e.g. Norway)	Joint EU target, possibly under EU governance	National target agreed with EU	Membership possible	Joint EU target, possibly under EU governance
Energy Community (e.g. Ukraine)	National target agreed with EU	National target agreed with EU	Linking possible	National target possible
Bilateral Treaty (e.g. Switzerland)	National target, possibly coordinated with EU	National target, possibly coordinated with EU	Linking possible	National target possible
WTO (e.g. Morocco)	National target not coordinated with EU	National target not coordinated with EU	Linking possible	National target possible

Source: Bruegel.

## 7. Rules for security of electricity and gas supplies

Pooling energy resources among Member States is essential for the EU to build a common and truly integrated internal energy market that is able to withstand external shocks. Given the UK's limited energy integration with the Continent, the security of electricity and gas

supplies on the Continent will not be substantially affected by Brexit. (Special considerations concerning the Republic of Ireland are discussed later.)

For electricity, the UK benefits considerably from its trade with the EU27. Imported electricity (7.5 percent of the UK’s total consumption) helps the UK to keep prices down. The EU27 receives relatively little substantive benefit, however, because its electricity exchanges with the UK remain well below 1 percent of its total consumption.

On gas, the trade volume between the EU26 (i.e. excluding Ireland) and the UK generally remains rather limited and does not represent a relevant issue, as the UK does not provide access to storage or suppliers to which the EU27 would not have access on its own. Furthermore, given the capacity and the underutilisation of its LNG terminals, the EU26 could well manage LNG imports even without the UK’s infrastructure. However, gas trade is an important issue for Ireland, which imports 56 percent of its consumption from the UK.

The security of the EU26’s electricity and gas supply is not likely to be affected by the UK withdrawal. It is reasonable to expect the UK’s and neighbouring countries’ transmission system operators to continue their long-standing cooperation on the basis of their respective regulatory frameworks. Continued cooperation and coordination on security of energy supply would benefit both sides.

**Table 5: A countries participation in the EU’s energy solidarity under different arrangements**

	Participate in EU solidarity
EU Member State (e.g. France)	Yes
EEA (e.g. Norway)	Under discussion
Energy Community (e.g. Ukraine)	Under discussion
Bilateral Treaty (e.g. Switzerland)	Not formally, but cooperation of TSOs
WTO (e.g. Morocco)	Not formally, but cooperation of TSOs

Source: Bruegel.

## 8. Future relation with Euratom

The UK has indicated its intention to exit Euratom as well as the EU. This requires clear arrangements on issues such as equipment safeguards and radioactive waste.

Both the EU and the UK recognise that from the withdrawal date, the UK will have sole responsibility for ensuring its compliance with international treaties and conventions.

Both the EU and the UK recognise the need to set out clear arrangements on issues like special fissile materials, equipment safeguards and radioactive waste in the Withdrawal Agreement.

On safeguard obligations, the two parties seem to agree that on the date of the withdrawal, the UK will have implement safeguard agreements with the IAEA.

On safeguard equipment, the two parties seem to agree that the Euratom Community should transfer ownership to the UK of equipment and other property related to the provision of safeguards located on UK territory. However, the two parties will most likely disagree on the value, as the EU assumes the value assigned to this property in the

consolidated accounts of the Union, while the UK claims the need to negotiate a 'fair value'. This point can thus be expected to be subject to intense negotiation.

On the issue of ownership of special fissile material, the two parties seem aligned.

On the issue of spent fuel and radioactive waste, the two parties agree on the principle that responsibility should go to the state in which the spent fuel or the radioactive waste was generated. However, disagreements could emerge during the negotiations. This could particularly be the case for the UK's Sellafield nuclear reprocessing site, the world's largest civilian stockpile, which stores around 130 tonnes of plutonium – about a fifth of which stems from imported nuclear waste. Any disagreement on this issue will presumably be subject to negotiation.

Considering the highly technical nature of these issues, there have been calls for the UK to remain in Euratom. However, even if Euratom is legally governed by a separate treaty, its functioning is based on EU institutions. For this reason, Euratom could not be separately considered from the wider Brexit dossier.

**Table 6: Possibility of UK membership in Euratom and the IAEA under various scenarios**

	<b>Euratom-member</b>	<b>IAEA</b>
EU Member State (e.g. France)	Membership possible	Membership possible
EEA (e.g. Norway)	Membership possible	Membership possible
Energy Community (e.g. Ukraine)	Associate membership possible	Membership possible
Bilateral Treaty (e.g. Switzerland)	Associate membership possible	Membership possible
WTO (e.g. Morocco)	Associate membership possible	Membership possible

**Source:** Bruegel.

## 9. Impact on energy markets for UK and EU companies

A large number of European companies are active on the UK gas and electricity markets and hold significant market shares there. European energy companies might become exposed to regulatory changes in the UK energy market after Brexit. For instance, the UK would not necessarily be bound by EU state aid regulations after withdrawal (and WTO rules are less strict). Potential home bias of UK regulatory decisions and competition policy could pose another threat to EU companies.

London is one of the most important trading hubs for electricity, gas, oil and emission rights in the world. The UK's gas trading hub remains one of the largest and most important in Europe. However, continental gas trading hubs could gain market share because of the uniform regulatory environment safeguarded by the EU, together with the absence of currency risk. For the EU, it is important to ensure that UK energy traders active in the EU follow financial market and transparency rules at least as rigorous as those applicable to their EU counterparts.

London as a venue for arbitration cases will most likely not be affected. This is a consequence of the New York Convention on the recognition and enforcement of foreign



arbitral awards. For place-of-jurisdiction clauses, EU27 companies might decide to abandon London in favour of Continental competitors. Enforceability currently enshrined in the Brussels Convention will no longer be automatic, but it is not under threat. However, burdensome recognition procedures could increase the costs of enforcement of UK court rulings.

**Table 7: Rules applicable to energy companies in countries under different arrangements**

	Market rules	Financial regulation of energy trading	Legal jurisdiction and enforceability
EU Member State (e.g. France)	EU IEM legislation + EU state aid rules	EU legislation	Full enforceability ( <i>Brussels Regime</i> ) Full choice of law ( <i>Rome I</i> )
EEA (e.g. Norway)	EU IEM legislation + EU equivalent state aid/competition rules	'Passport' clauses for certain regulations 'Equivalence' clauses for certain regulations (+ international rules)	Enforceability possible ( <i>Lugano Convention</i> )
Energy Community (e.g. Ukraine)	EU IEM legislation + national state aid rules + WTO subsidy rules	'Equivalence' clauses for certain regulations (+ international rules)	Bilateral and international treaties ( <i>The Hague Convention</i> possible)
Bilateral Treaty (e.g. Switzerland)	national state aid rules + WTO subsidy rules	'Equivalence' clauses for certain regulations (+ international rules)	Enforceability possible* ( <i>Lugano Convention</i> )
WTO (e.g. Morocco)	national state aid rules + WTO subsidy rules	'Equivalence' clauses for certain regulations (+ international rules)	Bilateral and international treaties ( <i>The Hague Convention</i> possible)

Source: Bruegel.

Note: \* If the UK joins the EFTA and chooses to join the Lugano Convention.

## 10. Impact of the UK withdrawal on Ireland

The energy system of the Republic of Ireland (ROI) could be significantly affected by Brexit. The ROI operates a joint electricity market with Northern Ireland (NI), trades electricity with Great Britain (GB) and buys a significant amount of gas from GB. Ensuring that the Irish Single Energy Market (SEM) continues to function efficiently and that a level playing field is maintained in the SEM will be important following Brexit.

For the ROI, the first best solution would be for the UK to remain inside the internal energy market; the second-best option would be for NI to remain inside the internal energy market; and the worst option would be for only the ROI to remain inside the internal energy market.

It is possible that the ROI might be exempted from certain provisions of EU energy regulation, but it seems questionable that the ROI could qualify as an 'energy island'.

Both the EU27 and the UK have an interest in an increasingly integrated energy market. But both face matters of principle that make it difficult to agree on this first-best solution. The UK seeks to repeal European rules that infringe on its sovereignty. The EU, on the other hand, does not want to allow the UK to 'cherry-pick' parts of the existing acquis in the negotiations.

The complex case of the Republic of Ireland might offer both sides an opportunity to achieve a first-best solution. The EU might argue that accepting full membership of the UK in the internal energy market is the price to pay for allowing the Republic of Ireland to fully benefit from the EU internal energy market. At the same time, the UK – which benefits in any case from the EU's present internal energy market – might be willing to accept a certain loss of sovereignty as a result of participating in the EU energy market framework (possibly without being able to play a full role in the institutions) if this is the price to pay for energy security in Northern Ireland. This mutual dependency can be a credibility device for both sides (and it might also help convince investors of the stability of the arrangement).

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Contact: [Poldep-Economy-Science@ep.europa.eu](mailto:Poldep-Economy-Science@ep.europa.eu)

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