



# Energy Outlook 2024

Bird & Bird



# Introduction

I'm delighted to introduce the second edition of our Energy Outlook report, where our global Energy & Utilities team anticipate the important developments across key areas of the sector and give an invaluable oversight of the market in 2024.

The Energy & Utilities sector is changing rapidly as governments and the private sector continue to keep up with the demands of the transition to a net zero system by 2050. With fears around a pricing crisis subsiding, there has been a positive shift back to the energy transition. Energy transition strategies must balance decisions and actions to achieve net zero targets with other priorities including energy security and affordability. The agreement at COP28 provided positive energy transition signals including a pledge for the tripling of renewable energy by 2030 and a doubling in the average annual rate of energy efficiency improvements – all key factors in achieving net zero by 2050.

This year's Energy Outlook brings together significant themes across the energy system. It's clear that we are going to see continued accelerating growth across clean energy, with more money pouring into solar PV and onshore wind as the cheapest forms of new capacity in almost all circumstances. What we highlight now is the need to prevent bottlenecks from enabling this level of capacity growth, with a strong focus on the removal of storage and grid blockages and the greater integration of projects across renewables, storage, EVs and grids.

This is reflected particularly in numerous recent policies, such as the EU's 'Action Plan for Grids', 'Regulation on Trans-European Networks' and 'Recommendations on Energy Storage'.

One enabler of this will be the digitalisation of energy, and the EU's Data Act and AI Act were significant recent regulatory milestones which will have an impact this year. AI, the breakout technology of 2023, has incredible potential across the sector and we expect to see it used increasingly to forecast supply and demand, cut costs, improve efficiency and reduce emissions. AI in oil & gas is revolutionising the industry, particularly from a safety & compliance perspective.

We also see more innovative energy management models coming to market, such as the resurgence of Energy as a Service models; with efficiency measures being further subsidised by governments from Australia to Latvia and Singapore.

We have seen tangible progress in hydrogen with the first allocation rounds in the EU and UK, and with more rounds to come in 2024 we expect to see a greater focus on delivery of projects and driving value in the supply chain.

There has been a real focus on critical minerals in the mining sector recently and securing this supply will remain high on the agenda, along with sustainability efforts across recycling materials, emissions disclosure and hydrogen use.

Innovation remains a central theme in achieving global energy transition goals including the creation of new collaborative structures, the procurement of new solutions and unlocking barriers to previously unviable transactions.

The energy transition is also a global change programme that needs to be carefully managed to identify, minimise and manage risk and maximise success. The people agenda is fundamental – the sector needs to attract and retain the best talent and is increasing competing with the tech sector for such talent.

Over the following pages we highlight and assess how these market trends and government policies are going to set the agenda for 2024. I hope you'll enjoy reading and feel enthused about the year ahead in the energy sector, with exciting developments right across the fascinating areas in which we work.



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The agreement at COP28 provided positive energy transition signals including a pledge for the tripling of renewable energy by 2030 and a doubling in the average annual rate of energy efficiency improvements – all key factors in achieving net zero by 2050.





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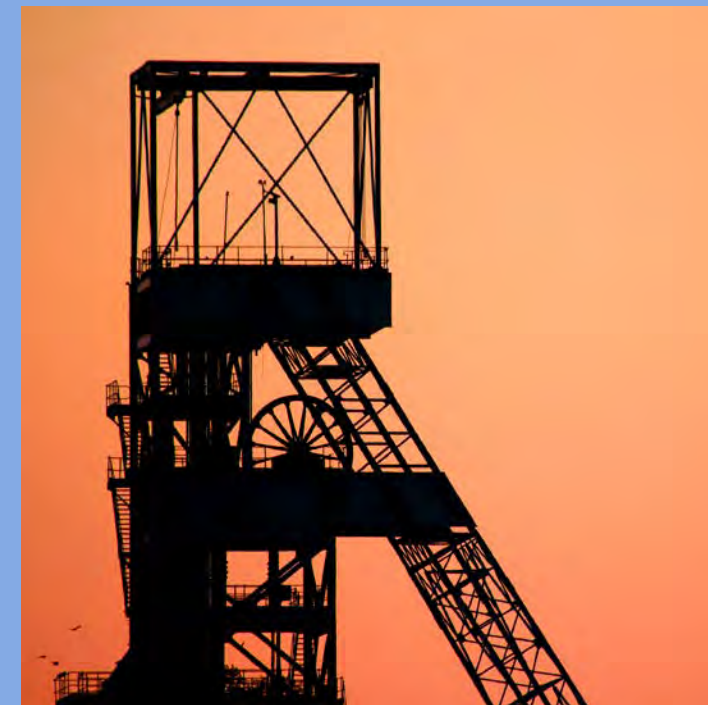
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“Bird & Bird are up to date with the *latest developments in law* as well as the *energy sector*, and are able to provide *quick advice* that is solution-orientated.”

Chambers Global, 2023



# Renewable Energy

We expect the global energy crisis will continue to drive the momentum for renewable energy throughout 2024, as countries look to strengthen energy security and race to meet ambitious net-zero targets.

## A push to remove the bottlenecks to renewables growth

During COP28 in Dubai, governments across the globe came together to launch new initiatives to bolster clean energy production in a bid to halt climate change. More than 120 countries signed up to the Global Renewables and Energy Efficiency pledge to triple the world's renewable energy generation capacity to at least 11,000 gigawatts by 2030. Whilst solar and wind are now the cheapest sources of new energy generation in most countries, this will require a huge increase from what has been achieved to date. It took 12 years to achieve the last tripling of renewable capacity, and this target needs to be reached in the space of seven.

The pledge also recognised the two major bottlenecks which policy makers are trying to unblock: the permitting rules that can hold up renewables and related infrastructure projects for years; and the need to expand and digitalise the energy system, improving renewables integration and accelerating grid connections.

Following the release of the EU's Action Plan for Grids, we expect to see a significant ramp-up in the planning, investment and delivery of grid improvements in the coming years, with action across EU member states.

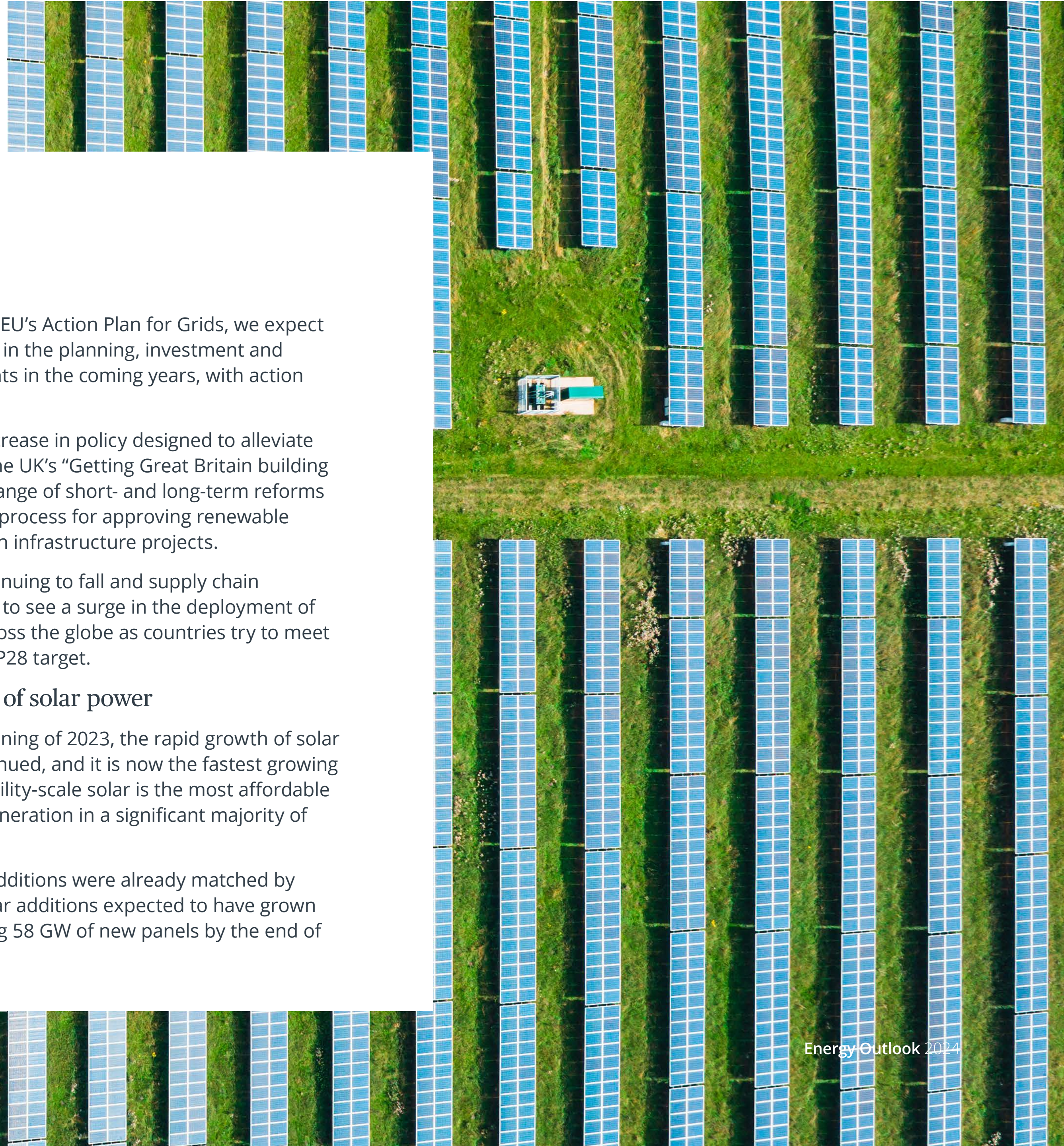
We also expect to see an increase in policy designed to alleviate permitting issues, such as the UK's "Getting Great Britain building again" policy paper, with a range of short- and long-term reforms put in place to expedite the process for approving renewable energy and other low carbon infrastructure projects.

In addition, with prices continuing to fall and supply chain problems easing, we expect to see a surge in the deployment of solar and wind continue across the globe as countries try to meet this hard but achievable COP28 target.

## The accelerated growth of solar power

As we expected at the beginning of 2023, the rapid growth of solar capacity additions has continued, and it is now the fastest growing power source worldwide. Utility-scale solar is the most affordable option for new electricity generation in a significant majority of countries worldwide.

In Europe, 2022's capacity additions were already matched by October 2023, with new solar additions expected to have grown 30% year on year, surpassing 58 GW of new panels by the end of 2023.





Key markets include Germany, Spain, Poland and the Netherlands. Growth has been fuelled by a surge in rooftop installation, with rooftop PV expected to account for 70% of all newly installed solar across Europe. One year after the launch of the RePowerEU plan, these figures suggest it is already proving to be successful in accelerating growth and we expect to see more of these effects in 2024.

Record highs are becoming the norm across many regions, and 2024 should be no exception, driven by falling prices of solar modules. This continuous growth in the economic attractiveness of PV, coupled with massive development in the supply chain and increasing policy support are expected to further accelerate capacity growth in the coming years.

This is especially true in China, where the 14th Five-Year Plan for Renewable Energy provides ambitious targets for deployment; the United States, as a result of generous new funding for solar in the Inflation Reduction Act; the European Union, where new policies and targets proposed in the REPowerEU Plan and The Green Deal Industrial Plan are key drivers; and India, which has a new target to increase solar additions to 40 GW annually is expected to result in further acceleration in the near future.

As a result, we expect the rapid global growth of solar to continue into 2024, however, this will need to be accompanied by policies and market rules to support grid infrastructure and flexibility investments.

### Significant growth of Corporate PPAs

There has been significant growth in the number of Corporate PPA deals signed in numerous industries across the globe year-on-year, with 30.9GW of clean power deals emerging from Corporate PPAs in Europe as at October 2023. The trend towards the Corporate PPA has been fuelled by:

1. Global sustainability, decarbonisation and net-zero goals.
2. Energy security and climate change.
3. The benefits associated with directly sourcing renewable power (Corporate Social Responsibility, supply diversification, economic incentives, and reputational goals).
4. The ongoing rise of energy prices and the desire for price certainty.
5. The need for flexible and tailored agreements to suit the commercial and financial needs of corporations and power generators.

The most prominent players in the global Corporate PPA market are those with high energy consumption: technology companies and data centre owners, followed by telecommunications, ICT and heavy industries. Contributions to the market by other sectors such as transport, automotive and retail are also currently on the rise.

Where the US continues to top the PPA market globally, Europe is the second-largest market, led by Spain and the Nordic countries, mostly utilizing solar and wind power. Other popular energy sources include the production of green hydrogen through wind power PPAs in Germany and geothermal power PPAs in the US, Iceland and New Zealand.

We expect global Corporate PPA activity will continue to increase in 2024 amidst global energy market reforms, sustainability and decarbonisation goals. In fact, record volumes of PPAs are likely to be signed in 2024 due to the growing number of companies in energy intensive sectors seeking long-term PPAs.



### Use of emerging technologies

The last year has seen a dramatic rise in the awareness and use of generative AI. In renewables, the use of AI can provide valuable insights into wind and solar resource availability, power generation forecasting, demand patterns and wholesale price predictions which are pivotal to enhancing renewable energy integration and management. By analysing data and simulating a huge number of different configurations, AI can also make more informed decisions on planning and developing future projects. Furthermore, AI can help predict and prevent potential equipment failures, minimizing downtime and ensuring optimal network performance which helps reduce operational costs and improves reliability.

Combined, these uses cases provide vast potential for the renewables industry to optimise operations, gain competitive advantage and save costs. We expect a wave of new AI solutions coming onto the market and growth in their adoption over the coming year.

Despite the huge potential, the promising uses of AI also come with several cybersecurity, regulatory and data challenges to be aware of. We are increasingly seeing companies get to grips with these issues and expect it to be an area of particular focus in 2024.

The rapid growth of solar capacity additions has continued, and it is now the fastest growing power source worldwide.



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# Energy Digitalisation

The energy industry is changing in profound and permanent ways as the digital transformation provides enormous opportunities and challenges. Digitalisation will further accelerate and intensify change in an industry that has already been transformed.

## What's the impact of the new EU Data Act

The European Union is implementing another milestone in its European digital strategy - the EU Data Act. The Act was formally adopted by the European Parliament and the Council on 27 November 2023 and includes provisions to make data from connected devices more readily available. A vast amount of data is already generated during generation, transmission, deployment, and use of energy. The new EU Data Act opens new potential for the sharing and use of data in the energy sector and is likely to raise questions around product design, as well as opportunities for new business models and energy management services.

## UK roadmap for digitalisation

The UK Energy Digitalisation Strategy also seeks to make the energy system more visible and system data more shareable. Regarding the sharing of energy related data, the UK regulator Ofgem has suggested that there will be a call for input in April 2024, with a consultation and workshops to follow. They estimate a 12–18 month process of building a digital roadmap and data sharing infrastructure. In March 2023, the Department for Energy Security and Net Zero published details regarding a six month feasibility study to assess the feasibility of a 'digital spine' concept for the UK energy system.

## Using Artificial Intelligence in the energy sector

There are a vast number of AI use cases across the entire energy value chain – time series forecasting, market analysis, optimised bid selection, anomaly detection, failure prevention, consumption pattern recognitions, and more. Ofgem has estimated that there are 110 AI use cases in the UK system operator alone. With generative AI at its peak hype and the European Parliament having reached a political agreement on the EU AI Act in December 2023, it's now accepted that AI will be a key technological enabler for energy companies. So, energy companies have already been making great investments into the adoption of AI solutions. A recent Global Data report predicts that AI in the energy sector will be worth \$909 billion in 2030.

Using connected devices, smart meters, and other digitally enabled devices within the energy sector continues to grow at a rapid pace. There are a vast number of AI use cases across the entire energy value chain – time series forecasting, market analysis, optimised bid selection, anomaly detection, failure prevention, consumption pattern recognitions, and more.





## Renewable Energy Directive III – what it means

In acknowledgment of the EU’s need to expedite its clean energy transition, the Renewable Energy Directive was revised in 2023 to establish a new binding renewable energy target for the EU of 42.5%. EU member states will now be subject to three new energy digitalisation-related obligations:

1. The digital publication of data on the share of renewable energy content of electricity supplied;
2. demand response potential;
3. various data relating to electric vehicles and their batteries.

## Adopting technology at a rapid pace

Using connected devices, smart meters, and other digitally enabled devices within the energy sector continues to grow at a rapid pace. The UK government estimates that it is now technically possible to connect a smart meter to an in-home display in 96.5% of homes and the number of smart power meters worldwide is estimated to reach more than 25 billion in 2030. Similarly, more than 320 million distribution sensors have been deployed for integration with power grids. With the rise in vehicle electrification and autonomous driving, electric vehicles are forecast to be half of global car sales by 2035.

## European Commission’s Smart Energy Expert Group

The EU’s 2022 action plan to digitalise the energy system outlined a proposal to create a Smart Energy Expert Group which was formally adopted in September 2023. Tasked with assisting the Commission on digital transformation of the energy system, calls for applications to become a member of the Commission’s Smart Energy Group closed in November 2023.

### Three sub-groups have been established within the Group:

- The ‘Data for Energy’ group, which focuses on providing recommendations regarding the access to and sharing of energy-related data;
- the ‘Consumer Empowerment and Protection’ group, which will explore ways consumers can benefit from smart energy services; and
- the ‘Cybersecurity’ group, which will provide cybersecurity related recommendations and evaluate the impact of new cybersecurity-related legislation.

## New legislation in Germany for “green” data centres

Following the amendment to the EU Energy Efficiency Directive in September 2023, a new Energy Efficiency Act was implemented in Germany in November 2023. This Act requires public authorities and bodies to make energy savings of 2% per year and requires companies to minimise and reuse waste heat.

Data centre operators are also placed under high demands in terms of energy efficiency, e.g. a power usage effectiveness value of 1.2 for newly constructed data centres; providing certain energy consumption data annually in a public register; and sourcing their power physically/virtually from renewable energies of at least 100% by 2026. Other EU member states may use the new German law as a model for their national implementation of the amended Directive.



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The broader hydrogen production market was valued at \$159 billion in 2023 and is estimated to reach \$258 billion in 2028.

# Hydrogen

## What is green hydrogen and why is it important?

Produced by using renewably generated electricity that splits water molecules into hydrogen and oxygen, green hydrogen holds significant promise to help meet global energy demand while contributing to climate action goals.

The broader hydrogen production market was valued at \$159 billion in 2023 and is estimated to reach \$258 billion in 2028. Although only 1% of global hydrogen production currently uses renewable energy, green hydrogen is expected to become the cornerstone of the ongoing energy transition, with its use cases expanding across multiple sectors.

It's an exciting area of development within the energy industry and beyond, and one which more and more companies need to be paying attention to in terms of the opportunities it represents.

Over the following pages we explore some of the key issues and policy updates expected to shape the green hydrogen economy development path in the coming year, and what this means to you.

## 1. Critical mineral threats and *REPowerEU*

The ability to use hydrogen in storing renewable energy is gaining traction. In light of this, the EU is eager to exploit its potential under its new gas storage rules. The *REPowerEU* program has set an objective to import 10 million tonnes of green hydrogen by 2030, which the EU plans to match with an equal amount of domestically produced green hydrogen. If successful, programs such as *REPowerEU* are expected to significantly reduce the hydrogen power generated using fossil fuels, which is currently how the overwhelming majority is produced.

According to GlobalData however, a scale-up in production of hydrogen energy will require a dependable supply of platinum group metals, predominantly palladium and graphite. Russia currently dominates the global palladium supplies, and owing to the war in Ukraine, energy producers are dealing with a degree of risk on future provisions. Whilst no critical constraints have been felt to date, this will be a key concern for the long-term outlook of hydrogen production, particularly as it grows over the coming years.

For graphite, China dominates and has the potential to monopolise the market, potentially raising prices for supplies required by hydrogen fuel cells. The green hydrogen market will still need to navigate these potential challenges if it is to become a sustainable energy option.



## 2. IEA Global Hydrogen Review

The International Energy Agency's (IEA) **2023 Global Hydrogen Review** is the output of the Clean Energy Ministerial Hydrogen Initiative. This year, the focus was on the demand for low-emission hydrogen. At present, hydrogen demands are mostly met by production from fossil fuels. However, in order to meet climate goals, the growing global demand must focus on 'green' production methods and low-emission applications.

The IEA's analysis concludes that whilst low-emission hydrogen production can expand exponentially by 2030, investment in and deployment of green hydrogen is currently being hampered by the costly processes involved. Inflation has resulted in higher equipment and material costs, leaving existing projects at risk, threatening bankability of profits, and reducing government support available for deployment. As a result, the gap between green hydrogen and that from more affordable fossil fuels remains substantial.

There is new investment into technologies which will make green hydrogen production more affordable, such as China's lead on electrolyser development dedicated to hydrogen production. However, for now, the global capability for low-emission hydrogen production is yet to find its way to commercial dependability.

## 3. UK Government Hydrogen Strategy Update

In August 2023, the Department for Energy Security & Net Zero published its **Hydrogen Strategy Update to the Market**. The report highlights recent milestones in the UK's commitment to clean hydrogen, in particular:

- Being one of five co-leads of Mission Innovation's Clean Hydrogen Mission.
- Making progress through its research and innovation production working group, to deliver against the Mission's Action Plan for 2022 to 2024.

Domestically, SGN (who manage the gas network across the south of England and Scotland) have also taken steps in the use of green hydrogen in heat. SGN have started to build a new hydrogen network in Scotland with a trial due to start in 2024. This will involve supplying green hydrogen to roughly 300 homes through new pipes, laid alongside the existing natural gas network.

Through trials like these and a continued focus on delivering the UK's Hydrogen Strategy, the aim is to take forward the clean hydrogen recommendations from the Net Zero Review, with a view to creating a sustainable production delivery roadmap for the UK's green hydrogen capabilities.

Other exciting developments in the UK, include the country's first Hydrogen Allocation Round (HAR1) providing over £2 billion (\$2.53bn) of subsidies to multiple green hydrogen projects in England, Wales and Scotland.

The funding was initially launched in July 2022. On 14 December 2023, the government announced the 11 successful projects under this first funding round, totalling 125 MW of energy. This is a significant step for green hydrogen production in the country, and makes the UK a global leader in hydrogen.

On the same day, the government also announced the consecutive hydrogen allocation rounds which will take place annually up to 2029 as well as the introduction of several new policy updates across hydrogen production, transport, storage, and use. With an existing strong track record, and a solid pipeline of future activity, it's an exciting time for green hydrogen in the UK.



## EU's Hydrogen Milestones

In addition to these more general developments, the EU has been a hub of activity when it comes to green hydrogen. With a strategic focus on strengthening the regulatory landscape regarding hydrogen as well as backing up innovation, the EU has carved a path towards a hydrogen-powered future. Here are some of the key recent developments in the Union which will be key to the green hydrogen outlook:

### 1. Hydrogen regulatory framework reinforcement

To solidify the hydrogen regulatory framework in the EU, two delegated Acts were adopted on 20 June 2023, under the 2018 Renewable Energy Directive. The two Acts outline detailed rules on the EU's definition of renewable hydrogen, to ensure it is produced from renewable energy sources and achieves 70% emissions savings.

Additionally, the EU achieved another significant milestone on 28 November 2023, by reaching a provisional political agreement on the European Directive establishing common rules for internal markets in renewable and natural gases and in hydrogen.

These milestones lay the foundation for a stable regulatory environment regarding hydrogen in the EU, and will play a crucial role in attracting investment for hydrogen production and technology advancements.

### 2. Investment in Hydrogen-related Innovation

A cornerstone of the EU's commitment to hydrogen advancement, has been the support provided through the Important Projects of Common European Interest (IPCEIs) on hydrogen. The IPCEIs are projects which the EU exceptionally authorises member states to invest in, beyond the limits set by European regulation on state aid. Through "IPCEI Hy2Tech" and "IPCEI Hy2Use," approved consecutively in July 2022 and September 2022, the EU is clearly proclaiming its commitment to the hydrogen value chain and hydrogen-related infrastructure.

Furthermore, on 28 November 2023, the European Commission published the sixth list of pre-selected Projects of Common Interest (PCI). PCIs are projects selected due to their impact in helping the EU achieve its energy policy and climate objectives. Their strategic importance means they benefit from accelerated planning and permit granting, improved regulatory conditions and lower administrative costs, as well as eligibility for European funding.

For the first time, the 2023 list includes hydrogen and electrolysed projects which account for 65 selected projects (almost 40% of the total). This heavy investment makes it clear that the EU sees hydrogen as a key part of its strategic plans for renewable energy over the coming years.

### 3. EU launches the first auctions for the production of renewable hydrogen

The European Commission launched the first round of auctions for the production of renewable hydrogen, and is offering €800 million to hydrogen producers to kickstart demand for hydrogen in the EU.

As a reminder, the auctions are a new financing mechanism of the European Hydrogen Bank, aimed at stepping up the production of

renewable hydrogen (as defined in the Renewable Energy Directive and its delegated acts) in the European Union. By 2030, the aim is to produce 10 million tonnes of renewable hydrogen annually.

Under the pilot auction, producers of renewable hydrogen will be able to submit bids for EU support for a certain volume of production. The bids must be based on a proposed premium per kilogram of renewable hydrogen produced with a cap at €4.50 per kilogram. Successful producers will receive support in the form of a fixed premium per kilogram of hydrogen produced.

This will be awarded for periods of up to ten years, with production needing to start within five years of signing of the grant agreements.

Effectively, this premium is intended to reduce the cost gap between renewable and non-renewable hydrogen production, in a market where the latter remains a lot cheaper to produce. This would incentivise consumers to purchase renewable hydrogen, which would in turn increase the predictability of producers' revenues and guarantee the financial viability of projects, thereby facilitating their access to other financing. In short, it sets the ball rolling for a virtuous circle, with investment reducing prices, increasing consumption and revenues, and in turn attracting further investment.

Producers have until 8 February 2024 to submit their applications. Applicants will be informed of the results of the evaluation as early as April 2024, and will sign grant agreements within nine months of the close of the call.

The Commission plans to launch a second round of auctions in Spring 2024, reaching a total value of €3 billion of support for renewable hydrogen production.



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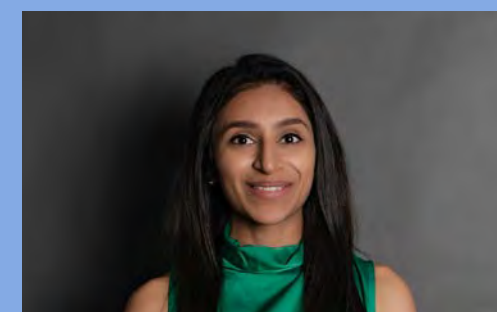


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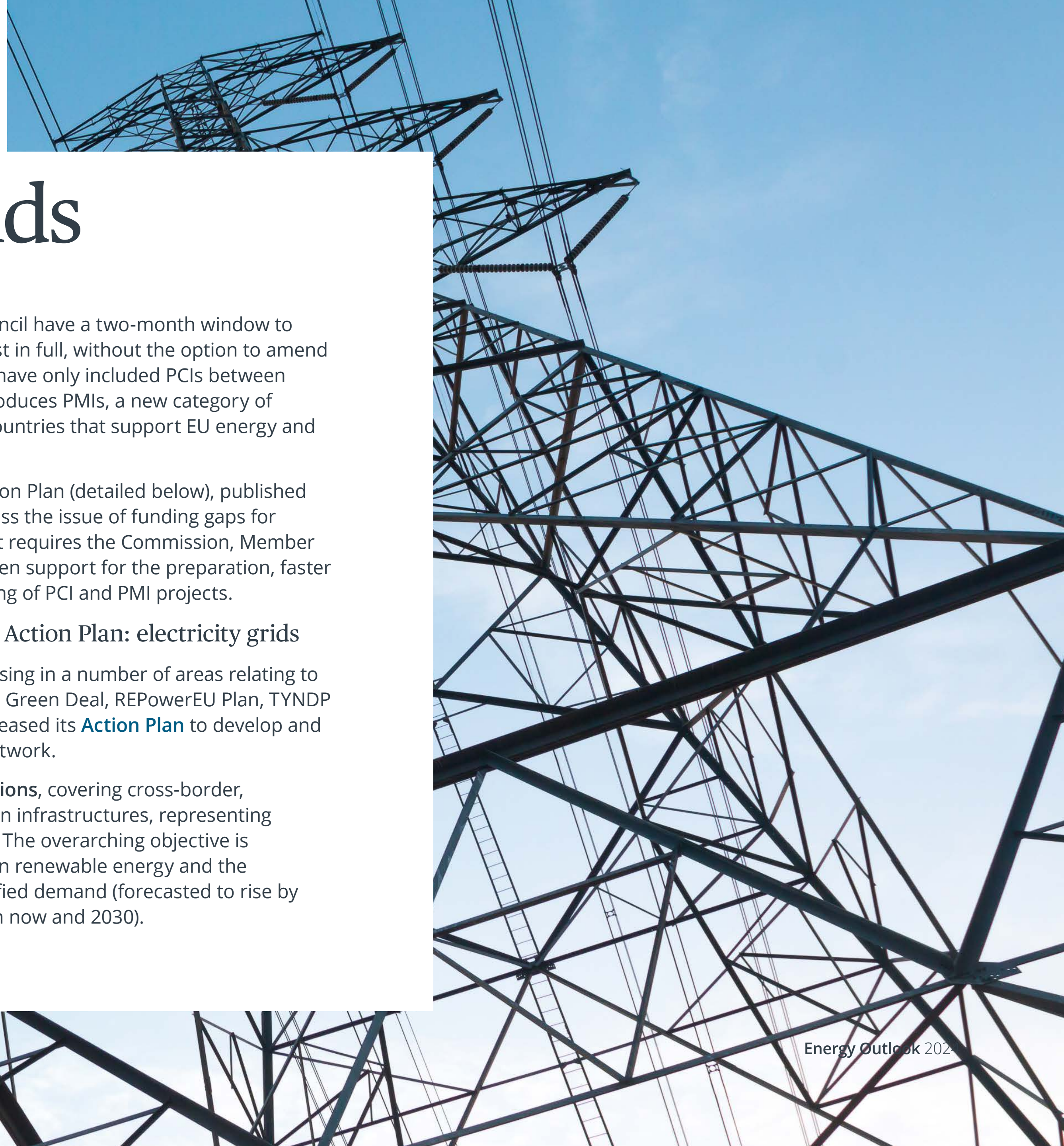


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# Energy Networks and Grids

## The EU's focus for 2024

Energy networks will be a key EU focus for 2024, reflecting the importance of grid reinforcement and enhancement to the green transition and energy security.

Here, we expand on three key developments – two focused specifically on networks, and one on the energy sector as a whole – all of which impose significant additional obligations on the operators and users of grid infrastructure.

## Embracing renewables and cross-border energy collaboration

On 28 November 2023, the European Commission unveiled its first list of projects of common/mutual interest (PCIs and MCIs) under the revised Regulation on Trans-European Networks (TEN-E) **166 cross-border energy projects**. This list of projects reflects the decision to end support for fossil fuel infrastructure and instead prioritise projects that can effectively integrate and transport large amounts of new renewable electricity across Europe. The list includes 85 electricity projects, including offshore and smart electricity grid initiatives, with many expected to be commissioned between 2027 and 2030. Additionally, the list also includes projects related to CO<sub>2</sub> networks, including carbon capture and storage projects, as well as hydrogen and electrolyser projects.

The Parliament and the Council have a two-month window to either accept or reject the list in full, without the option to amend it. Unlike previous lists that have only included PCIs between Member States, this list introduces PMIs, a new category of projects involving non-EU countries that support EU energy and climate objectives.

The EU's Electricity Grid Action Plan (detailed below), published the same day, aims to address the issue of funding gaps for PCIs and PMIs as 'Action 1'. It requires the Commission, Member States and TSOs to strengthen support for the preparation, faster implementation and financing of PCI and PMI projects.

## Understanding the EU's Action Plan: electricity grids

In response to the issues arising in a number of areas relating to EU policy and legislation (EU Green Deal, REPowerEU Plan, TYNDP etc.), the EU Commission released its **Action Plan** to develop and modernise the electricity network.

The plan sets out **14 key actions**, covering cross-border, transmission and distribution infrastructures, representing **€584 billion** in investments. The overarching objective is to accommodate the surge in renewable energy and the expected increase of electrified demand (forecasted to rise by approximately 60% between now and 2030).



Energy networks will be a key EU focus for 2024, reflecting the importance of grid reinforcement and enhancement to the green transition and energy security.

The Action Plan mainly establishes objectives, a timeline, and key actions to be carried out by various entities, such as:

- **Improving long-term grid planning for a higher share of renewables and increased electrification** – the Action Plan requires ENTSO-E to enhance top-down planning by integrating the identification of offshore and onshore system needs, whilst further considering hydrogen (Action 2). It requires the EU DSO Entity to explore case studies and best practices, subsequently publishing recommendations to improve distribution network planning (Action 3);
- **Incentivising a better usage of the grids** – the Action Plan calls for the Agency for the Cooperation of Energy Regulators (ACER) to support National Regulatory Authorities (NRAs) through recommending best practices in the next tariff report. This is aimed at ensuring that network tariffs are sending the right market signals, establishing long-term incentives, supporting shifting in peak demand, and incentivising the deployment of technologies that increase the efficiency and operability of the grids (Action 8);
- **Improving access to finance** – the Action Plan requires the Commission to identify tailored financing models and strengthen dialogue to address obstacles to private financing (Action 9); and

- **Strengthening grid supply chains** – for the purpose of developing technical specifications and EU standards for the electricity grid value chain, the Action Plan calls for ENTSO-E and the EU DSO Entity to collaborate with technology providers to develop common technology specifications (Action 13).

### How does REMIT II impact EU energy market regulation?

Following extensive trilogue negotiations, the EU Commission, the EU Council and the EU Parliament reached a consensus on 16 November 2023, regarding the final changes to the EU Regulation on Wholesale Energy Market Integrity and Transparency (REMIT). This amendment, known as REMIT II, is designed to improve the EU's protection against energy market manipulation. Besides revising certain definitions (e.g., the definitions of 'market manipulation' and 'inside information') to ensure they align with definitions in the Market Abuse Regulation governing financial markets, REMIT II introduces key new measures, such as:

- **New obligations for market participant from third countries** – REMIT II will require market participants from third countries to designate a representative in a Member State where they are active in the wholesale energy market. This representative will be responsible for ensuring that the market participant complies with decisions and cooperates with the NRAs and ACER;



- **New rules on algo-trading** – REMIT II stipulates that a market participant engaging in algorithmic trading must notify its home NRA and ACER, and have effective systems and risk controls in place. These controls are to ensure resilience, sufficient capacity, appropriate trading thresholds and limits to prevent errors and abuse. This codifies, as a legal requirement, what is already considered best practice in the trading rules of a number of markets; and
- **ACER's new investigative powers** – this is probably the most heavily debated element of REMIT II. The revised Regulation will grant ACER extensive new investigative powers in cases with cross-border implications affecting at least two Member States. These new powers will allow ACER to carry out on-site inspections, send RFIs, take statements, and impose periodic penalty payments for non-compliance with these investigative measures. However, Member States will retain the authority to impose fines for infringements or breaches of REMIT, and NRAs will still have the right to object to investigations.



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Companies across the sector are racing to reach net-zero and improve sustainability, whilst trialling new and innovative technologies.



# Energy Storage and EVs

The energy storage market is rapidly growing across the world, and it is expected that the global installed storage capacity will reach over 270 GW by 2026, with a 56% expansion in the next five years.

## Significant new funds for energy storage

The European Commission launched the Innovation Fund 2023 Call for Projects, which is one of the world's largest funding programmes for the deployment of net-zero and innovative technologies.

The scheme will invest EUR 40 billion from 2020-2030 in the EU's climate neutral future, including energy storage projects. This covers batteries and other storage solutions for stationary and mobile use, as well as intra-day and long duration storage. The Cleantech manufacturing category within the call for projects has an increased budget of EUR 1.4 million.

We expect to see a significant number of applications for this funding across the energy storage sector in the coming months. Projects can be submitted via the EU Funding and Tenders portal until 9 April 2024, and successful applicants will sign grant agreements in the first quarter of 2025.

## Continued strong growth of demand for energy storage capacity as a result of increasing renewable energy supply

The share of renewable energy in the EU's electricity system is expected to reach 69% by 2030, according to the European Commission. The future energy system will need more flexibility, stability and reliability to achieve climate neutrality by 2050 in conjunction with the European Green Deal. Energy storage is essential for the full potential of variable renewable energy generation.

## Increased attention on addressing the most pressing issues

The European Commission's "Recommendation on Energy Storage – Underpinning a decarbonised and secure EU energy system" aims to accelerate the deployment of energy storage. It provides ten recommendations to address pressing issues such as taxation, permitting, financing and data transparency. This is the strongest push for energy storage deployment by the European Commission to date.





The development of more sophisticated charging infrastructure to support the changing shape of the automotive industry is critical as sales of electric vehicles in the EU and UK continue to grow year on year.

If you'd like to know further detail on the ten recommendations, please [read our article here](#).

The recommendations mark the first time that the European Commission has addressed the relevance of energy storage in an official document this explicitly and with so much detail. It is by far the strongest and most concrete push for the deployment of energy storage until now.

We welcome this initiative of the European Commission and expect to see the most pressing issues and bottlenecks starting to be better addressed over the coming year, with member states acting on the 10 recommendations outlined.

### **New challenges and opportunities brought about by stricter sustainability and safety standards for EVs and batteries**

The new EU Battery Regulation (2023/1542) will apply from 18 February 2024. The new regulation will impose stricter sustainability and safety standards, on all types of batteries placed on the EU market.

The regulation includes requirements for conformity assessment, electronic battery passports, extended producer responsibility and material recovery rates.

The implementation of the new regulation will be a challenge for many across the automotive industry, as organisations will be required to report sensitive data. The implementation of the battery passport will offer but also create new opportunities for sustainability and circularity.

### **New legislation will push the improvement of EV charging services and increase sales**

The development of more sophisticated charging infrastructure to support the changing shape of the automotive industry is critical as sales of electric vehicles in the EU and UK continue to grow year on year.

New regulations in the UK and the EU focus on improving the charging experience, reliability, pricing transparency and data security. The UK's Electric Vehicles (Smart Charge Points) Regulations 2021 focus on smart EV charging infrastructure and ensuring minimum standards for user privacy and cybersecurity. The UK's draft Public Charge Point Regulations 2023 aim to reduce range anxiety and require EV charge point operators to demonstrate 99% average reliability.



EV adoption will continue to grow due to evolving driving experiences and national government sales targets. The recent published Zero Emission Vehicle Mandate (or “ZEV Mandate”) in the UK sets requirements for car manufacturers to increase zero emission vehicle sales gradually, reaching 100% by 2035.

### Increasing pressure on the grid to lead to innovative solutions, significant investment and collaboration

The increased use of electric vehicles puts pressure on the grid, requiring innovative solutions, investment and collaboration. Consumers and charging infrastructure operators will need to interact with the electricity industry in new ways. Smart charging optimises grid stability by controlling EV charging loads. Charge management applications allow users to customise the charging process and access information. Manufacturers benefit from remote problem detection and resolution, while prioritising data protection compliance.

Advanced charge management software enables higher interaction between EV batteries, grid networks, and consumers, reducing energy bills and offering the potential for grid feed-in rewards. The pressure to improve the grid leads to significant investment, collaboration and M&A opportunities.



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# Energy Management

## What is Energy Management and what does it mean to you?

Energy management is the efficient and effective use of energy to minimise costs and reduce future energy demand. With increased regulatory, environmental, and stakeholder pressure on companies across all sectors, it's more important than ever that you have the proper energy management measures in place. It's not just about remaining compliant - this fast-evolving space is also home to new innovations, technologies, and opportunities.

Here we explore some of the key areas where energy management is developing, and the challenges and opportunities that this presents.

## Building Automation: Empowering Energy, Operational, and Cost Efficiencies

Buildings are currently responsible for 39% of global energy-related carbon emissions: 28% from operational emissions (from energy needed to heat, cool and power them), and the remaining 11% from materials and construction. Scrutinising the energy management of our built environment will be a critical pathway to improving the energy efficiency of our buildings, and overall decarbonisation. Addressing such challenges will significantly reduce costs and enhance businesses' competitiveness, whilst reducing their reliance on volatile energy supply chains.

Ongoing technological innovations are already helping businesses improve energy management. For example, centralised building automation and control systems (BACS) help buildings use less energy and reduce CO2 emissions, without compromising on safety or occupant comfort. A good number of energy service companies (ESCOs) offer installation and ancillary consultancy services for BACS on short payback times, which make BACS an attractive and cost-effective option compared with other energy efficiency measures.

BACS comprise of smart integrated energy systems developed specifically around the building. BACS typically harness the power of AI and machine learning algorithms to analyse energy usage patterns, and automatically adjust energy consumption to enhance energy efficiency. In addition, energy consumption prediction, demand response, energy storage, and management of distributed generation of renewables, all work cohesively to ensure an optimally functioning building. BACS can integrate and optimise these functions too, making buildings ever smarter. They give building operators real-time access to cloud-based analytics and reporting services, enabling informed decision making.





## What does this mean for the construction and energy sectors?

The new generation of green buildings are smart, safe and sustainable, benefiting occupants, operators and the environment alike. In addition, reduced energy consumption can also take some strain off the energy grids during periods of excessively high demand or supply deficits, which in turn promote grid stability.

### Energy as a Service (EaaS): Taking on energy performance risk

Energy management solutions can often be capital-intensive, and a burden to businesses already grappling with uncertain economic outlook and inflationary pressures. In light of these challenges, EaaS has risen to the fore as an increasingly attractive option.

Under an EaaS agreement, the energy service provider (ESP) secures third-party funding to pay for all project costs. This means the building owner has no upfront expenses or internal capital, and typically treats the transaction as an off-balance-sheet financing solution. As the EaaS model generally operates on a pay-for-performance model, the ESP bears the performance risks and is constantly seeking operational efficiencies. The ESP may also provide upgrades to new technology to secure more

savings for the building owner. The ESP can usually also offer a suite of energy-related services on top of supplying electricity. For instance, ESPs can bundle energy consultancy, financing, asset installation and energy management solutions all-in-one for building owners.

Increasingly, current-day EaaS is extended more broadly to IaaS (Infrastructure as a Service). As ESPs race to provide an even larger suite of innovative and technological products and services to enhance energy efficiency and minimise the building's carbon footprint, their remit expands beyond energy to cover infrastructure as a whole. The capex for such goods and services will typically be underwritten by the ESP. However, the responsibility for maintenance and upgrades is highly negotiated, and we see a variety of commercial models in the market depending on the risk appetite of the building owners. In short, there is no one-size-fits-all.

### Government spending: Investing with purpose

With stakeholders prioritising a reduction in energy demand and cutting greenhouse gas emissions, governments are working alongside the industry to boost their investments in energy management systems. Alongside this, they are actively monitoring the output of digital devices and IoT technologies to collect reliable data regarding electricity supply and consumption, giving them an overall picture of 'what works'.

Based on the latest IEA Government Energy Spending Tracker database released in June 2023, governments have spent USD 264 billion on energy efficiency retrofits (buildings and industry), efficient appliances, near-net zero new buildings, and end-use renewables (e.g. solar thermal, geothermal). The funds are expended via direct spending or public private projects (PPP) for infrastructure buildings.

### Countries where we've seen this done well include:

- **Australia:** Subsidies for residential energy efficiency retrofits and energy-efficiency grants for SMEs;
- **Latvia:** State loans for energy efficient renovation of multi-apartment buildings, provided to landlords;
- **United Kingdom:** 2023 Home Upgrade Grant scheme and the Social Housing Decarbonisation Fund allocations, targeting low-income households and social housing retrofits; and,
- **Singapore:** Grant support to companies to install Energy Management Information System (EMIS) to monitor and manage energy consumption in a structured manner, to achieve efficiency improvements).

Despite these successes, challenges remain in fully reaping the benefits of such grants. Examples include the higher-cost financing for smaller projects, unstable revenue streams, and payback risks if ownership changes hands, or if business longevity is uncertain. This means governments need to consider ‘the whole picture’ before entering into funding arrangements.

### Legal documentation: A rapidly evolving legal landscape

There are a number of key legal agreements which dominate the energy management space. The humble Energy Services Agreement has stood the test of time and remains entirely relevant today. It is pertinent for smaller scale projects where the building owner engages an ESCO to implement the energy conservation measures (ECM) onsite on a design, build, own and finance basis to achieve energy efficiencies. In this case, the building owner pays a regular service fee to the ESCO over a fixed term, and may have an option to purchase the ECM equipment.

A step-up from this would be the Energy Savings Agreement. Here, the ESCO implements and funds the ECM onsite and is paid a regular service fee. However, there is an additional feature whereby the ESCO will share an agreed proportion of the energy savings from the ECM, with the building owner.

The termination rights of either party are highly negotiated, as these affect the bankability of such agreements. Force majeure and change of law provisions are also highly scrutinized.

The EaaS or IaaS model, which we mentioned earlier, is the latest innovation in terms of legal documentation, and contains the key features of the Energy Services Agreement. The difference is that the suite of products and services offered are generally broader, and may include wider elements such as energy consultancy, cloud services, asset enhancement, installations for renewable power, and other upgrades.

EaaS or IaaS documents could take varying forms, from Master Service Agreements (MSA) to EaaS contracts, and are constantly evolving to meet the building owners’ need for more integrated services on- an off-balance sheet transaction. It is an exciting space for practitioners to develop practical and concise contracts to meet the changing needs and risk profiles of the actors in this space.

Ongoing technological innovations are already helping businesses improve energy management. With stakeholders prioritising a reduction in energy demand and cutting greenhouse gas emissions, governments are working alongside the industry to boost their investments in energy management systems.



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# Mining and Minerals

From market volatility and geopolitical tensions to emissions reduction strategies, the past 12 months have seen widespread changes for the mining and minerals sector. We look ahead to 2024, highlighting key opportunities for businesses, as well as some potential risks to avoid.

## Critical minerals and national security: a push to increase domestic capacity

China continues to dominate the global supply of critical minerals (including rare earth elements), particularly in production and processing. This has sparked governments elsewhere to realise the importance of securing national supplies for the energy transition and for sensitive sectors, like defence. This push will continue to be exacerbated by geopolitical trends in 2024. Governments will continue to develop their domestic policies – for example, the US’s “Inflation Reduction Act”, and similar legislation and/or policy documents published by the EU, UK and Australia.

As a result of this, we expect to see the publication (and updating where already in place) of more national critical mineral strategies that identify access to critical minerals as a national security risk.

Such categorisation of goods gives governments the ability to act quicker and from a national security stance. So far, published strategies, including the UK’s and EU’s, have indicated an overwhelming desire to increase domestic mining capacity and to collaborate with alternative international partners. In the UK, a number of domestic mining ventures are making encouraging progress, but will it be enough, and will the UK and other governments make meaningful funding available and fast-track permitting for critical minerals projects?

We also expect to see other jurisdictions, particularly in the Middle East, emerging as potential downstream producers of refined critical minerals; as well as resource nationalism, where producing countries, particularly in Africa, seek to keep more of the value chain in-country.

## Price volatility & market uncertainty: offtake contracts a challenge

A trend we expect to continue into 2024 is offtake contracts with creditworthy counterparties proving challenging as buyers seek options in their contracts that protect them from market volatility. This will leave projects and their investors at risk as they require the inclusion of contractual rights that allow buyers to change the amount of material they are committed to purchase.

The surge in early-stage development projects, especially in lithium and rare earths, is expected to add further fledgling companies onto the market but will this end up with too many companies chasing the same dollar?





Secondly, whilst geopolitical tensions naturally produce difficulties in raising capital, heightening domestic opposition to mining activity will also continue to make raising capital prohibitive. Several high-profile examples of public opposition to mining exploration and extraction occurred in 2023, negatively affecting mining company share prices and investor confidence. This is indicative of a challenging market for the mining and minerals sector as corporate social responsibility issues come to the fore. Heightened public interest and scrutiny from non-corporate stakeholders because of the energy transition will require careful community engagement. If countries like the UK, US and those in the EU want to develop domestic critical minerals assets, rather than 'offshoring' the dirty business of mining, governments will have to balance the needs of domestic stakeholders.

In addition, shortages of key commodities and depletion of critical minerals have been worsened by aggressive transition targets. The sector has responded by increasing investment in mining operations to increase supply, but significant capital is needed to drive further development. Equity and debt raised on the capital markets has been difficult for early-stage projects over the past couple of years, although certain resources in certain markets, like lithium in Australia, have remained steady, and this is expected to continue through 2024.

The surge in early-stage development projects, especially in lithium and rare earths, is expected to add further fledgling companies onto the market but will this end up with too many companies chasing the same dollar? This is also reflected in increased cross-sector investment activity with companies vertically integrating to increase their supply. This is particularly evident in the automotive and battery manufacturing industries, which have increased direct investment into mining companies and securing farm-in arrangements, for production security; and in forward-thinking mining companies developing downstream operations, such as magnet recycling plants.

### **Recycling of materials and minerals: an opportunity to diversify the supply chain**

We expect to see an increase in domestic recycling strategies, working in conjunction with national critical mineral strategies, to promote a market for second-life materials and minerals – particularly for batteries and magnets. This should help diversify the supply chain and support the reduction of mining and product development where there is already mineral depletion. We expect such recycling strategies to be strongly supported by the mining industry due to the positive impact on their Scope 3 emissions. We're already seeing junior mining companies developing downstream projects.

### **Scope 3 Emissions Disclosure driving digital strategies**

The International Council on Mining and Minerals (ICMM) has published its Scope 3 Emissions Accounting and Reporting Guidance. This Guidance provides a standardised framework for mining and metals companies to calculate and disclose their value chain emissions. Using the Greenhouse Gas (GHG) Protocol Scope 3 standard developed by the World Resource Institute and the World Business Council for Sustainable Development, the Guidance is based on the most widely used standard for corporate greenhouse gas emissions accounting and reporting worldwide.

Depending on a mining company's commodity portfolio, up to 95% of its emissions can be attributed to Scope 3 emissions. Therefore, the Guidance should help identify hotspots where mining companies can focus their efforts on collaboration with suppliers and customers to achieve meaningful emissions reductions, likely at a cost. We expect to see an increase in digital strategies and new products offerings in the mining and minerals sector which utilise blockchain technologies to monitor and report on value chain emissions, which have traditionally been extremely difficult to quantify and track.

## Hydrogen: key to the green transition, but PGM security remains crucial

A continuing trend from 2023 is the growing popularity of Hydrogen in the energy transition. Hydrogen output only accounts for 1% of renewable energy but hydrogen fuel cells have the potential to store excess renewable energy for long periods of time. This means they could prove useful in bridging the gap between when intermittent renewable energy sources such as solar and wind are available and when they are needed, especially as mining sites are increasingly looking to reduce Scope 1 emissions by being entirely powered by renewables.

Hydrogen fuel cells can also power heavy-duty vehicles such as haulage trucks and buses on mine sites. The heavy vehicle industry has similarly been facing pressure to reduce its carbon footprint, and the adoption of hydrogen fuel cell EVs will be one measure taken to do so.

The European Union (EU) is leading the way in supporting hydrogen in the green transition; however, hydrogen requires access to platinum group metals (PGMs), namely palladium and graphite, the supply of the former being dominated by Russia and the latter by China. Despite this, the EU's move for mandatory green hydrogen usage targets under the Renewable Energy Directive, will increase demand within the industry but raises concerns on where a reliable supply of PGMs will be sourced from.

Nevertheless, the EU's focus on being an early adopter of hydrogen, particularly in relation to transportation and grid-scale energy storages, makes it a key area of focus for the mining sector.

## Technology, automation and data protection

Given the time sensitive transition to renewable energy, we're seeing increased use of and investment into technology, particularly in automation projects and data technology, which will be key in expediting transition efforts. However, with increased use of technology comes increased risk in relation to intellectual property, data privacy and cyber security. The current geopolitical environment is underscored by resource nationalism, as demonstrated by critical mineral strategies, which lead to isolationist practices focussed on domestic development and self-sufficiency.

For this reason, a robust approach in protecting data via legal means is fundamental, as the mining and mineral sector is particularly vulnerable to data breaches due to the large volumes of sensitive data being stored.

## Key takeaways

Overall, these trends and concerns highlight the need for governments to reduce reliance on China, increase domestic mining capacity, address price volatility and market uncertainty, promote recycling strategies, disclose emissions, explore hydrogen as an alternative energy source, and ensure the protection of data and technology.



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# Oil and Gas

## The influence of AI on the oil and gas industry

The oil and gas industry has long been known for its complexity and challenging operational environments. With facilities spread across the globe, managing them all effectively has become a daunting task. However, the integration of Artificial Intelligence (AI) – i.e., an amalgamation of Machine Learning (ML), Natural Language Processing (NLP), and robotics that can learn, reason, problem-solve, perceive, and interact in ways akin to human intelligence – has brought about a significant change in the industry that is expected to continue growing in 2024. Major oil and gas firms are now able to access all their locations' data in one spot thanks to AI, enabling them to manage and monitor all their plants remotely. This centralized control not only boosts operational efficiency but also amplifies production and optimization across their entire operational spectrum.

## Revolutionizing the way industries operate

AI's entry into the oil and gas industry shows remarkable promise for the future of oil and gas. 92% of oil and gas companies worldwide are now investing in AI or planning to do so in the next 5 years. The impact of AI is already evident, as 50% of oil and gas executives are using it to solve challenges across their organization. Of course, it's not a silver-bullet solution, but it certainly serves as a compelling response to some of the most pressing challenges the industry faces, especially regarding safety

and environment compliance, exploration and production, refining and distribution, defect detection and quality assurance and accessing new sites. Each aspect holds significant importance in its own, but the impact on safety- and environmental compliance are especially important.

## Reinventing safety and compliance

In industries like oil and gas, ensuring the highest safety standards and meeting stringent compliance regulations are top priorities. AI's role in enhancing safety protocols, mitigating risks, and ensuring adherence to industry regulations can profoundly impact not only the operational efficiency but also the overall reputation and trust within the industry.

AI ensures safety and compliance by detecting equipment malfunctions and monitoring work sites for adherence to safety protocols, contributing to a safer work environment. For instance, computer vision technology can now analyze camera feeds to identify leaks, spills, methane emissions, and other problems, like neglecting to wear protective gear or signs of fatigue or distress among workers, in real-time by analyzing video footage captured by cameras mounted on drilling rigs. Meanwhile, some oil companies use aerial drones and AI to regularly inspect remote assets for corrosion, cracks, and other signs of wear and tear that prevents minor issues from becoming major failures.



AI has the potential to drive substantial emission reductions within the oil and gas industry by 2024.

There are numerous examples already that demonstrate that AI does contribute to safety in the sector. For example, one of the industry majors, leveraged AI algorithms to predict equipment failures that helped them reduce downtime by 28% and saved millions in maintenance costs in a single year, while other companies adopted AI-powered drones for site inspections to monitor safety parameters and detect anomalies.

AI also plays a crucial role in assessing damage and prioritising rescue efforts during natural disasters like hurricanes or earthquakes. Amongst other functions, drones equipped with AI algorithms can analyse satellite imagery to determine which areas require immediate attention. This approach can help emergency response teams save lives and minimise damage more efficiently.

### **Energy companies to achieve carbon neutrality with the help of AI**

Needless to say, that the demand for low carbon clean energy is creating urgency for all energy majors to reduce their carbon footprint and to move towards investing in solutions. Consequently, oil and gas majors have made commitments to achieve carbon neutrality by 2050. To meet these commitments, AI is already playing a crucial role in helping oil and gas firms reduce their carbon emissions, and its impact is likely to grow further by 2024, as advancements in AI technologies,

coupled with increasing environmental awareness and regulatory pressures, are likely to push oil and gas firms to adopt AI-driven solutions more extensively to mitigate their carbon emissions. This adoption will not only be beneficial for the environment but also for the companies themselves, as reducing emissions often leads to cost savings and improved operational efficiency.

This proactive approach has resulted in several companies already reporting that by utilizing AI in their operations helped them cut their methane emissions by 5%. Through advanced monitoring and maintenance strategies facilitated by AI, their projections indicate an even higher, an ambitious 15% reduction by 2024. Moreover, AI-driven operational precision has emerged as a significant driver in cutting energy consumption and waste as well. One oil major reported that by the implementation of AI for drilling optimization has led to a commendable 10% reduction in energy usage, with plans for an additional 5% reduction by 2024 through AI-driven insights into efficient drilling practices.

These real-world examples demonstrate not only the immediate impact of AI but also its projected significance in driving substantial emission reductions within the oil and gas industry by 2024.

### Challenges and limitations - Navigating the hurdles of adoption

While the industry recognizes AI's potential, there are hurdles in the path to full adoption, which made the oil and gas sector adapting AI slower than other industries.

One significant hurdle is the recent acceptance of AI within the industry, thus there is a shortage of skilled professionals proficient in leveraging AI effectively. Legacy systems present another obstacle as they require substantial upgrades to integrate seamlessly with AI platforms. Furthermore, the increasing reliance on AI and automation raises cybersecurity concerns, thus robust security measures are essential to safeguard automated systems from potential cyber threats, which necessitate significant investments. There are also apprehensions regarding job displacement due to AI, prompting the need for comprehensive change management and retraining programs for the workforce. Coupled with the substantial initial costs of AI implementation, these challenges pose barriers to widespread adoption within the oil and gas industry.

### Conclusion - Paving the way forward

While there may be concerns about the impact of AI on the oil and gas industry, it also offers significant benefits. Companies can improve efficiency, reduce costs, and enhance safety by automating tasks that are dangerous or time-consuming for humans to perform. To overcome these challenges, a collaborative effort is required from various stakeholders in the oil and gas industry. Companies must invest in data quality and integration, provide training and development opportunities to employees, and work with technology providers and regulatory bodies to tackle regulatory and ethical concerns. Furthermore, companies need to be open to change and adopt a culture of innovation to fully realise the benefits of AI solutions in the oil and gas industry.



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Innovation remains a central theme in achieving global energy transition goals including the creation of new collaborative structures, the procurement of new solutions and unlocking barriers to previously unviable transactions.





# Our Energy & Utilities Group

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Our Energy & Utilities team of over 250 lawyers spread across our network advise on energy and utilities matters across all our practice areas. As an international team, our sector approach is not broken down by offices but into sub-groups that focus around particular aspects of the Energy & Utilities sector.

## Get in touch

Our market-leading team are paving the way with some of the most cutting-edge developments in the energy sector. Wherever you are on your journey, get in touch with the team to help you navigate the challenges and realise the opportunities that the areas discussed in our report represent.

Mining and Minerals

Energy Management

Hydrogen

Energy Digitalisation

Energy Storage and EVs

Energy Networks and Grids

Oil and Gas

Renewable Energy

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