STEPHENSON HARWOOD

Energy Transition Insights

February 2025

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Welcome

We asked our colleagues from across our international Energy Transition Group for their thoughts on the key themes they saw in their sector areas in 2024 and what they see on the horizon for 2025.

In this Insights briefing we have included a selection of highlights from some of our key practice areas, including energy supply and infrastructure, nuclear, offshore and onshore wind, CCS, maritime decarbonisation, aviation, carbon markets, the built environment and greenwashing risk.

It has been an exciting year for the Group as we expanded our international energy transition practice, one of five areas of strategic focus for Stephenson Harwood. We strengthened the practice with a number of expert hires across the breadth of our three energy transition pillars: energy, transportation and trade, and the built and natural environment. We welcomed new partners Nick Dingemans, corporate, and John Zadkovich, disputes, to our Singapore office and Kirsti Massie, energy projects, and Ryan Fordham, non-contentious construction and engineering, to our London office. In London, we also welcomed shipping lawyer Rachel Hoyland, a specialist in maritime decarbonisation.

We hope you enjoy this Insights briefing. If you are interested in any of the topics discussed or the upcoming events noted at the end of this briefing, please do get in touch with any contributing author, any other member of the Energy Transition Group or your usual contact at Stephenson Harwood.

Overview

In recent years continuing geopolitical tensions and global market disruption have led to an increase in energy nationalism and protectionism. Countries are seeking energy independence and security to avoid exposure to price surges and supply risks. Increasingly, we see state-level action taken to protect and prioritise the development of local supply chains and the building of domestic capacity.

Protectionism continued to be a key driver across energy transition in 2024, seemingly marking a swing in the energy trilemma pendulum towards security, compared to equity (access and affordability) and sustainability. Stephenson Harwood regularly discusses recent energy developments, set against the context of the energy trilemma, with industry clients and contacts at roundtable breakfasts and seminars, facilitated by partners John Zadkovich and Nick Dingemans. A summary of key points raised at roundtables held in Singapore, London and Jakarta can be found in **"Energy Trilemma 2024 trying to strike the balance"**.

Scaling-up, roadblocks to grid connection and difficult planning and consenting environments continue to be challenging areas globally. We hear from our clean energy sector clients of the pressing need to secure supply chains and develop skilled workforces. In the UK, some of these issues are addressed in the UK Government's Clean Power 2030 Action Plan, published in December, including the proposed wide-ranging reform of the planning system and overhaul of the grid connection queue. We will closely follow the further policy and regulatory details as they emerge this year.

The Action Plan set out the UK's ambitions for an energy system comprising of principally offshore and onshore wind, and solar, with some nuclear and assisted by low carbon flexible capacity, including storage. Unabated gas remains a transitional energy source as a backup, to be used only when essential to ensure security of supply. Of course, huge progress and technological development must be made and the challenges of securing financial investment overcome incredibly quickly to achieve this target by 2030. This is particularly the case as the Government requires the majority of the predicted £40 billion needed annually to come from private investment. The Government acknowledges that the UK is competing with other countries in these areas and for the corresponding investment.

On a positive note, 2024 saw a number of major milestones reached in the UK's net zero ambitions, including the financial investment decision for Net Zero Teesside, the world's first at scale gas power plant with carbon capture, wind surpassing gas as the largest source of electricity generation for the first year ever, and the closure of the last coal-fired power station, bringing to an end 142 years of electricity generation from coal in the UK.

While the UK Government laid out ambitions to step up as a climate leader and "clean energy superpower" in 2024 and China may possibly have reached peak emissions while beating previous renewable energy capacity records, the US sails in a different direction. Although federal policy will reflect President Trump's views on the climate and fossil fuels, there may continue to be support for the clean energy transition at state level, including in some Republican states.

With the EU also seeking to protect domestic supply chains and capacity building, these competing interests continue to increase the risk of more global trade barriers. The impact of tariffs and other non-tariff barriers on the acceleration of the energy transition, collaboration, costs and availability of critical materials will certainly be under the spotlight this year.

In the wider Asia Pacific region, a number of the ASEAN member states are exploring CCUS at scale, particularly cross border CCS to support the decarbonisation of Singapore, Japan and Korea as well as domestically. In North Asia, Japan has been advancing the use of corporate and virtual PPAs and Australia and New Zealand are in the early stages of planning for large scale offshore wind projects as well as continued construction of solar and onshore wind. In the Middle East, Abu Dhabi continues to lead the way with ongoing investment in CCS as well as solar and battery storage projects. Across ASEAN and the Middle East the ongoing nuclear renaissance is also gathering speed.

Overview

The role of AI in the energy transition also came into sharp focus last year. Debate continues as to its increasing impact on energy consumption and grid demands, versus the positive role it could play in driving energy efficiencies and the development of new technologies. The interest from tech giants in nuclear to meet their future energy demands is something we discuss further in this briefing. However, the emergence of DeepSeek and its challenge to energy demand forecasts, has put an even bigger question mark over the ability to predict AI's future energy consumption needs and highlighted how quickly geopolitical issues can impact the energy sector.

Jonathan Cripps
Partner, head of energy transition

T: +44 20 7809 2084
E: jonathan.cripps@shlegal.com

Joanne Wallace
Senior knowledge lawyer, energy transition

T: +44 20 7809 2129
E: joanne.wallace@shlegal.com

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Energy supply and infrastructure

Virtual/financial power purchase agreements, with guarantees of origin (certificates evidencing the electricity comes from renewable sources), were a focus for many corporates looking to hedge their power price and demonstrate their "green credentials" in 2024. This is a trend which we expect to see continuing through 2025, including in Japan where a number of Japanese corporates have recently announced signings. Virtual PPAs settle the price for electricity through structures that are similar in many respects to a contract for difference, without providing for the physical supply of electricity. In Europe, one increasingly important issue is around settlement during negative pricing hours, (caused by electricity supply outstripping demand). In Sweden and Spain for example, negative pricing settlement periods have increased, and many generators are now requiring settlement from offtakers in negative pricing periods as well, to ensure a continuous revenue stream (key in a project financing context).

Supply arrangements in the global electrolyser market were also a key topic last year. Electrolysers are critical components of green ammonia and hydrogen projects, so it is imperative that manufacturing production capacity is scaled-up as well as the size/capacity of the electrolysers themselves. With only a small number of suppliers, supply arrangements are critical. The EU recently included new eligibility criteria in its second renewable hydrogen auction to limit the use of Chinese electrolyser technology in hydrogen production. With China already having more than half of the existing global electrolyser manufacturing capacity and planning growth, the EU is attempting to protect its domestic electrolyser supply chain. The market has also seen various technical issues associated with the scale-up of the technology.

Looking to the rest of 2025, we expect batteries and longer-term storage technologies to be a real focus in many jurisdictions. The UK is proposing a cap and floor scheme to encourage investment in long duration electricity storage, with plans being published in Q1 this year and aims to approve the first projects by Q2 2026. The challenges of grid connection continue to be under the spotlight, with the recent proposals for changes to UK grid connection queue arrangements having potential implications for a number of developers and altering the prioritisation of certain projects. Ofgem is currently consulting on the grid connection reform package and aims to transition to the reformed process in Spring 2025. We also note that gas fired electricity generation, far from being dead, is being seen as an important generation source to support the large demand of data centres and as a backup energy source particularly during the transition. This could lead to supply chain issues, in terms of gas turbines and other gas generation equipment, if there is an uptick in demand.

Energy

Nuclear

The nuclear "renaissance" continued in momentum in 2024, bolstered by governments and tech giants in the data centre industry, recognising its potential as a low-carbon solution to energy security, renewables intermittency and the projected growth in energy demand. Last year, Amazon and Google announced nuclear deals, including support for the development of Small Modular Reactors (SMRs), Microsoft signed a power purchase agreement which will restart the Three Mile Island nuclear plant and Meta commenced a nuclear request for proposal process.

In the UK, the Government's Clean Power 2030 Action Plan gives nuclear a key role in the proposed future energy mix. However, challenges remain with ageing nuclear reactors, most of which are set to reach end-of-life by 2030, and the costs and delivery delays associated with new large nuclear reactors and new technologies. The Scottish Government does not support new nuclear stations in Scotland using current technologies, citing poor value and environmental concerns. There also remains the issue of negative public perceptions of nuclear, which need to be addressed if the wider public are to embrace it.

We see this year as a critical time for the nuclear industry in the UK, as it awaits final decisions on the SMR programme and the Sizewell C nuclear plant in the Government's spending review in late spring. GE-Hitachi NEI, Holtec Britain, Westinghouse Electric Company and Rolls-Royce SMR (the UK's only SMR company) are the four developers remaining in the competition, led by Great British Nuclear, to win Government support in the rollout of a fleet of SMRs in the UK.

Adding to the difficulties in constructing large nuclear power plants in the UK, France's state auditor Cour des Comptes recently called upon EDF to delay a final investment decision for the UK's Sizewell C nuclear plant until it has reduced its exposure in Hinkley Point C. Reflecting current trends in protecting domestic capacity, it said that EDF must not delay the programme of new nuclear projects in France.

We now expect to see significant progress towards the first commercial nuclear power projects in ASEAN in 2025. Many ASEAN governments have activated nuclear programmes, with Indonesia announcing plans for its first nuclear power project in December 2024 and Singapore announcing (in February 2025) an increase in capacity building to allow deeper research of nuclear options.

Increasing global nuclear capacity will also lead to increasing demands on the nuclear industry's supply chains, skilled workforces and the availability of uranium supply and enrichment, topics increasingly coming under the spotlight. In 2024, Stephenson Harwood hosted a joint workshop with the Nuclear Industry Association (NIA) and GIFEN at our Paris office, as well as the NIA's International Business Group's event "Showcasing UK supply chain capability" at our London office. Our event on 26 February 2025, hosted by our Singapore office, explores opportunities in the ASEAN region, as these governments begin looking closely at nuclear as an option to support their energy transition and energy security.

Energy

Wind

The offshore wind sector continued to grow globally in 2024, with numerous jurisdictions announcing ambitious plans and goals in the space. However, as many older offshore wind farms near the end of their operational life, we will see offshore wind decommissioning becoming increasingly important and a real focus for a number of owners. The demand for decommissioning services and end-of-life extension strategies is expected to surge, presenting significant market opportunities in this emerging area. Various regulatory issues need to be considered, as well as the interface with the offshore transmission owner (OFTO) assets. Meanwhile, the US wind sector faces a difficult future, following President Trump's executive order pausing offshore wind leasing and announcing a cessation and review of leasing and permitting practices for both offshore and onshore wind projects.

The outlook remains more positive in the UK, where last year wind became the largest source of electricity generation for the first time, accounting for 30% and overtaking gas. The UK is a global leader in wind generation, with the second largest offshore wind market in the world behind China, however both offshore and onshore wind capacity need to accelerate rapidly to meet the UK's 2030 ambitions of 43-50 GW of offshore (from 14.8 GW installed as of Q2 2024) and 27-29 GW of onshore capacity (from 14.2 GW installed as of Q2 2024). In relaxing planning and consenting and bringing onshore wind back into the Nationally Significant Infrastructure Project (NSIP) regime in England, the UK Government is hoping to kickstart growth in projects. Targeted reforms of the contracts for difference auction mechanism also seek to further support offshore wind.

Energy

Carbon capture and storage (CCS)

CCS is emerging as a critical technology in decarbonisation strategies, by reducing emissions at source and storing them underground or in the case of carbon capture and utilisation (CCU), reusing the captured carbon. Planned developments of capture, storage and/or transport capacity are growing.

The final investment decisions for the Northern Endurance Partnership CCS project in the UK and the Greensand carbon storage project in Denmark are milestones in the global approach to carbon emissions reduction. While Northern Lights was fully funded by the EU as a demonstration project, Northern Endurance and Greensand are full-scale commercial projects. The UK and EU funding for these projects shows that commercial parties can structure and deliver CCS at scale. However, like the development of offshore wind in the North Sea, early projects do require government support to be economically viable.

As well as direct funding, a number of mechanisms are being used by countries to support CCS growth and improve conditions for potential projects, including policy development, enabling legislation and financial incentives.

With economies of scale, the development of carbon markets and new options for carbon utilisation, CCS has become another major tool for decarbonisation and energy transition.

In the Middle East, Abu Dhabi continues to invest in CCS with the certification in late 2024 of ADNOC's West Aquifer carbon dioxide storage site in the UAE as being suitable for CCS. In Saudi Arabia, Aramco and its partners (SLB and Linde) signed a shareholders' agreement to build a CCS hub in Jubail. The first phase construction is expected to be completed in 2027, with capacity to capture and store up to 9 million metric tons of carbon dioxide per year.

We are watching closely the development of CCS in ASEAN. Indonesia, Singapore and Malaysia all have active programmes in place to develop and deploy CCS at scale. Major progress is expected in 2025 on the transboundary movement of carbon dioxide within ASEAN and the Asia Pacific region to support cross border CCS projects between emitter states such as Japan, Korea and Singapore, and host storage states such as Indonesia, Malaysia and Australia. We also expect to see major advances in CCS projects in ASEAN aimed at the decarbonisation of hard-to-abate sectors throughout the Asia Pacific.

CONTRIBUTING AUTHORS

Jonathan Cripps
Head of energy transition and partner, projects, energy and infrastructure, London
E: jonathan.cripps@shlegal.com

Kirsti Massie
Partner, projects, energy and infrastructure, London
E: kirsti.massie@shlegal.com

Cathal Leigh-Doyle
Partner, maritime trade and offshore, London
E: cathal.leigh-doyle@shlegal.com

Nick Dingemans
Partner, corporate, Singapore
E: nick.dingemans@shlegal.com

John Zadkovich
Partner, maritime trade and offshore, Singapore
E: john.zadkovich@shlegal.com

Transportation and trade

Maritime decarbonisation

The rapid development of maritime decarbonisation regulations (at national, EU and IMO levels), lack of global uniformity and regulatory uncertainty, have all been key concerns for the industry throughout the year, and issues we have spoken on many times.

The implementation of the EU ETS (emissions trading system) continued to be a major decarbonisation topic for the industry last year. The need to adapt contracts throughout the maritime ecosystem to accommodate regulations such as the EU ETS and FuelEU, was a subject of our "Game Changers in the Maritime Sector" event held in Paris, in October. Amongst other issues, we have advised a number of clients on EU ETS disputes, and the arrangements between parties needed to enable compliance. For instance, in the context of ship financings where the registered owner of the financed vessel is an SPV owned by a financial institution. While early market practice on EU ETS has now emerged, the next subject for 2025 will be the implementation of FuelEU.

It is worth noting that the holiday is over for the offshore industry, which was outside the reach of the initial wave of decarbonisation legislation for shipping. However, from 2025 onwards, it will need to come to grips with new regulatory requirements in the EU and UK.

A key discussion point emerging from Stephenson Harwood's Maritime Decarbonisation Week in Singapore, was the need for the industry to adopt a proactive and strategic, rather than reactive, approach to addressing these and other decarbonisation challenges. Securing final investment decision approval for green projects remains a significant challenge. Meanwhile, rising financing costs and a reduced appetite among financiers for certain green technologies have created, in some areas, a more difficult and competitive market environment.

With alternative fuels and new fuel technology critical to the decarbonisation of the shipping sector, a key question for shipowners today is which fuels they will use in the future. Methanol seems to be the preference today, with a number of new-built methanol-ready vessels in recent months, but the question of its availability remains open. The market is also considering ammonia and hydrogen, and biofuels will certainly play an important role in the transition. Meanwhile, the market for wind assisted propulsion continues to grow and we have worked on a number of financings of vessels, particularly in France, involving ro-ro, transportation vessels and cruise ships adopting wind assisted propulsion.

Transportation and trade

Maritime decarbonisation

The need for certification of, and proof of sustainability documentation for, renewable fuels emerged as another hot topic over the course of the year, an area in which increased scrutiny and regulation are needed. Our clients are increasingly asking us to advise them in connection with the EU Renewable Energy Directive (RED III), for instance, in relation to biofuels, biomass and RFNBOs (renewable fuels of non-biological origin).

Stephenson Harwood's maritime decarbonisation team continue to play a key role in influencing the decarbonisation of the sector, as well as responding to it. This includes chairing the decarbonisation international working group of the Comité Maritime International; participating in the annual summit of the Global Maritime Forum; co-ordinating the Blue Visby Consortium; working on the BIMCO committees drafting new clauses for industry; participating in UK Government working groups and consultations; and speaking on decarbonisation and energy transition topics on panels and at seminars globally. To register for our monthly Offshore Energy Bulletin, please contact any of the contributing authors or Tim Kelly.

CONTRIBUTING AUTHORS

Haris Zografakis
Partner, maritime, trade and offshore, London
E: haris.zografakis@shlegal.com

Cathal Leigh-Doyle
Partner, maritime, trade and offshore, London
E: cathal.leigh-doyle@shlegal.com

Rachel Hoyland
Of counsel, maritime, trade and offshore, London
E: rachel.hoyland@shlegal.com

Alain Gautron
Partner, maritime, trade and offshore, Paris
E: alain.gautron@shlegal.com

Hortense Atthenont-Duret
Managing associate, maritime, trade and offshore, Paris
E: hortense.atthenont-duret@shlegal.com

Transportation and trade

Aviation

The aviation industry is making progress to find appropriate solutions to the challenges it faces on its decarbonisation journey, but that progress has been slow through 2024 in real terms. With sustainable aviation fuel (SAF) mandates taking effect in the EU and a number of countries including the UK, Singapore, Indonesia and Malaysia in 2025-27, while the SAF market is still in its infancy, mandatory policy is being used to create demand for SAF with the aim of driving production and supply. Meanwhile, the key themes around (i) recognition of the importance of SAF to industry decarbonisation efforts, (ii) ongoing challenges to the scaling of SAF projects, notably the absence of financing, feedstocks and offtakes and (iii) questions over who foots the bill for industry decarbonisation, continued to bubble on the surface of most industry event agendas but with little clear progress as to in play solutions.

That said, the thinking among many key industry players has become more focused and we are perhaps better placed going into 2025 than we were in 2024.

We see arguments at senior industry levels developing in support of "contracts for difference" and/or government supported loans in lieu of (or in addition to) tax breaks, the case being made for industry self-funded schemes (for example, from a larger portion of the proceeds of EU-ETS and UK-ETS revenues), an appreciation of the need to support weaker credit airlines to secure SAF offtake agreements, and a desire to collaborate between SAF producers, governments and alternative financiers.

2024 also welcomed the Pegasus Guidelines, a bank-led framework to aid disclosure of lending portfolios' emissions across the aviation sector, and a re-launch of the impact milestone concept, intended to enhance the standards of sustainability-linked financing in aviation. The theme of setting meaningful climate goals and reporting on carbon emissions is also becoming more prescient for many aircraft leasing companies as those caught by the EU's Corporate Sustainability Reporting Directive regime prepare to meet their reporting obligations for FY 2025 with reports to be published in 2026.

CONTRIBUTING AUTHOR

James Collins

Partner, finance, London

E: james.collins@shlegal.com

Transportation and trade

Carbon markets

The agreement at COP29 on the final rules for Article 6.4 of the Paris Agreement, was a key moment for energy transition in 2024. Article 6.4 establishes the UN-supervised carbon crediting mechanism to create a centralised market for UN-recognised carbon credits. This is the final part of the overall Article 6 structure to be agreed. While each country now needs to implement a framework for Article 6.4 and put in place its own national rules, and there remains more work to be done by the UN supervisory body before the market can be operational, the creation of a truly global carbon market is getting closer and with it a global price for carbon. Once fully implemented, Article 6.4 will provide new funding pathways for energy transition projects and should help to accelerate net zero.

Support for the role of voluntary carbon markets and efforts to raise the integrity and quality of carbon credits gained traction at government and regulator level in 2024. In particular, in November the UK Government issued Principles for Voluntary Carbon and Nature Market Integrity, and in early 2025 is expected to issue a public consultation seeking views on their proposed implementation and application, including market standards and architecture.

CONTRIBUTING AUTHORS

Nick Dingemans
Partner, corporate, Singapore
E: nick.dingemans@shlegal.com

John Zadkovich
Partner, maritime trade and offshore, Singapore
E: john.zadkovich@shlegal.com

Built environment

Accelerating action in decarbonisation, climate resistance and international collaboration were key topics for the global buildings sector in 2024. In March, 70 countries signed the Declaration de Chaillot at the first Buildings and Climate Global Forum in Paris, and the Intergovernmental Council on Buildings and Climate was launched at COP29. COP29 also saw progress made on the recognition of the importance of the building sector in reaching net zero, with hopes this will be reflected in the round of Nationally Determined Contributions (NDCs) currently due for submission.

Key issues for the sector include addressing embodied emissions and whole lifecycles, supply chain transparency and availability, electrification and ensuring buildings are resilient to a changing climate. Another key issue, enhancing energy efficiency, has seen increasing policy development in a number of countries, including in the UK where Energy Performance Certificate (EPC) regulation is still very much on the agenda for 2025.

It is already the law that properties which are rented out need to have an EPC rating of at least an "E". It is expected that this will be tightened over the next few years, with the UK Government running a consultation process on EPC reform. Landlords are increasingly having to carry out expensive works to their properties to improve their energy efficiency and keep up with the requirements. In turn, lenders, even lenders who do not typically do development financings, are reacting to this by considering granting their borrowers loans for these works.

We see light touch "green lease" provisions as commonplace in leases now. These are usually obligations on landlords and tenants to share energy use information and to meet at various intervals during the lease term to discuss energy efficiency initiatives at the building. The expected trend over 2025 is for these obligations to become more involved and more specific. As an example, we expect to see it become more commonplace for leases to require parties to use sustainable or recycled (or recyclable) materials in their alteration or refurbishment works.

Another development to watch is the UK Carbon Border Adjustment Mechanism (CBAM) which is expected to be implemented from January 2027, with HMRC due to publish draft legislation and detailed guidance. This carbon border tax ensures the carbon price of imports of emissions intensive goods, from the cement, aluminium, iron and steel, fertilisers and hydrogen sectors, is equivalent to the carbon price of goods produced in the UK. This equal treatment of domestic and imported goods aims to mitigate carbon leakage risk. The EU introduced the world's first CBAM in 2023, applying to imports in these sectors (as well as electricity) into the EU.

CONTRIBUTING AUTHOR

Archie Campbell

Partner, real estate, London

E: archie.campbell@shlegal.com

Greenwashing risk

Greenwashing is now a material risk across all sectors. Understanding, mitigating and responding to the associated financial, regulatory, litigation and reputational risks arising from greenwashing is crucial for businesses. Last year saw an increase in relevant regulation and regulatory powers in the UK, which will continue into 2025. The Financial Conduct Authority's (FCA) anti-greenwashing rule came into force and the Competition and Markets Authority (CMA) stepped up its focus on greenwashing, starting with the fashion industry. The CMA will have new direct enforcement powers this year with the ability to issue significant fines. In 2025 we expect to see regulators using these new powers to crack down on the most serious instances of greenwashing. We also expect to see an uptick in the number of private investor and shareholder claims against corporates for alleged greenwashing, a risk particularly for the energy, retail, and transport sectors.

Last year, we launched our greenwashing risk practice, offering integrated advice on mitigating the risk of greenwashing by combining regulatory, civil fraud, commercial litigation, competition and consumer protection expertise from across our international offices. As well as providing advice on greenwashing risk, we continue to see increasing client interest in training and have been running sessions across the banking, real estate, marine and energy sectors in the UK, Europe, Middle East, Asia and the APAC regions. The greenwashing risk practice regularly hosts client and industry dinners and other events, as well as speaking regularly on the topic at conferences. You can read more on the key takeaways from our "Current trends and horizon scanning" roundtable dinner in London here.

CONTRIBUTING AUTHORS

Galina Usorova

Managing associate,
commercial litigation, London
E: galina.usorova@shlegal.com

Adam Culy

Partner, commercial litigation, London
E: adam.culy@shlegal.com

John Zadkovich

Partner, maritime trade
and offshore, Singapore
E: john.zadkovich@shlegal.com

Upcoming events

Please get in touch with any contributing author, any other member of the Energy Transition Group or Tim Kelly, if any of the following upcoming events are of interest to you:

Nuclear power: exploring ASEAN opportunities
Singapore | 26 February 2025

The Energy Trilemma – trying to strike a balance
Perth, 13 March 2025 | London, date TBA

CTV Day – one-day programme for those engaged in the Crew Transfer Vessels sector
London | 26 March 2025

Legal ESG – Greenwashing Conference
London | 29 April 2025

Offshore Legal Seminar
Rotterdam | 22 May 2025

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