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Spring Forum

Oxford 2022

DELIVERING THE ENERGY TRANSITION IN A FRACTURED WORLD:

NAVIGATING PRICE VOLATILITY, GEOPOLITICAL RISK,
AND SUPPLY CHAIN DISRUPTION

Thursday 14 July | Examination Schools, University of Oxford



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DEAR FRIENDS AND COLLEAGUES

It was my great pleasure to welcome you to Oxford this year for the 8th edition of the Aurora Spring Forum. What a fantastic day!

You may recall that I shared my three focus questions at the start of the event:

Firstly, what does the current crisis do to the pace of European electricity decarbonisation?

Secondly, what does energy security in Europe look like 10 years from now?

Thirdly, in the power sector, will the price crunch lead to productive or destructive market reform?

Thanks to our collective engagement and discussion, I feel I made progress in my thinking on all three. I very much hope you share my sense of progress from the day on some of the most challenging questions our industry faces right now. It was also simply brilliant to see so many friends in person after so long.

I won't attempt to summarise the various sessions here, however in this pack we've aimed to compile the Aurora team's main learnings and punchlines from the day. It is obviously impossible to do justice to the experience of being there, but we hope this is a useful summary to take away, especially of those parallel sessions that you may not have been able to attend.

Many people deserve thanks for the critical role that they played in bringing the 2022 Spring Forum into existence.

Our speakers were brilliant and very generous, including our distinguished keynotes delivered by Kwasi Kwarteng and Ben van Beurden. I'm also extremely grateful to our keynote panellists Fintan Slye, Greg Jackson, Hunter Hunt, Miguel Stilwell de Andrade, Nora Mead Brownell, Ruth Kent, Scott Strazik, and Tony Cocker.

Our generous sponsors are due special appreciation. The partnerships with Barclays, Clarke Energy, Greencoat Capital, MUFG, Osborne Clarke and RWE, build on many years of fruitful cooperation, and we would like to thank them for supporting the Aurora Spring Forum 2022.

Finally, thank you to my own team at Aurora, especially Narcisa-Camelia Danila and Kim Carroll, for their diligence, commitment, and adaptability in staging the Aurora Spring Forum 2022.

We look forward to welcoming you again next year to continue the discussion!

John Feddersen, Founder & CEO, Aurora



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SOCIAL MEDIA, FEEDBACK & IN THE NEWS

Thanks so much for a genuinely wonderful event!

A pleasure to be included & a great opportunity to reconnect with old friends.

Very informative, delivered in an engaging format & great networking opportunities.



Ben van Beurden • 3rd+
Chief Executive Officer at Shell
4d • 🌐

+ Follow ...

Yesterday I had the pleasure of joining [Aurora Energy Research](#) to discuss the importance of accelerating the energy transition. We need bold targets and actions to get to net zero faster.

At [Shell](#), we have been reducing our own emissions, making crucial investments in low- and zero-carbon energy, and setting up collaborations in sectors that need our help to reduce emissions.

You can read my full speech here: <https://lnkd.in/eMZGvNeW> #SpringForum #PoweringProgress



Aurora Energy Research
15,691 followers
5d • 🌐

"Companies like [Shell](#) must focus on actions as well as targets" – [Ben van Beurden](#), Chief Executive Officer.

"Real change is not about reducing our emissions; it's about reducing the emissions of the products we sell. These contributes to 90% of the emissions of the company."

Thank you for joining us Ben for a truly interesting speech.
#springforum #auroraenergyresearch #auroraspringforum



Good to see & hear the level of emotion in the room on these issues, just shows how much we are doing and how much more there is to deliver.

As always, the variety of speakers and topics was second to none!

As an independent consultant and having spent the last year developing a geothermal start up and watching costs like a hawk, it was both money and time well spent.



Limejump
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This afternoon our CEO, [Catherine Newman](#), took to the stage at [Aurora Energy Research](#)'s Spring forum to discuss her thoughts on the current 'invest-ability' of [#gridscalebatteries](#)... and the short/medium term challenges the market faces, such as grid connection capacity constraints. Thank you [Aurora Energy Research](#) for the invitation, and of course, to the fellow panelists.



Rad Hart-George (He/Him) • 2nd
Investment Director at Temporis Capital
4d • 🌐

Many thanks to [John Feddersen](#) and all at [Aurora Energy Research](#) for a brilliant [#auroraspringforum](#). Particularly enjoyed the afternoon session on battery storage investment with [Ben Guest](#), [Catherine Newman](#), [Dr Marise Westbrook](#), and [Paul McCusker](#).

#netzero #energy #renewables #batterystorage



Katja Wünschel • 2nd
CEO Onshore Wind/PV Europe & Australia, RWE Renewables
10m • 🌐

The expansion targets for renewable energy have been raised across all of Europe, but there is still a gap between ambition and reality in most countries. How to accelerate the built out was a key point in our panel discussion at the [Aurora Energy Research](#) Spring Forum in Oxford.

I've noticed that many countries look to Germany, since the ambitions are especially high. If Germany realises its ambitious targets quickly and decisively, then that could be a real game changer and other EU countries could follow. The so called Easter package by the German government was already an important step in this direction. Now it's time to follow up with further measures in the Summer package to accelerate approval processes and ultimately the expansion of renewables. This could make Germany a role model for all of Europe.

It was great to discuss the challenges of the European energy transition with [Ana Isabel Barillas](#), [Kate Tuohy](#), [Rosheen McGuckian](#) and [Thekla von Bülow](#). I really enjoyed that discussion going into some detail – a very valuable exchange. Another remarkable thing was our all-female panel. This is still somewhat unusual in our industry and a very welcome change. 🙌



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15 Jul / 2022 9:46

NEWS REGULATION SUPPLY

Molly Lempriere
Deputy Editor, Currents

Role of gas in setting consumer bills is 'problem that needs to be addressed,' says Kwarteng



The speech was shown at Aurora's Spring Forum in Oxford. Image: Solar Media/Molly Lempriere.

Consumer bills still being set by marginal gas prices is a "problem that needs to be addressed," said business and energy secretary Kwasi Kwarteng.

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EU energy rationing can't be ruled out, Shell warns


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July 14, 2022 5:09 PM GMT+1 Last Updated 7 days ago

Energy

Exclusive: Shell wants to share more of its blockbuster profits, CEO says

By Ron Bousso



Chief Executive Officer of Royal Dutch Shell Ben van Beurden attends a session of the St. Petersburg International Economic Forum

Summary Companies

- Shell looks to boost returns beyond 30% of cash target
- Extra cash can also cut debt that surged in the pandemic

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Shell CEO Warns Parts of Europe May Need to Ration Energy

As energy prices skyrocket, Ben van Beurden says Europe faces an uncertain winter

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Markets

Shell CEO Says Europe Faces 'Tough Winter' And Rising Prices

- Putin has proven he's ready to weaponize supplies: Van Beurden
- Countries should have contingency plans in case gas turned off



Ben van Beurden. Photographer: Jose Sarmiento Matos/Bloomberg

By Will Mathis and Rachel Morison
14 July 2022 at 11:40 BST Updated on 14 July 2022 at 13:09 BST

Europe will face a tough winter with even higher energy costs, Shell Plc's Chief Executive Officer Ben van Beurden said Thursday.

"We will be facing a really tough winter in Europe," van Beurden said. Prices are set to rise further and "in a worst case, we will be in a situation where we have to ration."

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Commodity Tracker: 5 charts to watch this week

INTERVIEW: Former Gazprom unit SEFE back as key gas market player

HIGHLIGHTS

- Focus on procuring spot LNG, operate infrastructure
- Stabilize 170 TWh/year gas portfolio after sanctions
- New unit has complete OFAC sanctions waiver

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Securing Energy For Europe has re-established itself as a European gas market player after Germany took the former Gazprom unit under trusteeship and provided a Eur9.8 billion (\$10 billion) loan to support procurement, managing director Egbert Laege told S&P Global Commodity Insights.

Author: Andreas Franke
Editor: Daniel Lohr
Commodity: Energy Transition, LNG, Natural Gas

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Russia

'Gas blackmail': how Putin's weaponised energy supplies are hurting Europe

After gas supplies through Nord Stream 1 stopped on Monday, European leaders plan for a future without Russian energy



Alex Lawson Energy correspondent
Fri 15 Jul 2022 16:37 BST



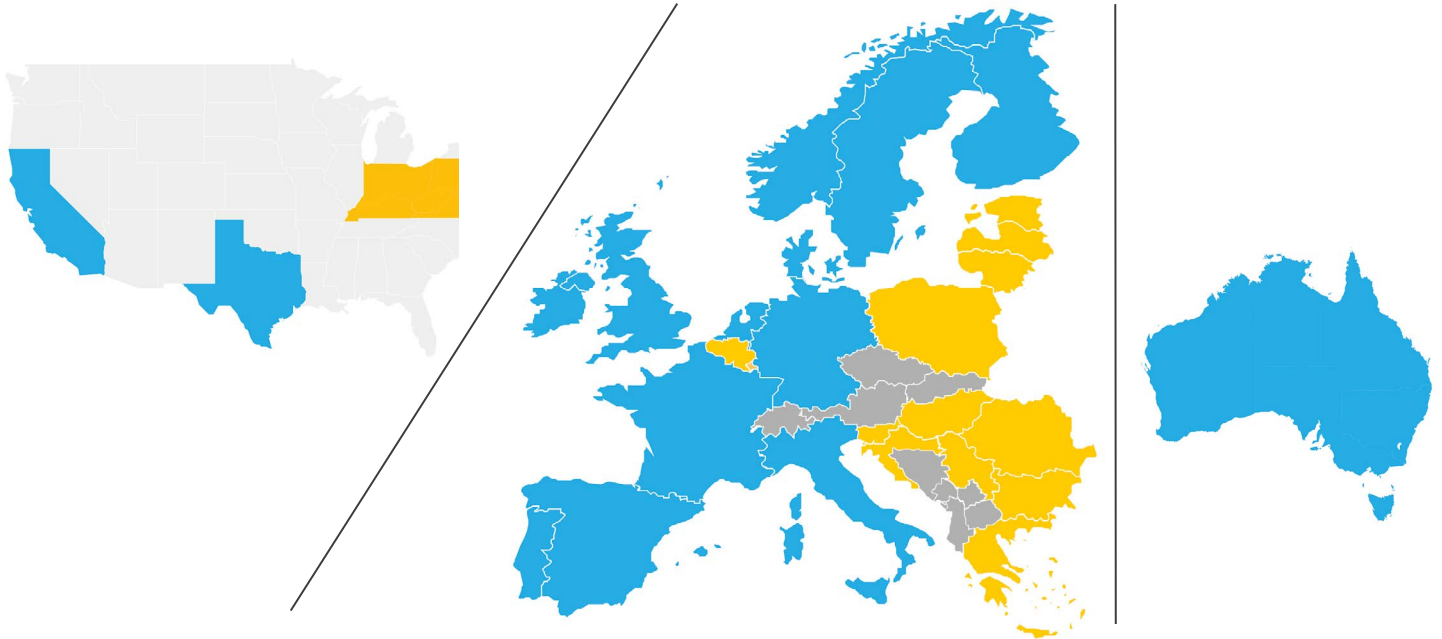
Despite EU leaders agreeing a partial embargo on Russian oil, any outright ban on its gas appears unlikely. Photograph: Michael Probst/AP

One question is dominating the energy industry: will Vladimir Putin turn the tap back on? This week the Kremlin-controlled energy firm Gazprom shut off gas supplies through the Nord Stream 1 pipeline for maintenance until 21 July, having already

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PROGRAMME HIGHLIGHTS

DISTINGUISHED OPENING KEYNOTE ADDRESS

INTERVIEW: THE IMPACT OF RUSSIA'S INVASION OF UKRAINE ON THE ENERGY TRILEMMA

Speaker:

Rt. Hon. Kwasi Kwarteng, UK Secretary of State for Business, Energy & Industrial Strategy

Interviewer:

Dan Monzani, Managing Director, UK & Ireland, Aurora

Brief summary:

UK Secretary of State for Business, Energy and Industrial Strategy, Rt. Hon. Kwasi Kwarteng, joined Aurora's Dan Monzani to discuss the themes of Aurora's Spring Forum: delivering the energy transition in a fractured world.

They discussed:

- **Energy security:** the Secretary of State restated his confidence in preparations in the UK for next winter, including restocking coal power stations.
- **Market design for Net Zero:** the Secretary of State argued for the need to decouple the market price received by wind farms from gas prices and expressed hesitation about locational pricing if it were to lead to disparate outcomes from consumers.
- **Affordability:** the Secretary of State discussed measures that have been taken to protect consumers this winter and felt that the current crisis would underscore, rather than undermine, public support for investment in decarbonisation.

Click [HERE](#) to watch the video interview



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DISTINGUISHED OPENING KEYNOTE ADDRESS

ACCELERATING THE ENERGY TRANSITION

Speaker:

Ben van Beurden, CEO, Shell

Discussion and Q&A with

John Feddersen, Founder & CEO, Aurora

Brief summary:

The opening keynote focused on the importance of accelerating the energy transition, and on the need to set targets backed up by commitment and action. To tackle climate change, the world needs to achieve a Net Zero emissions energy system. However, today's fossil fuel energy system cannot be dismantled before the low-carbon energy system of the future is reliable, sustainable and affordable.

Ben van Beurden highlighted Shell's ambition to be a pacesetter in the energy transition: 75% of the planned investments of £20-25bn in the UK are to be spent on the development of low- and zero-carbon energy products and services, including carbon capture and storage. In the years to come, gas will play an essential role in getting the balance right between energy security and the transition to Net Zero emissions and Shell will continue to supply it.

Alongside the aim to reduce emissions and change portfolios, the need for bold governmental policies and regulations that accelerate and synchronise the supply and demand of low-carbon energy was emphasised. In particular, Ben van Beurden specified that companies like Shell need to set actionable targets now, by making crucial investments in zero-carbon energy, and setting up collaborations in hard-to-abate sectors to ensure an energy transition with both a secure supply of energy and lower emissions.

"The world, and companies like Shell, must focus on action as well as targets now, if we want to get the balance right and have an energy transition with both a secure supply of energy and lower emissions."

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AURORA KEYNOTE

UKRAINE, RUSSIA, EUROPE AND THE RESURGENCE OF GEOPOLITICS IN ENERGY MARKETS

Speaker:

Hanns Koenig, Head of Commissioned Projects, Central Europe, Aurora

Brief summary:

“In the timeframe that the European Commission is targeting, it is possible to replace Russian gas without demand destruction in the industry.”

In his keynote addressing how the European energy security landscape has changed since Russia's invasion of Ukraine, Hanns mapped out the origins of the crisis, current implications, and the path forward.

“The current crisis is the biggest disruption to the European energy market since liberalisation”, Hanns summarised, referring to the decline in gas and the resulting price surge. He presented two scenarios of how Russian gas flows could be replaced by 2030, and discussed likelihood, drivers and key challenges.

Even a managed phase-out of Russian gas would be “extremely ambitious” and dependent on scaling up renewable energy sources and infrastructure, increasing workforce availability, profoundly changing supply chains and altering consumer behaviour. If Russian gas flows come to an immediate halt, the next 2-3 years would be ever more challenging, requiring “painful measures”.

Political measures such as the REPower EU plan and power market reforms were also discussed.

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PLENARY SESSION

ENSURING EUROPEAN ENERGY SECURITY IN THE SHORT AND THE LONG-RUN

Chair: **John Feddersen**, Founder & CEO, Aurora

Speakers:

Fintan Slye, Director, National Grid ESO

Hunter Hunt, Chairman & CEO, Hunt Energy

Nora Mead Brownell, Former Commissioner FERC, & Former Chair PG&E

Tony Cocker, Senior Independent Director, SSE & Chair, Infinis Energy Management

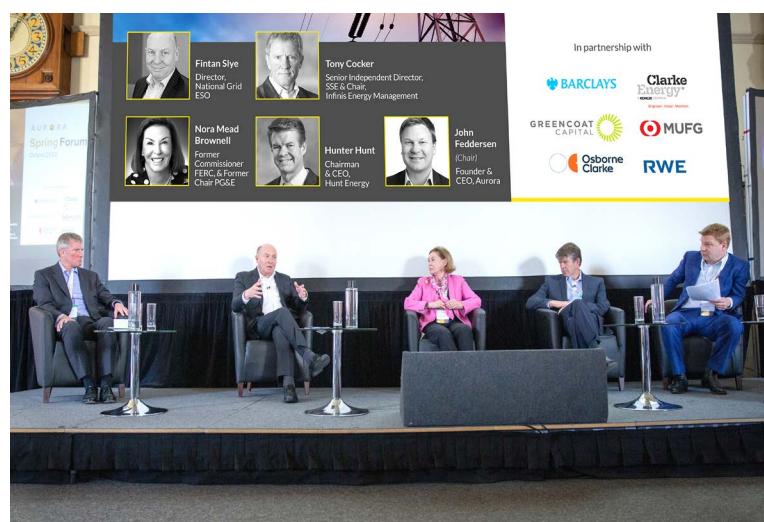
Brief summary:

Until 2022, Russia was seen as a reliable supplier of gas to Europe, despite geopolitical tensions. The German concept of 'Wandel durch Handel' – change through trade – dominated Europe's energy policy.

Sadly, this assumption of reliable supplies was clearly false, and Europe now needs to reassess its approach to energy security over the timeframe of days and weeks, as well as decades.

This panel assessed the risks in the short or long term, and debated alternative futures for Europe's energy security.

- The UK is well placed to get through this winter without shedding demand for power and gas. This is a consequence of adequate generation capacity and access to natural gas from the North Sea and global LNG markets
- The UK's European neighbours – France and Germany in particular – face much larger challenges this coming winter
- Natural gas has a major role to play in Europe well into the 2030s. Including natural gas as 'green' in Europe's taxonomy creates greater certainty for long-term gas investments like LNG import and upstream gas development
- US LNG can play a much larger role in ensuring European energy security, or at least curtailing Russia's ability to manipulate European energy markets. Adding 50 bcm p.a. is easily achievable, but it will not arrive for at least 4 years



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AURORA KEYNOTE

ACT GLOBAL, THINK LOCAL: GLOBAL DECARBONISATION CHALLENGES AND LOCAL SOLUTIONS

Speaker:

Richard Howard, Research Director, Aurora

Brief summary:

This keynote explained the outlook for global decarbonisation, the challenges it poses and discussed a diverse set of potential solutions.

Announced emission pledges would keep global warming to below 2 degrees, but policies remain off track. This is emphasised by a continued rise in fossil fuel production despite significant renewables investments in the past decade. Getting to Net Zero represents a huge investment opportunity, with 37,000 GW of green energy installations worth \$53 trillion required globally by 2050.

To enable these investments, Richard identified three key challenges: the compression of renewable investment returns, the slow rollout of electricity grids, and the current lack of flexible capacity required to keep the lights on in a Net Zero System.

Key takeaways include:

- Co-location of wind, solar and electrolyzers at an optimal site can double IRRs compared to stand-alone wind assets in Germany
- Grid constraints can be eased through investments into long-duration energy storage (LDES), albeit Great Britain alone would require 46 GW of LDES by 2050 (compared to 2.8 GW pumped hydro capacity today)
- Revenue stacking opportunities are crucial for enabling grid-scale battery storage business models. Capacity payments may be required to bridge financing gaps

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PLENARY SESSION

THE WAR IN EUROPE AND ITS IMPLICATIONS FOR THE ENERGY TRANSITION

Chair: **Laurie Fitch**, Strategic Advisory Group Partner, PJT Partners

Speakers:

Greg Jackson, Founder & CEO, Octopus Energy

Miguel Stilwell d'Andrade, CEO, EDP & EDP Renewables

Ruth Kent, Managing Partner & COO, Renewable Power, Brookfield

Scott Strazik, CEO, Global Energy Business Portfolio, General Electric

Brief summary:

The panel considered how the recent instability, both political and economic, has impacted the road to Net Zero targets. Europe's dependency on Russia's natural gas has highlighted energy security risks, underscoring the need to decarbonise even faster. However, this accelerated transition must be matched by concrete policy reform to incentivise a rapid deployment of low-carbon technologies, a challenge given the more-risk-averse investment landscape.

Some of the key topics that the panellists debated included the impact on consumers, the shift in investors' attitudes towards risk and low-carbon technology, supply chain constraints, the role of natural gas (both politically and environmentally) and system reform following the renewed focus on security of supply.

The panel agreed that investors attitudes had become more conservative following the war, amplified by higher rates. Policy is needed to incentivise the transition now more than ever.

Greg Jackson felt that there is **"enormous room for system reform needed to make renewables more attractive to investors"**.

However, despite increased rates, Ruth Kent claims the outlook for low carbon tech remains positive given that **"there is no shortage of capital available for renewables"**.



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BREAKOUT SESSION

REBUILDING THE RETAIL MARKET: HOW TO ENSURE CUSTOMERS ARE WELL SERVED THROUGH THE ENERGY TRANSITION

Chair: **Dan Monzani**, Managing Director, UK & Ireland, Aurora

Panellists:

Emma Pinchbeck, CEO, Energy UK

Jane Walker, Deputy Director, Energy Markets & Consumers, BEIS

Keith Anderson, CEO, Scottish Power

Melissa Gander, COO, Kaluza

Brief summary:

This panel discussed the dynamics and shortcomings of the existing electricity retail market in view of an increasingly volatile supply system, brought to light by the recent commodity price instability.

The panellists offered a range of perspectives on what exactly customers need in this changing climate and which aspects of reform are most crucial for the those most strongly affected by market instability.

They discussed the need for simplicity in pricing, packaging and service quality, as well as technological innovation in the market to ease consumer decision-making and to overcome the cost of underlying commodities.

Other key points discussed include:

- It is hard to make changes to the retail market until gas prices stabilise
- Service packages must be more holistic and flexible, catering to the needs of different consumers
- The market needs to be innovative to cater to not just private but public energy usage (e.g. public transport)

"The (energy retail) market is not designed for the world we're in now."

- Keith Anderson

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BREAKOUT SESSION

THE POTENTIAL FOR INNOVATION IN POWER NETWORKS

Chair: **Mateusz Wronski**, Digital Solutions Director, Aurora

Panellists:

James Kelloway, Energy Intelligence Manager, National Grid ESO

Nora Mead Brownell, Former Commissioner FERC,
Former Chair PG&E & Founding Partner, ESPY Energy Solutions

Paul Ezekiel, CEO, AMP Energy

Brief summary:

The panellists considered the potential for innovation in power networks from different perspectives, including technological solutions, policy and regulation to enable innovation, and investment opportunities. Panellists working in different roles and geographies shared their experiences of the key challenges to achieve innovation in power networks and where they see the most promising opportunities.

- Many of the technologies required to solve the grid constraints currently preventing broader deployment of renewables in the network already exist; it will be challenging to build new networks.
- The most promising opportunities include digital solutions to better operate our systems (e.g., AI and machine learning), storage technologies, and developments in the optimisation of distribution networks. Many of the solutions not yet developed for energy systems are computationally challenging but have been deployed in other sectors (e.g., defence systems)
- Panellists highlighted the need to develop a regulatory model that properly incentivises investment in R&D and innovation. There are large amounts of capital waiting to be deployed with the proper regulatory framework

"Before you could ring somebody and turn on a power station if needed. Now you're looking at days where 80% of your country generation is dependent on the weather. You need innovation to be able to optimise our generation. Innovation is about understanding how to deal with the volatility of these assets. Innovation is absolutely key. The pace of change is very rapid, so we need to innovate." - James Kelloway



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BREAKOUT SESSION

EUROPEAN ENERGY SECURITY: WHAT SHOULD COMPANIES AND GOVERNMENTS DO THIS YEAR AND OVER THE NEXT 5 YEARS?

Chair: **Anise Ganbold**, Research Lead,
Commodities and Hydrogen, Aurora

Panellists:

Alex Grant, UK Country Manager & SVP, Equinor

Egbert Laege, Managing Director, Securing Energy for Europe

Gautam Mukherjee, Head of Gas Analytics, bp

Theresa Chambers, Head of Energy and Security Analysis, BEIS



Brief summary:

Methods to reduce demand were discussed; for both industrial and residential sectors there is limited flexibility in the short term, and some solutions would lead to a short-term increase in greenhouse gas emissions. Panellists spoke about price caps and the risk of market distortion and unwanted effects. Consumers could be motivated through pricing signals set by the private sector, and voluntarily reducing demand could also be a greener solution.

Securing short-term supply may involve diplomacy between nations and agreements about how to share the commercial risk of purchasing gas on a long-term basis. Investing to secure supply on a longer timescale may be hindered by the risk of stranded assets as we approach Net Zero; could this risk be shared between governments and countries? The morality of locking in gas consumption and therefore fossil fuel emissions via long-term contracts was discussed.

We can look to past events for inspiration, such as the management of demand following the shutting down of Japan's nuclear reactors post-Fukushima.

- It was agreed that the solidarity principle should be maintained to ensure that energy is shared between countries
- The risk of stranded assets can hinder fossil fuel investment, causing potential misalignment between the goals of Net Zero and short-term security of supply
- The audience were asked whether Nord Stream 1 will come back online, which saw a 50/50 divide

"Some of the measures taken to reduce demand have had the opposite effect"



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BREAKOUT SESSION

ENABLERS FOR EUROPE'S ENHANCED RENEWABLES DEPLOYMENT AMBITIONS

Chair: **Thekla von Bülow**, Principal, Commissioned Projects, Aurora

Panellists:

Ana Barillas, Head of Iberia, Aurora

Kate Tuohy, Director, Energy, MUFG

Katja Wünschel, CEO Onshore Wind and Solar Europe & Australia, RWE Renewables

Rosheen McGuckian, CEO, NTR

Brief summary:

The panel highlighted the ever-increasing relevance of renewables and their role in helping Europe reduce its dependency on Russian gas: **"It's apparent that scaling up renewables is even more important, now more than ever"** Thekla commented.

Panellists from industry discussed their views on the ambitious targets in EU member states' climate plans, the common hurdles that limit renewable deployment across different Europe, and on a country specific level, and how these hurdles can be dealt with.

The main enablers identified were:

- Compensation for curtailment risk that will promote investment in those markets where this significantly affects the investment case, such as Germany
- Clear and stable regulation and policy in order to make informed investment decisions, and allow for large-scale deployment of flexible capacity
- Potential to include sophisticated insurances that will cover the risk of legal recourse over permits post COD, similar to what we have seen in the French market

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FIRESIDE CHAT

RETHINKING ENERGY SYSTEMS

Chair: **Emma Woodward**, Senior Associate, Aurora

Speaker:

Lord Deben, , Chairman, Committee on Climate Change

Brief summary:

"Saying we can't do Net Zero because of the cost-of-living crisis is the opposite of the truth" - Rt Hon Lord Deben

This Fireside Chat considered the positives and negatives to be taken from the UK's current energy and climate change actions, with ideas for improvement shared and discussed. The Rt Hon Lord Deben drew on his deep experience as Chairman of the Committee on Climate Change to offer unique insight into the opportunities and challenges which face the UK.

The discussion identified offshore wind as a remarkable success story which is enabling decarbonisation of the GB electricity system. A particular focus was applied to the opportunities presented in the land-use and agricultural sectors as significant emitters of CO₂ that could see decarbonisation, and eventually be used for significant sequestration.

FIRESIDE CHAT

OPPORTUNITIES FOR A UKRAINIAN-EU ENERGY FUTURE

Chair: **Hanns Koenig**, Head of Commissioned Projects, Central Europe, Aurora

Speaker:

Maxim Timchenko, CEO, DTEK

Brief summary:

This Fireside Chat considered the opportunities for current and future cooperation between Ukraine and the EU. This included how Ukraine could provide an alternative to Russia for natural gas supply to Europe in the short- to medium-term and, eventually, become its major supplier of clean energy through wind power.

The conversation began with a moving account of life in Ukraine in the wake of Russia's invasion, focusing on DTEK's continuous work to repair electricity networks damaged by shelling and bring the lights back on for millions of Ukrainian citizens. Finally, the pair discussed actions which the EU could take now to help Ukrainians, such as financial aid, knowledge sharing and underwriting of international investments into infrastructure which faces significant risk of damage due to the ongoing war.



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BREAKOUT SESSION

IDENTIFYING, FINANCING AND DEPLOYING THE NEXT WAVE OF DECARBONISATION TECHNOLOGIES

Chair: **Casimir Lorenz**, Principal, Aurora

Panellists:

Rafi Ghazi, Head of Corporate Finance, HH2E

Geoffrey Smith, Senior Banking Advisor, UKIB

Mallika Ishwaran, Chief Economist, Shell

Brief summary:

The panel discussed the practicalities of transitioning to a green energy system, including the potential for volatility as fossil fuels ramp down and renewables ramp up. The ability of the market to drive this transition was discussed, considering recent equity market declines, the urgency of the energy transition and the interest of private capital in this sector. The pathway for the hydrogen economy was debated, including whether it should be regional or global.

- Hard-to-decarbonise sectors may require low carbon molecules and carbon abatement
- Technologies need to come online within the next 30 years to meaningfully contribute to the energy transition
- The urgency of the energy transition may lead to logistical issues, including transportation and commodity crunches

"The industrial revolution was driven by the market... climate change requires more urgency than the market can provide"

- Geoffrey Smith

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BREAKOUT SESSION

HOW SHOULD INVESTORS MEASURE AND VALUE THE SOCIAL BENEFITS OF DECARBONISATION INVESTMENT?

Chair: **Hugo Batten**, Managing Director, Australia & California, Aurora

Panellists:

Caroline Lytton, MD, Head of Power & Renewables Global Structured Finance EMEA, SMBC

Hunter Hunt, Chairman and CEO, Hunt Energy

Mark Collette, Managing Director, Energy Australia

Brief summary:

This panel considered the full supply chain perspective of quantifying and financing 'green' projects, including commenting on the need for global policy to be focussed on more than just lowest cost.

Panellists touched on the global aspect of decarbonisation, citing an overreliance on mining in particular regions for key raw materials needed for Net Zero. They also talked about the opportunities and ambiguities of transition finance and how it might evolve soon.

Lastly, they discussed the effectiveness and future potential of financed emissions, and the need for market-driven incentives. Key discussion points included:

- People often turn a blind eye on the supply chain when trying to adhere to 'good practice' locally
- Decarbonisation trajectories are strongly affected by geopolitical issues with regards to the supply chain, labour conditions and prices
- With green finance, companies should focus on their scope 1 emissions first before scopes 2 and 3

"Everyone is doing it because it's the right thing to do, but at some point, it needs to be market-driven."

– Caroline Lytton



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BREAKOUT SESSION

SETTING THE MARKET FRAMEWORK FOR DEEP DECARBONISATION

Chair: **Dan Monzani**, Managing Director, UK & Ireland, Aurora

Panellists:

Rachel Fletcher, Director of Regulation and Economics, Octopus Energy

Richard Green, Professor of Sustainable Energy Business, Imperial College Business School

Tom Glover, UK Country Chair, RWE

Brief summary:

In the context of recent government intervention in electricity markets across Europe, the panellists discussed the need to reform electricity markets and the pros and cons of different reform measures. They discussed the potential introduction of locational nodal pricing, and the decoupling of carbon-emitting technologies and fossil-fuelled technologies into two markets.

- Locational nodal pricing (LNP) sends effective signals to the market (for both generation and increasingly flexible demand) and lowers requirements for network buildout. However, from an investor's point of view, panellists highlighted that LNP can raise the cost of capital due to increasing risk and lack of foresight on revenues, offsetting system cost savings from implementing LNP
- Measures implemented by governments must provide stability and maintain investor confidence, including grandfathering on existing arrangements. Measures such as smoothing out consumer bills can be implemented without undermining investor confidence. There is a need to move quickly, but there must be a proper discussion to reach consensus on no regret actions in the short term
- Separating electricity markets is a complex task, deploying CfDs (voluntary and for new assets) for low-emitting technologies may be an effective measure to deploy large-scale capital, bring down the cost of capital and provide affordability to end-consumers

"(The) market needs to provide actionable signals for thousands of assets providing the right action, at the right time and the right place"

- Rachel Fletcher

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BREAKOUT SESSION

INVESTING IN GRID SCALE BATTERIES IN EUROPE: WHICH MARKETS ARE RIPE FOR INVESTMENT AND WHY?

Chair: **Ryan Alexander**, Research Lead, European Power Markets, Aurora

Panellists:

Ben Guest, Managing Director, New Energy, Gresham House

Catherine Newman, CEO, Limejump

Marise Westbroek, Project Leader, Aurora

Paul McCusker, Vice President EMEA, Fluence



Brief summary:

The increased experience of battery operators has led to improvements in revenue stacking and state of charge management. Challenges include commodity prices, high labour costs, competition from the EV market and under-resourced grid companies. The planning process requires modernising and streamlining; innovation can provide short-term improvements, such as National Grid's TEC amnesty.

European market attractiveness is increasing thanks to more favourable regulation, such as the PICASSO project. Batteries are being seen as enablers of flexibility rather than consumers, which has been reflected in the elimination of charges and routes to markets becoming easier.

- The UK is one of the leading markets for batteries in Europe, with strong fundamentals that recognise the role and value of storage
- The Ukraine crisis has brought about a step change; storage can help with security supply, and is being deployed in Eastern Europe to prepare for Russian gas disruptions
- The logistical and geopolitical risks of supply chains provide an opportunity for Europe in the form of supply chain regionalisation

"The direction of travel is really quite positive"

- Ben Guest



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BREAKOUT SESSION

WHAT NEEDS TO CHANGE TO MAKE 24 GW OF NEW NUCLEAR FEASIBLE?

Chair: **Emily Gosden**, Energy Editor, The Times

Panellists:

Erin Coghlan, Deputy Director, New Nuclear Financing Policy and Legislation, BEIS

Luba Kotzeva, MD European Energy & Renewables, Lazard

Paul Spence, Director of Strategy and Corporate Affairs, EDF Energy

Richard Nourse, Partner, Greencoat Capital and Former Board Member, Urenco

Brief summary:

The panel, which included speakers from industry and government, discussed the short-term challenges that are limiting current nuclear development in the UK, before commenting on the longer-term solutions that would need to be implemented to reach 24 GW of new nuclear by 2030.

“Nuclear is clearly important for the UK in providing a low-cost zero-carbon energy system, and this target only reinforces its importance... however, we need to make it attractive and politically palatable for consumers” said Erin Coghlan of BEIS.

In particular, the panel focussed on how the 24 GW target had been determined, and whether it is a realistic objective. They highlighted the following considerations:

- Making new nuclear bankable will be key to attracting both private and public investment: the new RAB model will go a long way to achieving this as operation risk is redistributed
- The current political uncertainty in the UK is not expected to affect the long-term targets for nuclear capacity
- The UK needs a holistic model that cuts the negotiation period of the development and financing phase of new nuclear projects



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FIRESIDE CHAT

BUILDING A 100% RENEWABLE POWER SYSTEM FROM SCRATCH

Chair: **Hanns Koenig**, Head of Commissioned Projects, Central Europe, Aurora

Speaker:

Jens Madrian, Executive Director, NEOM Energy

Brief summary:

Jens provided an introduction to Neom, which is an economic zone in the northwest of Saudi Arabia of around 29,000-30,000km². It has its own legislation and regulation for energy. It is completely independent from the rest of Saudi Arabia, with its own energy legislation and regulations. NEOM Energy's goal is to power the zone independently with purely renewable generation at the lowest possible cost.

The Fireside Chat discussed how technology will be the core of the system, with households, generators and industry all connected to a digital platform integrated with artificial intelligence. By 2030, the plan is to have the 80 TWh system up and running, 75% of which will be made up of industry.

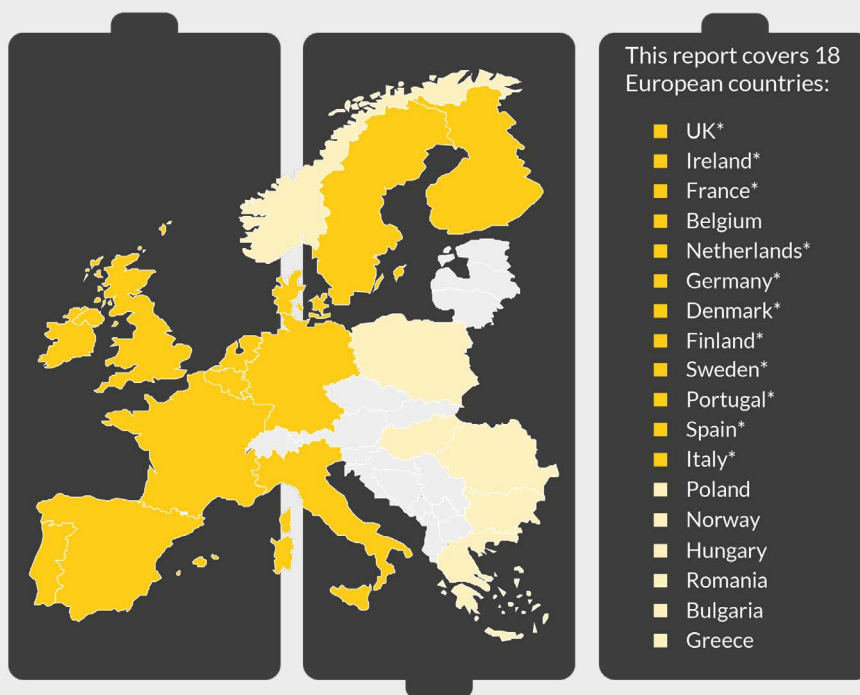
Jens and Hanns discussed the challenges of setting up a 100% renewable system, including maintaining energy security and balance. Interconnection and long-duration energy storage will be key to the project's success.

Jens highlighted that despite the challenges, the team is focusing on creating a "culture of innovation" in order to find solutions to their problems.

Click [HERE](#) to view the presentation

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 - Summary of attainable markets and revenue stacking opportunities
 - Description of relevant battery business models
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See above plus:

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 - Normalised gross margin stacks for investment cases



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BREAKOUT SESSION

THE ACCELERATING PACE OF ELECTRIC VEHICLE ROLLOUT AND ITS IMPACT ON THE POWER SYSTEM

Chair: Marlon Dey, Research Lead, Aurora

Panellists:

Hugo Spowers, Managing Director, Riversimple Movement

Juliet Davenport, Former Chair, Zap-Map

Nick Wooley, CEO & Co-Founder, ev.energy

Robert Llewellyn, Presenter, The Fully Charged Show

Brief summary:

This panel covered the technical and functional differences between battery and fuel cell electric vehicles. Both are crucial for decarbonisation but have their own shortcomings that may be overcome with time.

Delving into fuel cell EVs, panellists discussed the challenges to implementing the infrastructure required for the systematic production and dissemination of hydrogen in Great Britain.

The panellists also considered relevant innovations such as electric car share schemes and collective EV smart charging as a tool for shifting loads with demand-side response. They stressed the need for the right economic signals, delivered through multi-faceted policymaking and reform of the retail market.

- Electric vehicles can be a lot cheaper than petrol cars, particularly in the current commodities climate
- Battery technology will change significantly in the next ten years and infrastructure will have to play a different role
- Using EVs as Virtual Power Plants (VPPs) in demand-side management is beneficial on a locational basis, but economic signals need to be improved for this to be a significant player in the electricity mix

"The cars are brilliant, but I cannot help wondering where the hydrogen comes from." – Robert Llewellyn

Click [HERE](#) to read Robert Llewellyn's blog

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BREAKOUT SESSION

THE EMERGING GREEN GIANT ENERGY TRANSITION INVESTMENT IN THE US

Chair: **Oliver Kerr**, Country Lead USA, Aurora

Panellists:

Kellie Metcalf, Partner, EnCap

Laurence Fumagalli, Partner, Greencoat Capital

Brief summary:

In this panel, discussion focused on the role of the US in the energy transition, including its recent explosion in renewables investment, the scale of the market, and the risk and challenges investors currently face. The panellists discussed the differences between the US and European markets, investors' challenges facing nodal pricing, and the role of the government in the energy transition.

- Nodal pricing is more efficient because it values the energy at the place where it's generated; however, the difficulty of predicting revenues can create risks for investors
- Subsidies and market design differences between the US and EU countries make renewable investment cases very different, including revenues profiles and exposure to merchant risk across the life of the asset
- Cost of capital in the US is higher than in the EU due to a combination of fundamentals in financial markets (e.g. EU benchmarks are much lower than in the US), different subsidies and market designs, and the maturity of infrastructure investment markets in the EU
- The energy transition will proceed - despite the lack of federal effort - through state-ruled mandates. However, it will be difficult to implement measures such as carbon pricing at a federal level

"It is important for an EU player to do what it does well (deploy solar and wind assets) while respecting the idiosyncrasies of the US markets. That includes considering locational pricing, support through tax rebates, and inflation indexation in the renewable investment case"

- Laurence Fumagalli



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BREAKOUT SESSION

THE STATE OF GLOBAL RENEWABLES INVESTMENT: HOW ARE RISING ENERGY PRICES AND SUPPLY CHAIN DISRUPTION IMPACTING GLOBAL RENEWABLES DEPLOYMENT?

Chair: **John Feddersen**, Founder & CEO Aurora

Panellists:

Marek Kubik, MD, Fluence

David Swindin, CEO, Cubico

Luba Kotzeva, MD, European Energy & Renewables, Lazard

Sam Arie, Head of European Utilities Equity Research, UBS

Brief summary:

The panel discussed the impact that current supply chain disruptions and high energy prices are having on renewable deployment:

"Do your CAPEX costs really matter if power prices are at €200/MWh?" – John Feddersen.

The panellists highlighted the need to keep in mind the fundamentals when making long-term investment decisions, despite a potential short-term increase in profitability due to high prices.

In particular, the panel found that in the short term, current delays in receiving supplies do not imply a scarcity of goods or materials, however they cause uncertainty in the market which affects investment decisions. Diversifying the project supply chain with regional suppliers can help mitigate this issue as contract structures are tightening up globally, especially for European wind suppliers, as geopolitical concerns become more relevant.



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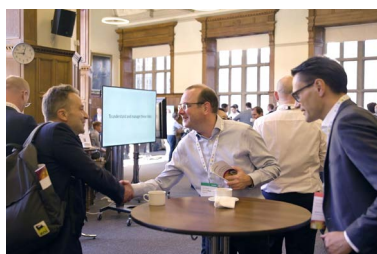
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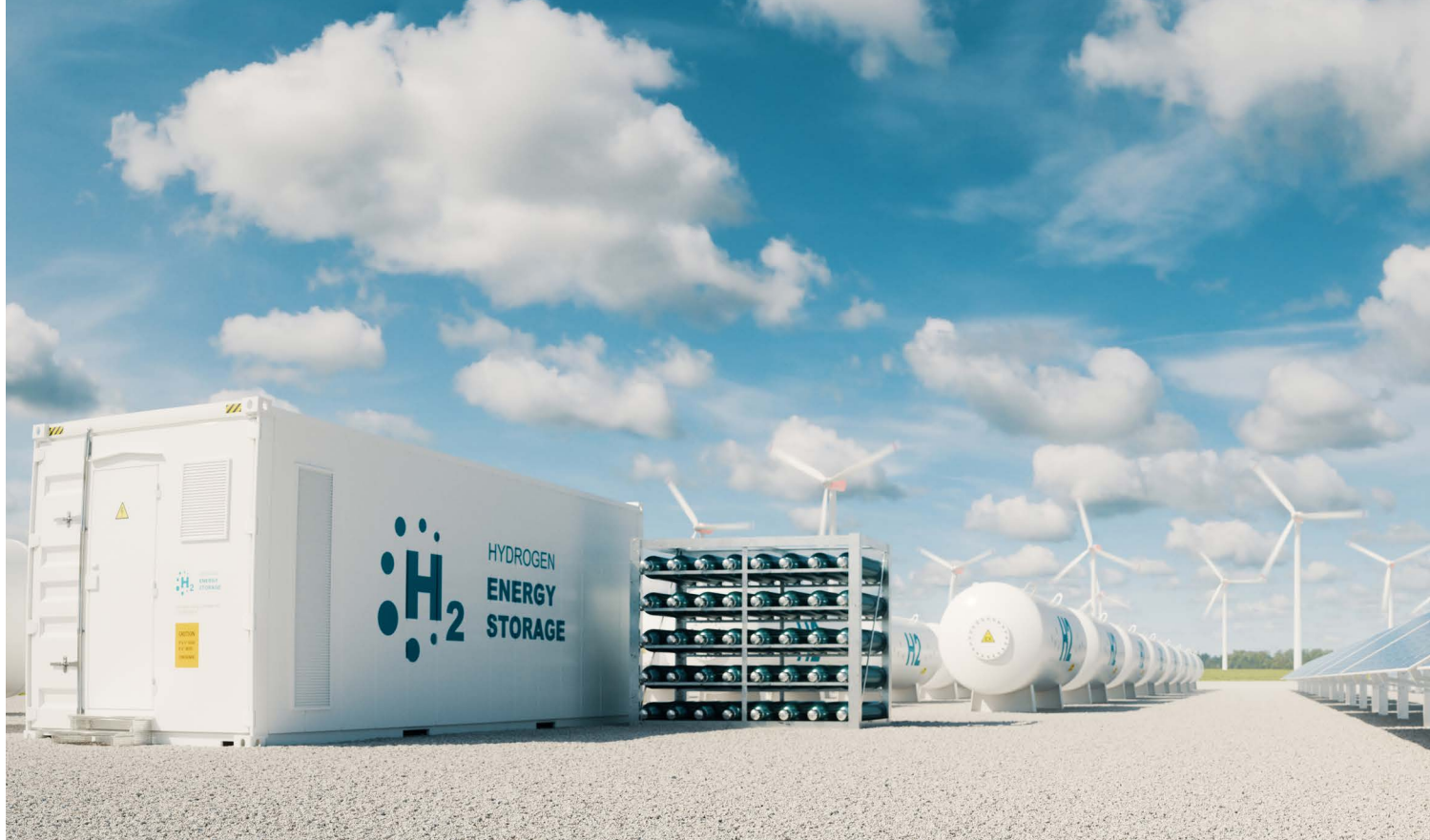
-  An overview of European renewables markets and the key underlying value drivers
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