



Renewables Summit

London 2023

Wednesday 14 June | IET London: Savoy Place



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European Solar Markets Attractiveness Report

May 2023



Capitalise on the best solar market business opportunities in Europe

Explore the most attractive markets for solar PV, and those to watch

24 MARKETS COVERED

TOP MARKETS RANKED

This report contains:

Analysis into the development of European capacity and generation, based on our fundamental modelling

Assessment of the local policy environments, subsidy schemes, and EU initiatives

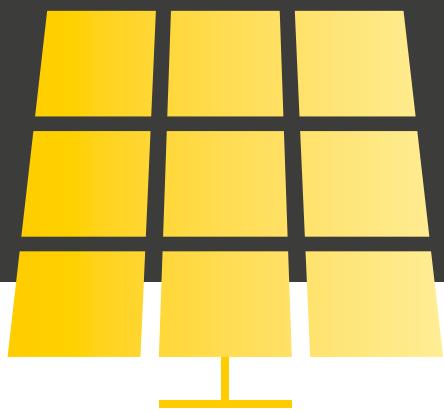
Comprehensive heatmaps showing baseload prices and solar PV capture prices, merchant and PPA-backed solar LCOEs, and attractiveness of co-location

Benchmark IRRs for fully merchant solar PV projects (2025, 2030), by country

Comparative assessment of policy, permitting, and grid connection risks based on local Aurora market knowledge



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Renewables Summit

London 2023

DEAR FRIENDS AND COLLEAGUES

It was my great pleasure to welcome you to London this year for the Aurora Renewables Summit 2023. I hope you enjoyed participating as much as we enjoyed the dynamism which you brought to the day.

Our context was a challenging one. The operating environment is becoming more difficult with higher cost of capital, tighter supply chains, and increased policy uncertainty. The policy challenge is similarly complex as regulators grapple not just with the need to support more rapid deployment but also to build a flexible and resilient new energy system which integrates renewables to provide the majority of power generation.

Despite this, the tone of the event was inspiringly optimistic and, I think, achieved our aim to showcase the innovation happening across the sector to drive forward the energy transition.

I hope this pack helps to distil the Aurora team's main takeaways from the day. It is obviously impossible to do justice to the experience of being there, the richness of the debate in the room and the value of the new connections made over drinks on the terrace, but we hope this is a useful synopsis.

Many people deserve thanks for the critical role they played in delivering the Aurora Renewables Summit London 2023.

All of our guest speakers were brilliant, insightful, and engaging. A big thank you to Ben Wilson, Keith Anderson, Adam Morrison, Sarah Redwood, Jonas Persson, Bill Rees, Hildagarde McCarville, Robert Todd, and Finlay McCutcheon.

Our generous partners deserve particular appreciation. It was a pleasure to work with our premium partners, Lloyds Bank and National Grid, and our supporting partners, Clarke Energy and ScottishPower. We would like to thank them for helping to make a success of the Summit and enabling us to make it an open event.

Finally, thank you to the team at Aurora, including the panel chairs and keynote speakers, but especially to Narcisa-Camelia Danila and Ethel Chiodelli, who delivered another seamlessly organised event, for their commitment, expertise, and good humour.

We look forward to welcoming you again at other Aurora events throughout the year to continue the discussion!

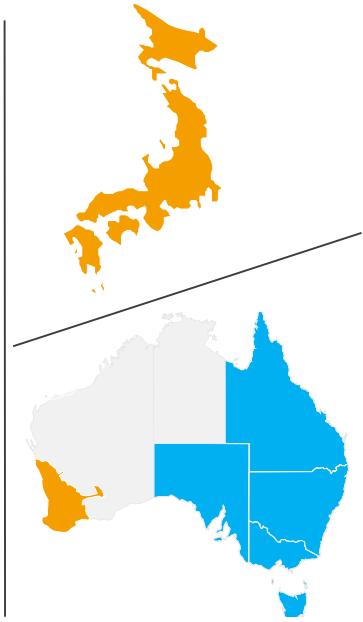
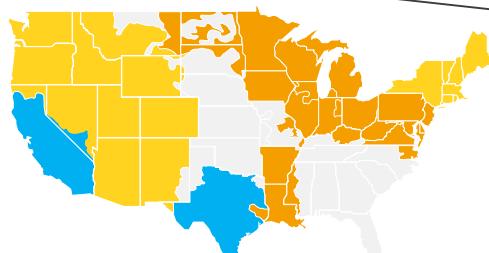
Dan Monzani, Managing Director, UK and Ireland, Aurora



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Aurora Renewables Summit

London 2023

SOCIAL MEDIA & FEEDBACK

Alan Beech • 3rd+
Sales Director - UK & Ireland at Clarke Energy
4d • 3

Great to be supporting another Net-zero event, with Aurora at the Renewables Summit at the IET London. Government bodies, Developers, Investors and Financial institutions working on solutions, with Clarke Energy as event partners to market our trusted track record of EPC project delivery and strength of balance sheet to mitigate project risk.

Edward Slack (He/Him) • 1st
Providing Aurora's clients industry leading forecasting and energy market insight...
4d • 1

Fascinating keynote speak by **Christian G. Miller** at the **Aurora Energy Research London Renewables Summit**. Offshore and onshore wind will lead to grid constraints in Scotland and East Anglia and give some interesting business models for batteries in the future

Clarke Energy
Energy 47,333 followers
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Clarke Energy UK is proud to have sponsored **Aurora Energy Research**, Renewables in London today. We look forward to sponsoring further 2023 events, championing renewables and lower carbon energy technologies.

We hope to meet you at **Aurora Energy Research** future events.

#netcarbonzero #hydrogenconomy #bess

Aurora Energy Research
25,921 followers
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Dan Monzani concludes today's event with some of his key takeaways mentioning the pure success story of the UK in the offshore wind sector, coming only 2nd to China with 14GW of offshore wind capacity, and highlighting the need for a more radical call to arms in the move towards NetZero.

A huge thank you to our partners for making this event possible and our fantastic lineup of speakers for their participation.

Lloyds Banking Group, National Grid, Clarke Energy, ScottishPower

#aurorareassummit #energyconference #renewables #renewableenergy



Alex Nearchou • 2nd
Project Manager, Energy Sales & Markets at ABO Wind
4d • 3

Attending the Aurora Renewables Summit afternoon in London today. Interesting talks about financing projects and hearing from National Grid on their plans for the future of grid connections in England and Wales.

Mei Mahon • 3rd+
Associate (Energy and Transport) at Dentons
5h • Edited • 3

Enjoyed attending **Aurora Energy Research's** Renewables Seminar this week in London listening to some excellent speakers on the future for grid, the challenges for offshore wind deployment in the current environment and the importance of location for onshore renewables. Great speaking to many project developers about the current opportunities in the space. Some of my additional thoughts following the conference on grid / storage:

- 1) There is a real push towards maximising the export limits of grid connections to achieve value. One thing that wasn't covered was that there are other innovative ways to do that when your connection is at capacity such as the possibility of sharing the connection of near located projects which we have increasingly been seeing.
- 2) The approach to connection priority is changing from first come first served to prioritising projects that deliver. Those who are meeting their development milestones should not be held up by others who are not. To fully effect this we are going to need a change in industry codes. We will update you on any developments in this area.
- 3) Optimisation services are becoming increasingly important as investors seek to maximise value from the revenue stack. This is not a new area but for those new to procuring these types of services, it is an additional component to the contractual structure for battery projects and it is important for developers to consider the interfaces and risk allocation between companies providing O&M services, optimisation services and any revenue floor being given.

#renewables #batterystorage #gridconnection

Ben Wilson • 3rd+
Chief Strategy & External Affairs Officer at National Grid
3d • 3

Great to have the opportunity to be interviewed by **Richard Howard** to open the Aurora Renewables Summit in London this week.

The U.K. is second only to China in installed #OffshoreWind capacity, so we have a lot to be proud of. But to deliver a #NetZero power system by 2053, we need a fundamental upgrade of the electricity grid. This means reforming the planning system, ensuring regulation is set up for delivery, transforming how clean energy connects, developing #SupplyChain capacity and a skills pipeline, and putting communities at the heart of the transition.

We also need to work closely with our closest European neighbours to maximise the clean energy potential of the North Sea through the development of offshore hybrid assets, which will maximise the benefits of offshore wind and interconnection for British and European consumers.

Karina Valieva • 2nd
Market Research Analyst | Renewable Energy Market Intelligence
4d • 3

Great to be a part of the Aurora Renewable Energy Summit at the IET London yesterday ☀️ Really enjoyed interacting with the panel and discussing industry trends 📈 and challenges at hand. Thank you, **Aurora Energy Research** for organising!

#renewableenergy #energytransition #windenergy #solarenergy

Carlos Mejuto Arco • 2nd
Power Portfolio & Market at Equinor
3d • Edited • 3

Very cool Renewables Summit by **Aurora Energy Research** in baking hot London.

Insightful sessions with great speakers, touching on matters at the forefront of GB's path to a 2053 net-zero power system. All set in the **Institution of Engineering and Technology (IET)**'s beautiful HQ at Savoy Place, overlooked by Mr. Faraday himself.

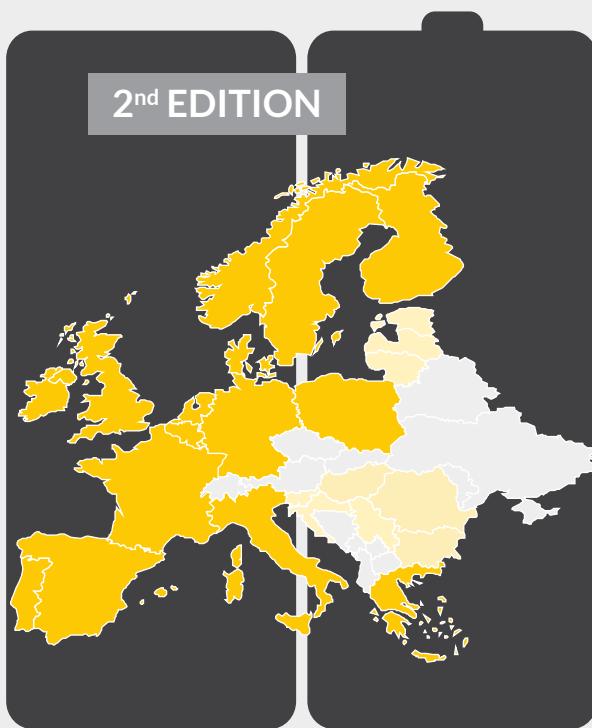
A heavily congested GB grid, particularly across B6 and B8 boundaries, the needed growth of hybrid-PPAs and varying value of co-location, were top on the agenda.

#aurorareassummit #futureofenergy #grid #transmission #routetomarket #PPA #colocation

Jordan Field • 3rd+
Investment Director at Equinor
4d • 3

Pleasure to attend the **Aurora Energy Research** renewables summit today to hear about accelerating the UK energy transition and the future of offshore wind, with a particular focus on declining subsidy support, as well as financing and supply chain cost pressures #energytransition #renewables #offshorewind

Discover your next business move in Europe with the European Battery Markets Attractiveness Report



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- Forecast volumes for battery deployment by year and country

Policy and Regulatory Environment analysis

- European and national battery strategies, targets and plans
- Analysis of anticipated regulatory changes impacting battery markets
- Assessment of policy risks including aggregation of demand side assets, and grid connection

Battery Storage Business Models and Value Drivers

- Summary of attainable markets and revenue stacking opportunities
- Comparison of value drivers across markets including RES penetration and daily wholesale market spreads, balancing services and capacity market auctions
- Assessment of saturation risk for each country

Battery Economics and Business Cases. See above plus:

- Revenue stacking opportunities and gross margins (1, 2 and 4 hours)
- Investment cases (estimated IRRs) for hybrid business models (optimised between energy arbitrage and ancillary services)

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PROGRAMME HIGHLIGHTS

INTERVIEW AND Q&A: ACCELERATING THE ENERGY TRANSITION

Speakers:

Ben Wilson, Interim President, National Grid Ventures

Richard Howard, Research Director, Aurora

Summary:

The UK has taken important steps forward on power-sector decarbonisation, including the construction of 14 GW of offshore wind capacity (second only to China), and 7.8 GW of interconnectors ferrying clean power between the UK and its partners. However, “we have an enormous amount left to build” if we are to meet the 2050 Net-Zero target, and there are three major barriers in the way:

1. Planning and permitting processes for the construction of new assets and grid connection is sluggish and too complex.
2. The current regulatory environment does not support enough anticipatory investment, which may hamper further buildout.
3. There is significant supply chain uncertainty; industry participants must be supported in creating order-book certainty for their supply chains.

The following are among some of the major takeaways from the panel:

- With at least 200 GW of capacity in the queue to receive transmission connections in England and Wales, the connection process must be refined beyond the current first-come-first-served principle. To discriminate more effectively between projects, the pipeline should be managed on a ‘connect and move’ basis, by which projects developing more quickly can move up in the queue.
- The scale of offshore wind deployment means it is no longer feasible to connect individual offshore wind farms to onshore grid infrastructure separately. Hence, grid infrastructure is moving offshore, and non-standard interconnectors will need to “pick up offshore wind power along the way”.
- Despite the US now being “the centre of gravity for hydrogen”, the UK should not attempt to imitate the hydrogen support measures in the US Inflation Reduction Act. Instead, it should double down on its model of strong regulatory backing for clean energy technologies, for example by “ensuring that CfDs remain the gold standard subsidy mechanism”.

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AURORA KEYNOTE

WHAT'S NEXT FOR OFFSHORE WIND?

Speaker:

Ashutosh Padelkar, Associate, GB Power & Renewables, Aurora

Summary:

"CfDs are no longer a one-stop-shop for financing renewables. You need to innovate, negotiate PPAs, and consider co-location. The market no longer rewards the risk averse."

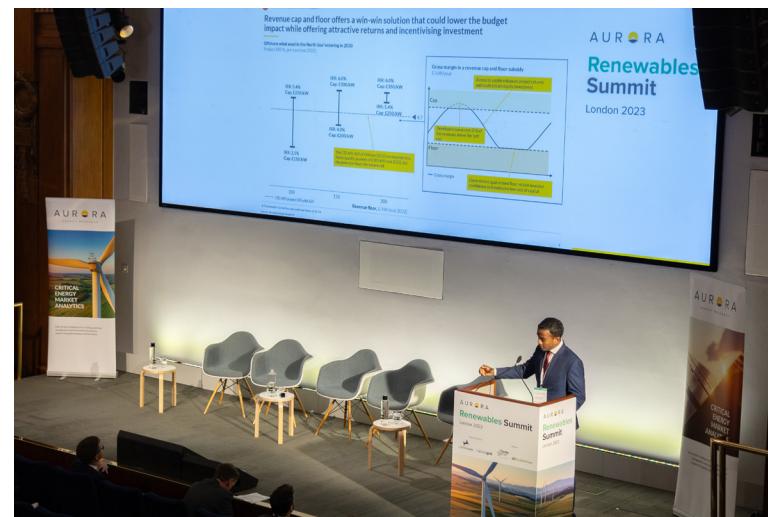
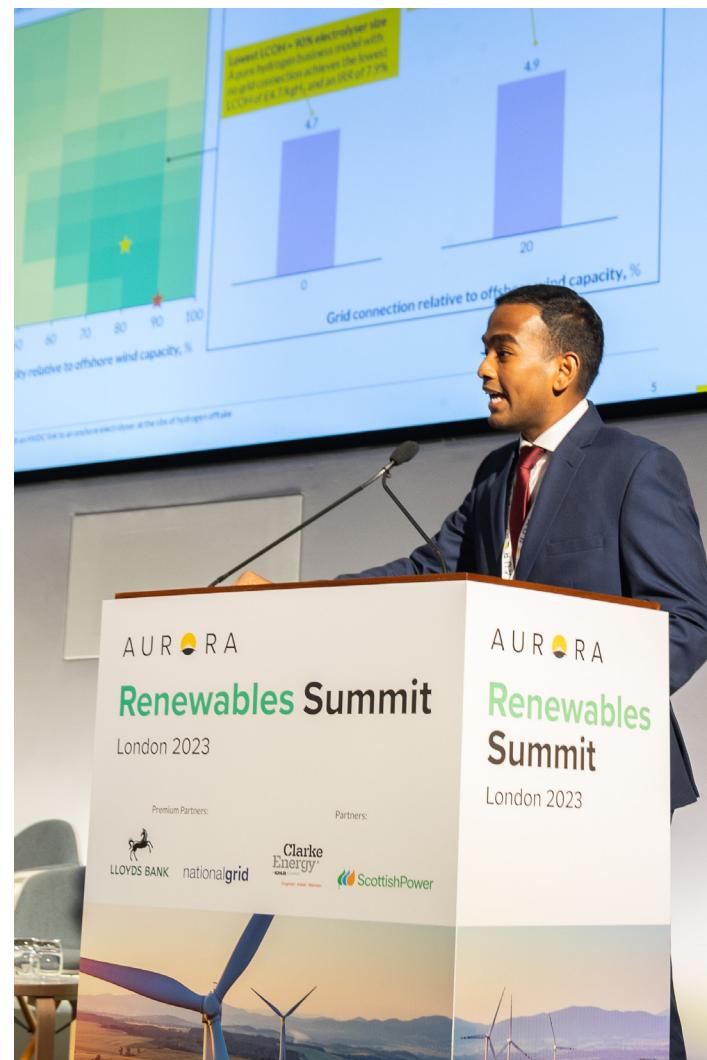
GB faces a trifecta of challenges in reaching its offshore wind ambition (i.e., 50 GW by 2030). The key factors behind these challenges are uncertainty around capital costs, increased financing costs, policy uncertainty due to REMA, offshore wind losing ringfenced support in CfD AR5, and the long-term trend of falling strike prices since FIDER in 2014.

In the face of these factors, three pathways in delivering the ambition of 50 GW offshore wind were discussed, ranging from incremental to transformational: combining CfDs with PPAs and more generally hybrid financing approaches; co-locating with hydrogen; and subsidy reforms, such as revenue cap and floors.

The analysis on these measures to unlock investment in offshore wind concluded the following:

- A representative CfD-only wind plant winning a CfD contract at the AR5 administrative strike price can expect an unlevered IRR of 4.7%. A hybrid strategy, combining CfDs with PPAs, can expect a 1.5pp upside in IRR.
- The business case for co-located electrolyser models that optimise for either lowest levelised cost of hydrogen or highest IRR still requires Government support, but such business models could play an important role in reducing the need for investment in transmission networks.
- A revenue cap and floor scheme could help reduce the budget impact of low-carbon subsidies for the Government while increasing the returns for developers. This would be achieved by transferring the volume risk from the individual generators to the Government; the financing costs for developers could be reduced since the volume risk is priced in.

[Click HERE](#) to view the presentation



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PANEL DISCUSSION

THE FUTURE OF OFFSHORE WIND FINANCING: EXPLORING THE ROLE OF PPAS AND FUTURE POLICY MODELS

Chair: **Rebecca McManus**, Renewables Lead, European Power Markets, Aurora

Speakers:

- **Adam Morrison**, UK Country Manager, Ocean Winds
- **Jonas Persson**, Managing Director, Sustainability & ESG Finance, Lloyds Bank
- **Keith Anderson**, CEO, ScottishPower
- **Sarah Redwood**, Director of Renewables Electricity, DESNZ

Summary:

Support mechanisms accelerating offshore wind financing, including the Contracts for Difference (CfD) scheme and the since-retired Renewable Obligation (RO) scheme, have played vital roles in positioning Great Britain as a world-leader in Offshore Wind development. In December 2022, the UK government signed an agreement raising its offshore wind capacity target to 50 GW by 2030, despite offshore wind strike prices under the CfD scheme showing a drastic decline. In this session, the panelists discussed the future requirements for continued financial support for offshore wind developments.

Key messages include the following:

- Grid connections and supply chain issues continue to affect offshore wind development. Keith Anderson noted the importance of increased access to supply chains and grid connections, stating, “one of the best ways to manage that...is by getting more of our supply chain to invest in this country”. Anderson additionally voiced his position with respect to the United States’ Inflation Reduction Act (IRA), stating that we should “not try to match IRA” and rather focus on certainty and speed of decision-making. Sarah Redwood echoed this, saying, “we don’t want to enter into a subsidy race, but rather focus on creating a stable regulatory environment”, of which planning, grid, and supply chains are the key topics.
- Jonas Persson noted the effectiveness of the CfD scheme diminishes in today’s volatile market, caused by geopolitical unrest and rising interest rates and inflation. For this reason, Adam Morrison explained that the Moray West Offshore Wind Project considered a different approach, combining a CfD with a Corporate Power Purchase Agreement (CPPA). Morrison cautioned against increased financial model complexity and argued in favour of a reformed CfD scheme.
- Upskilling people and combining complimentary technologies were also mentioned as important aspects of ensuring viable generation in the future.

The panelists unanimously called for “evolutionary, not revolutionary” policy reform to sustain offshore wind development.



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AURORA KEYNOTE

THE NEXT FRONTIER IN GREEN ENERGY: FINDING THE PERFECT SITE FOR ONSHORE RENEWABLES

Speaker:

Christian Miller, Senior Associate, UK & Ireland Advisory, Aurora

Summary:

"If grid development stagnates in a Net-Zero UK, the locationality of renewable assets will become increasingly important".

A common narrative surrounding the optimal placement of renewable assets is that load factor profiles have been driving the value of projects. In his keynote address, Christian Miller takes a more nuanced view, looking at the role of co-location in unlocking additional revenue streams from batteries and the locational value of system actions under both a Net-Zero and constrained-grid Scenario for standalone and co-located assets in the Balancing Mechanism (BM).

By exploring key congested transmission boundaries, Christian highlighted the following findings:

- Standalone assets in higher load factor areas, such as North Scotland for onshore wind and Southern England for solar, see greater locational value compared to the national average as expected. However, co-locating with a battery reduces developer risk for assets in lower load factor areas by diversifying revenue streams, leading to an overall national increase in IRRs for co-located projects vs standalone projects.
- Moving to a Net-Zero Scenario sees increased prevalence of congestion on the B6, although a more granular view sees the B4 similarly congested. Onshore wind projects in North Scotland benefit from curtailment revenue when these boundaries cannot facilitate their power flows, increasing locational value for the asset in the BM system but leading to increased costs to consumers to pay for these actions.

If ambitious grid development targets are not met, this effect is amplified. Standalone solar assets in Southern England see fewer opportunities to trade in the BM system, though co-location can levelise this risk by optimising dispatch in the same market.

Click [HERE](#) to view the presentation



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PANEL DISCUSSION

DRIVING PROJECT VALUE THROUGH LOCATION AND CO-LOCATION WITH ENERGY STORAGE

Chair: Emma Woodward, Project Leader, Aurora

Speakers:

- Bill Rees, Director, Centrica Energy Assets
- Finlay McCutcheon, Director Onshore Renewables, Europe, SSE Renewables
- Hildagarde McCarville, CEO, Anesco
- Robert Todd, Managing Director, CIBC Capital Markets

Summary:

In today's climate, renewable returns are becoming increasingly uncertain with high costs, supply chain issues, grid connection queues, and market and policy uncertainty. In this panel discussion, the speakers considered the challenges faced by investors and developers, respectively, as well as the role of location and co-location to unlock project value and maximise returns.

Key messages include the following:

- Robert Todd noted that rapid technological innovation with high optimisation potential makes it increasingly more difficult for investors to determine what an acceptable level of return is on a project. Todd called for refreshments to investment criteria as we now look towards a more granular level of detail. Moreover, as investors look towards more novel financial approaches, as well as co-located projects, it becomes difficult to draw a perimeter around an investment. Bill Rees added that "trying to find where the narrative is has been one of the biggest challenges".
- In recent years, developers have led the way by acquiring niche expertise in how best to manage technological, locational, and developmental aspects of a project to reduce risk. Hildagarde McCarville mentioned the importance of asset optimisation and the integration of digital platforms to enhance the use of our energy infrastructure.
- On co-location, Finlay McCutcheon argued the benefits of maximising the utility of a project's grid connection, at both project and portfolio level. Moreover, McCutcheon observed that investors now look towards standalone flexible assets as a means to reduce portfolio risk, in addition to their preexisting wind and solar assets. Todd echoed this, saying there is a lot of leverage in the storage space.
- Other alternative methods were proposed to drive project value, and one included extending and/or repowering projects to make use of both the pre-existing grid connection as well as the high level of public acceptance nurtured in that area.

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Lloyds Bank fully supports the UK Government's Clean Growth Strategy and our position in the UK economy enables us to be a driving force in the successful transition to a more sustainable, low carbon economy. In 2018 Lloyds Bank signed up to the RE100, a group of over 100 influential companies that have committed to 100% renewable energy in their own operations. We have already trained over 400 colleagues to an advanced level through our partnership with the University of Cambridge Institute for Sustainability Leadership. In 2018 Lloyds Bank was the only UK bank to earn a place on the CDP Climate Change A List, highlighting the importance of our role in tackling climate change. As an institution we seek to benefit from our clients who we are fortunate to learn from and, just as we can support them, they can also support us in our journey to be fully sustainable.

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New office coming soon!

Continuing on our path to global power market coverage, Aurora is expanding into Asia, with an office coming soon in Tokyo.

The Japanese energy market is set for an opportunity filled 2023:

- Subsidy schemes are being overhauled, with feed-in premiums replacing feed-in tariffs
- The introduction of a 20-year support mechanism for low-carbon assets
- Offshore wind auctions are due in mid-2023
- Interest in storage, hydrogen and ammonia is growing due, in part to the country's long, thin grid

Similar to our European, US and Australian services, the upcoming Japanese Power and Renewables Service will comprise of both quantitative and qualitative analysis of one of Asia's largest markets, spanning the nine major Japanese price regions.

Working with a suite of subscribers, we are building our first Power Market Forecast, due for release in May 2023.



Find out more, contact

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Head of Commercial – APAC
william.lewis@auroraer.com

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Hydrogen Conference

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Wednesday 27 September

The Aurora Hydrogen Conference brings together leaders from the hydrogen sector to look at the future, and exchange views on the challenges and opportunities for the sector.



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Battery Conference

London 2023

Wednesday 8 November

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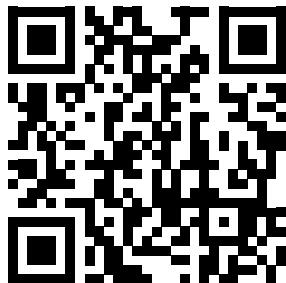
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