ALL-ENERGY®
EXHIBITION AND CONFERENCE 2022
Co-located with carbonise

21 YEARS OF ALL-ENERGY

11-12 MAY 2022 SEC, GLASGOW

SHOW CATALOGUE

Built by
RX
In the business of building businesses

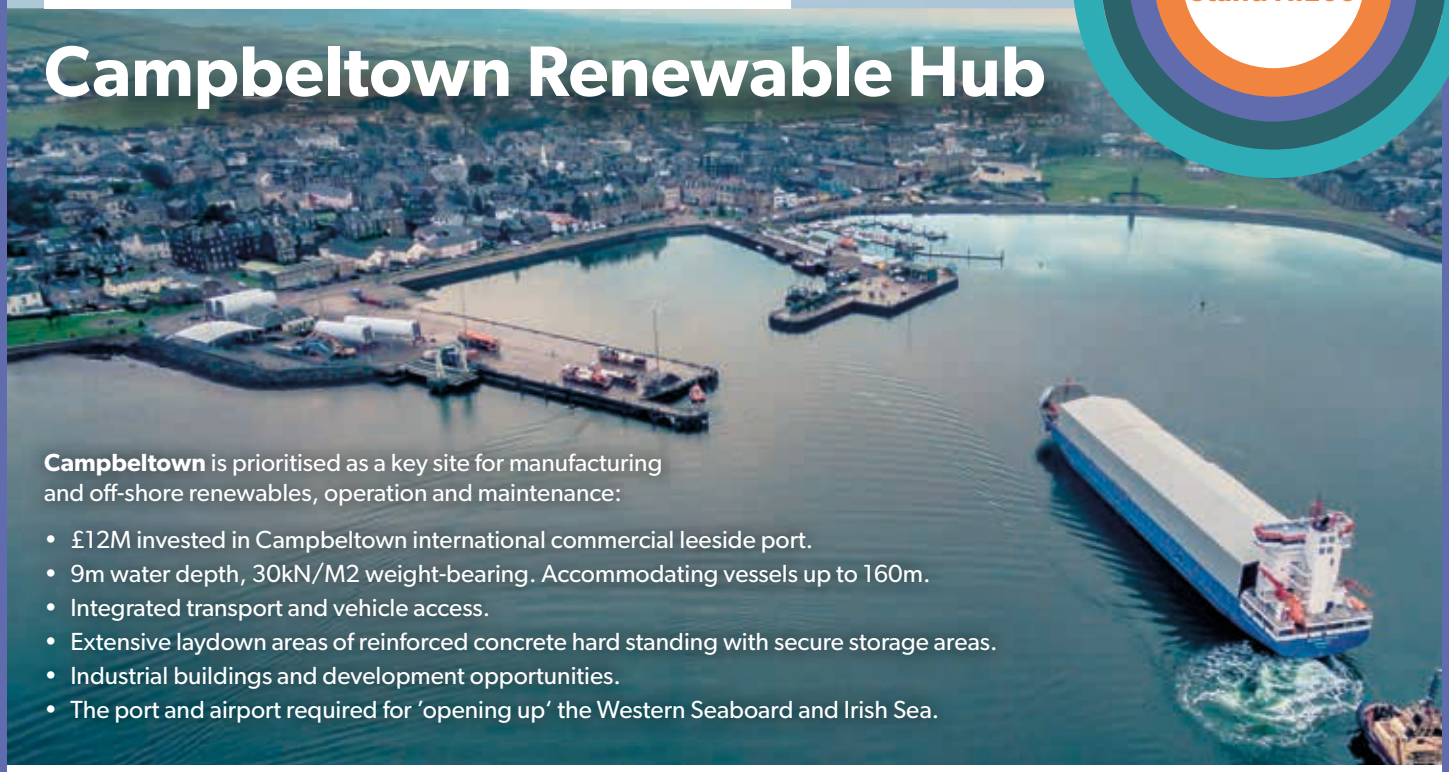
ABRA

ABRA (Argyll and Bute Renewable Alliance) is a strategic public/private sector alliance led by **Argyll and Bute Council** and **Highlands and Islands Enterprise** with a vision for working together and aligning partner resources to power Scotland's future, helping to deliver net zero and local economic growth.

The Argyll and the Islands region is home to over 1GW of consented and operational renewable energy developments with substantial ongoing activity and future opportunities.

Visit us on Stand HIE60

Campbeltown Renewable Hub



Campbeltown is prioritised as a key site for manufacturing and off-shore renewables, operation and maintenance:

- £12M invested in Campbeltown international commercial leeside port.
- 9m water depth, 30kN/M2 weight-bearing. Accommodating vessels up to 160m.
- Integrated transport and vehicle access.
- Extensive laydown areas of reinforced concrete hard standing with secure storage areas.
- Industrial buildings and development opportunities.
- The port and airport required for 'opening up' the Western Seaboard and Irish Sea.

Argyll and Bute Council
www.investinargyllandbute.co.uk
Tel: +44 (0)1546 604180
Email: renewable.energy@argyll-bute.gov.uk

Highland and Islands Enterprise
www.hie.co.uk
Tel: +44 (0)1546 605408
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Organisers of All-Energy and Dcarbonise

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Welcome to All-Energy and Dcarbonise

Welcome to the 21st anniversary edition of All-Energy, the meeting place for the renewable and low carbon energy community, and the first major UK energy event to run post COP26 in the same venue. Not only are we thrilled to be back delivering this legacy event face-to-face after the challenges of the past couple of years, but to do so knowing that this year's event is bigger and better than ever before, and with a supporting backdrop of green recovery, transition & growth, well, it's truly exciting for everyone!

We are delighted you are here with us, putting yourself at the centre of your community, where you will this week rub shoulders with thousands of colleagues and hundreds of exhibitors, many from overseas, and here to meet and do business with you, including at least 75 new ones exhibiting for the first time this year.

Your attendance here at All-Energy & Dcarbonise 2022 will provide you with the insight and connections to stay ahead in this rapidly developing landscape, ensuring you have the best chance of success as we deliver the UK's green ambitions together. It will also provide you with an invaluable opportunity to find the latest technologies, services and advice, connecting you with the most comprehensive source of industry expertise and business opportunities seen anywhere in the UK. As such, I would urge you to get involved in every aspect of the event to gain maximum benefit from it.

Here are just some of the highlights which will help you achieve a considerable amount over the next couple of days:

Dcarbonise – more opportunity to drive the sustainability agenda and your own green future

The trend for providing new knowledge, connections and opportunity continues this year with the return of Dcarbonise alongside All-Energy. Where All-Energy has spent two decades helping the UK to decarbonise its power supply, Dcarbonise has been introduced to ensure that private and public sector energy end-users gain the same access to advice and technology to assist them in their plans to decarbonise their buildings, businesses and transportation.

Aligned to the Scottish Government's "Business Energy Scotland" programme, and kindly supported by the Scottish Government & Energy Saving Trust, Dcarbonise brings you the latest solutions and know-how to improve the **energy efficiency** of your buildings, including the important role of **low carbon heating technologies**.

You'll also be able to see some of the latest and cleanest vehicles on our roads (and in water in one case!) by visiting the Decarbonising Transport zone and dedicated seminar theatre, sponsored by Shell, and the Hydrogen Hub & Tech Showcase, sponsored by Doosan Babcock. Both are at the far end of Hall 4.

World-class conference

The combined All-Energy and Dcarbonise conference programmes provide a myriad of star conference speakers looking at the challenges, the opportunities and, importantly, the innovative solutions across renewable power, low carbon heat, energy efficiency & low carbon and smart transport.

The programme contains over **65 sessions** for you to attend, delivered by over **450 speakers** – a veritable "who's who" of the industry – in what is undoubtedly one of the industry's biggest free of charge conferences seen anywhere in the world, something we are hugely proud to deliver to you. Check out the full conference programme on pages 18-29 to see the amazing breadth of free knowledge on offer to you.

We are also delighted to welcome back **Nicola Sturgeon MSP, First Minister of Scotland**, who will provide a keynote address in the opening plenary on 11 May, followed by two Scottish Government Ministers addressing Dcarbonise audiences with **Patrick Harvie MSP, Scotland's Minister for Zero Carbon Buildings, Active Travel and Tenants' Rights** getting the Built Environment stream off to a flying start, whilst **Jenny Gilruth MSP, Scotland's Transport Minister,** will do the same in the Transport Decarbonisation stream. On Day 2 Michael Matheson, Scotland's Cabinet Secretary for Net Zero, Energy and Transport will deliver a keynote address on Day 2 in the NZTC-inspired session.

Trusted show features and new content to help you

The "**Meet the Developer**" meetings programme is back once again to help suppliers of renewable energy solutions meet organisations who are actively looking to expand their supply chains; the **Power Club** continues to welcome and host project developers and investors; and no less than **eight**

show floor theatres will again provide you with bite-size chunks of free learning whilst you do business on the busy exhibition floor. Add to that the zones for hydrogen (Hall 4), low carbon transport (also Hall 4), and those for heat and energy efficiency technologies as part of Dcarbonise (Hall 5), and you've got plenty to engage with.

Other new content which may also be of interest includes:

- **NEW – Innovation Zone**. Innovation lies at the heart of All-Energy and runs throughout the event like a golden thread. This year sees a new zone dedicated to it, with key themes of investment, future talent, academic innovation and research, and business-led innovation from development through to commercialisation. Check out the zone, its seminar theatre, and its exhibitors including:
- Innovate UK and their showcase of British low carbon entrepreneurs and solutions (and their conference session on Wednesday morning inviting ambitious organisations interested in applying to future rounds of Energy Catalyst funding to join them to learn more and find potential partners);
- The Canada stand hosting innovative Canadian companies with capabilities crucial to the energy transition;
- Greenbackers, a climate tech venture firm focussed solely on accelerating capital flows into the climate start-up/scale-up space (and don't forget their finance and funding session from 2pm on Wednesday, followed by a super pitch for early stage climate technology ventures);
- and the Offshore Renewable Energy Catapult Network, the UK's leading innovation centre for offshore renewables.
- Future Talent is hugely important to all of us as we strive towards meeting our Net Zero ambitions. As such, this year boasts more youthful focus than ever before across the event including:
- **The Research Zone** on the exhibition show floor with academic posters and presentations from low carbon academic programmes.
- **NEW** – the **Future Talent Hub**, kindly sponsored by bp, boasting a programme of free-to-attend sessions focussed around attracting new and re-skilled resource & talent to power an accelerated net zero future;
- Further relevant sessions in the conference include "Offshore Wind: Supply chain and skills - Opportunities and Challenges" & "Skills and Training: Recruiting and training the thousands of people needed", both on Wednesday afternoon;
- **NEW - Green Skills for a Net Zero Future demo area**. The Energy Skills Partnership, in conjunction with a number of their college members, are showcasing the proactive approach colleges across Scotland are taking to support the Climate Emergency and the Just Transition to Net Zero. Visit their demo area at the back of Dcarbonise to discuss your skills requirements, available support and see live demonstrations of the training activities colleges are offering.

Exceptional networking

From a networking perspective, All-Energy has long held a reputation for memorable networking events, and this year is no exception with the much-lauded **Civic Reception**, courtesy of Rt Hon The Lord Provost of Glasgow, and **Giant Networking Evening**, kindly sponsored by Siemens Energy, taking place once again in the engaging Glasgow Science Centre across the river from the show venue. The event is a truly exceptional opportunity to relax after a busy day, catch up with friends old and new and interact with the Centre's exceptional "Powering the Future" exhibition. Listen out for the piper on the exhibition floor from 5.45pm on Wednesday 11th to herald the impending start of the event which begins in earnest at 6pm (until 8.00pm) and is free for all to attend.

On behalf of the entire All-Energy & Dcarbonise team, I would like to extend our immense thanks to all of our industry supporters and luminaries, committee members and conference chairs, speakers, sponsors, exhibitors, visitors and press & media partners that work with us to deliver the events each year. Their efforts, and the relationship we enjoy with them, are fundamental to their success.

We are honoured to have been helping the UK low carbon & renewable energy value chain to engineer a net zero future for these past decades, and look forward to continuing that key role as we all strive to meet strong decarbonisation targets in the years ahead. In the meantime though, thank you for attending the focal point of the industry's calendar this year and I wish you a very successful week of business and networking at All-Energy & Dcarbonise 2022

Jonathan Heastie
Portfolio Director, Energy & Marine
RX Global – in the business of building businesses

General information

Opening times
Wednesday 11 May - 08:30-18:00
Thursday 12 May - 08:30-16:00

All-Energy and Dcarbonise 2023
If you are interested in reserving exhibition space for next year's event being held at the SEC on 11 and 12 May, please visit our stand R30.

Animals and pets
Pets or animals are not allowed into the SEC or All-Energy and Dcarbonise conference and exhibition with the exception of registered guide dogs.

Cafés and restaurants
There are café areas inside the exhibition halls and on the concourse. For restaurants in the Glasgow area, please visit peoplemakeglasgow.com

Car parking
There are ample parking facilities at the SEC multi storey car park for cars. For coach parties requiring parking, please contact the SEC reception direct.

Cash machines
There are ATM facilities in the SEC concourse.

Cloakroom and luggage storage
There is storage provided for visitors and exhibitors in the SEC concourse.

Disabled facilities
The SEC main building has automatic doors at both East and West entrances. The Conference Centre has widened main entry doors, which a steward will be pleased to open for you. All halls in the main building are situated at ground level, and the upper levels of the Conference Centre, Loch Suite and Seminar Suite are all accessible by lift. For more information about wheelchair access, travel, carparking and toilet facilities visit sec.co.uk.

Internet access
The SEC offers free internet access each day for attendees.

Lost property
If you need to locate any lost property, contact SEC Security at the East Entrance reception.

Medical centre
This is located at the East Entrance in the SEC concourse.

Meeting point
This is situated at All-Energy and Dcarbonise main registration area at the front of Hall 5.

Networking tools: Make the most of your visit with the All-energy and Dcarbonise event App
Download the All-Energy and Dcarbonise App and enjoy seamless experience with your smartphone, ensuring you get the quicker live navigation routes to exhibitor stands, conference rooms or any other show floor features. Keep your eyes on the event agenda, save time and search the exhibitor and visitor directory, favourite exhibitors, conference sessions & speakers to create your personalised show plan and send exhibitors and industry colleagues messages and meeting requests.

Organisers' office
Situated at back of Hall 4 within the exhibition.

Press & speakers' room
Situated in Boisdale 2 in the Loch Suite across the concourse from the exhibition hall.

Problems
If you experience any problems with any of the services during your visit please let the All-Energy and Dcarbonise Team know at the Organisers' Office at the back of Hall 4.

Public address system
The public address system is for official announcements only. It is not available to visitors or exhibitors.

Smoking policy
SEC Glasgow operates a no smoking policy throughout the venue. Smoking is permitted outside the venue.

Admission policy

- Only pre-registered visitors who are badge holders, visitors who register onsite, and exhibitors who are badge holders will be able to attend the Event.
- Admission is open to professional and business visitors and exhibitors who are involved in or have a direct connection or interest in the subject area of the Event or associated industries or organisations. Visitors and exhibitors should be dressed in suitable business wear.
- Badge holders must not allow their badges to be worn by anyone else. Any failure is likely to lead to the badge holder and the person wearing the badge being removed from All-Energy and Dcarbonise
- Anyone obtaining an All-Energy and Dcarbonise visitor or exhibitor badge by theft, deception or other illegal means may be asked to leave All-Energy and Dcarbonise
- Anyone attending All-Energy and Dcarbonise should carry some form of photo-ID (passport, photo-ID driving licence, national identity card) or other identification acceptable to the Organisers which the Organisers may ask to see.
- No one under the age of 16 will be able to attend All-Energy and Dcarbonise unless they have obtained the prior written consent of the Organisers.
- Anyone attending All-Energy and Dcarbonise must not take part in any canvassing, leafleting, demonstrations, objectionable behaviour or wear offensive apparel or be involved in any activity which may disrupt All-Energy and Dcarbonise.
- The Organisers reserve the right to exclude or remove anyone from All-Energy and Dcarbonise and the Exhibition Centre who do not comply with this policy or who they reasonably consider are likely to break these rules or who are prohibited from attending under any applicable sanctions, laws or regulations.
- Press badges at All-Energy and Dcarbonise are restricted to publishers, editors, journalists, photographers, broadcasters and web bloggers associated with the industry. Members of the press may be required to complete an application form and produce accreditation in the form of a photocopy of a recognised press or media card, business card, a letter from the editor or an official web address linking to a press release in order to verify their position. Press applications from advertising personnel and media sales representatives will not be accepted.
- Official All-Energy and Dcarbonise photographers and videographers will be taking photographs and filming videos at All-Energy and Dcarbonise. Anyone attending All-Energy and Dcarbonise consents to such photography and filming without compensation and confirms that the Organisers shall be entitled to use such photographs and videos, which may include photographs and videos of visitors, for the purpose of marketing All-Energy and Dcarbonise in future, for exploitation in any and all media, without liability.
- By registering to attend All-Energy and Dcarbonise you will automatically have an account created for you on our website allowing you to use our planning tools and message exhibitors before the event. Your contact details will only be shared with the exhibitors you contact or favourite and you can amend these settings at any time via the website.

12. CANCELLATION BY PARTICIPANT

- The Participant shall not assign or otherwise transfer their rights and obligations hereunder without the organisers' prior written consent
- In the event that the Participant wishes to cancel the booking the fee will remain payable in full to the organisation.

Keeping you safe

Your safety and your business are our priorities. At All-Energy and Dcarbonise, both are in safe hands.

At All-Energy and Dcarbonise, we are all about connecting people, and so the health and safety of our visitors, exhibitors and staff is of the utmost priority. Our team are working closely with local authorities, partners and venues to implement robust safety measures, which mean our event may look a little different this year. Inside our event we are making meeting and doing business as safe as possible for everyone.

Mask Wearing

We strongly recommend everyone onsite wears face masks, except those who are exempt.

Hygiene

Hand sanitizers will be readily available throughout the venue. Please continue to follow guidance and wash your hands frequently.

Be Kind

Please be mindful of individuals personal space, everyone will have their own unique levels of comfort as we return to events. Please give people space when you are walking past them and check before initiating personal contact (consider elbow bumps rather than handshakes or hugs).

Ventilation

Ventilation will be increased, improving fresh air circulation in line with the latest guidance.

Cleaning

We will maintain the highest standards of cleaning before, during and after the event, including frequent cleaning of all high touch points.

Food and beverage

All catering facilities will be open but in line with the latest government guidance. Cashless payments are encouraged.

Show Features

THE RESEARCH & INNOVATION HUB

Focusing on academic/industrial research projects

The Research & Innovation Hub focuses on energy-related projects that have high levels of academic/industrial collaboration – each has its own pod and presents its research project in the Hub's theatre with its rolling programme over the two days. Academic posters have been a regular feature of All-Energy since 2005; this year there will be up to 40 posters on display in the nearby Academic Zone.

INNOVATION ZONE AND THE INNOVATION THEATRE

Innovation - a silver thread running throughout the show

All-Energy has long had a close association with UKRI, Innovate UK and KTN. The Innovate UK stand will showcase exciting innovations and offer a hub to network and collaborate with industry experts. "Together, we can provide the connections to create, develop and produce smart solutions for sustainable economic growth." Alongside this The Innovation Theatre will open on the show floor on 12 May. See the theatre programme for info on planned sessions.

OFFSHORE WIND THEATRE

A full schedule of presentations on Day 1

The Offshore Wind Show Floor Theatre (11 May, 10:30-17:00, sponsored by Shepherd and Wedderburn) lies at the very heart of the exhibition and will be, as always, a key element of the event. Its programme complements five packed offshore wind conference sessions in the main conference on licensing rounds, supply chain, offshore transmission and floating wind, looking primarily at innovative solutions of all kinds.

COMMUNITY AND LOCAL ENERGY THEATRE

Turning community and local energy projects into a reality

Highlands and Islands Enterprise (HIE) and Local Energy Scotland welcome you to this year's Community and Local Energy Theatre on 11 May. Pop along to the theatre on the exhibition show floor for an exciting full-day programme with over 20 speakers. Key themes include finance & funding, islands, local energy systems, hydrogen and support for community & local energy projects. Networking will continue at the HIE drinks reception. There are two conference sessions developed by the same team on Thursday, one on heat and the other on islands.

'MEET THE DEVELOPER' SHARE FAIR

Developers are looking for your products & services

Join us for a series of 1-2-1 'speed dating' meetings in a dedicated area of the Power Club. This is where buyers for developments can meet with potential suppliers in 1-2-1 meetings to discuss how their product/service might fit into the supply chain. See page 29 for details of who you can meet there.

MARINE ENERGY THEATRE

Catch up with EMEC activities and innovation

Following a day-long programme in the main conference on day 1 the show floor theatre, sponsored by Shepherd and Wedderburn, will be abuzz on 12 May with quick-fire presentations between 10:30 and 15:30 largely on technology developments. At 12:30-14:00 it will be the turn of the European Marine Energy Centre leading the 90-minute 'Ocean energy updates from EMEC and friends' session.

HEAT DECARBONISATION THEATRE

Explore all aspects of low carbon heat over two packed days

Two scene-setting sessions in the main conference are complemented by the Heat Decarbonisation Theatre right at the front of Dcarbonise. Nearly 40 presentations are planned over the two days, embracing all forms of low carbon heat for residential, non-residential and use in industry, including hydrogen, heat pumps, district heating/heating networks, geothermal and mine water heat.

BUILT ENVIRONMENT DECARBONISATION THEATRE

From retrofitting to new build – business to residential

In addition to a scene-setting conference programme the Built Environment Decarbonisation show floor theatre in Dcarbonise is where to come to learn about energy efficient buildings – both residential and non-residential. It complements the expert advice available throughout the two days from the Energy Saving Trust's experts in business and residential energy efficiency.

HYDROGEN & ENERGY STORAGE THEATRE

Over 40 hydrogen and energy storage presentations

Doosan Babcock welcomes you to the Hydrogen and Energy Storage Theatre. Both hydrogen and energy storage feature prominently on the main conference programme (and in many sector-specific sessions). Here 40+ presentations will be given over the two days, including 'Hydrogen updates from EMEC and friends' on day 2, an exciting quick-fire session with a host of presentations packed into 90 minutes.

TRANSPORT DECARBONISATION THEATRE

Quick-fire presentations - the order of the day

The **Shell-sponsored** Transport Decarbonisation Theatre is set to be busy and buzzing following an introductory conference session featuring keynote addresses by Scotland's Transport Minister Jenny Gilruth MSP and David Bunch, Country Chair, Shell UK. Sited amongst low carbon vehicles, drop in to hear about low carbon vehicles of all types and the necessary infrastructure. Be sure to watch out for the 60-minute EMEC Hydrogen and low carbon aviation session on day 1.

ARNOLD CLARK ELECTRIC CAR SHOWROOM

Arnold Clark is proud to showcase the future of transportation with its Electric Car Showroom at the All-Energy and Dcarbonise event. With a number of product geniuses on hand to answer all of the visitors' questions on alternative fuel vehicles and exciting new car technology, attendees will also be able to see the vehicles first-hand and book a test drive for a later date. Meanwhile, you can also get advice on EV solutions and finance options to suit the needs of your business.

BUSINESS ENERGY SCOTLAND

Business Energy Scotland, funded by the Scottish Government, provides free, impartial support and access to funding to help SMEs save energy, carbon and money. Advisers will be on hand at Dcarbonise in the Scottish Government and Energy Saving Trust area to help SMEs take vital first steps towards net zero. Swing by for presentations on topics such as X-tendo, as well as an introduction to Business Energy Scotland at a late afternoon reception.

Show Features

GREEN SKILLS FOR A NET ZERO FUTURE

Energy Skills Partnership, in conjunction with a number of its college members are showcasing the proactive approach colleges across Scotland are taking to support the Climate Emergency and the Just Transition to Net Zero. ESP work with colleges, government, agencies and industry to develop and deliver the capability, capacity and curriculum to support skills for the Energy Transition, Transport, Engineering and Manufacture, Construction and Energy Efficiency. Visit the area to discuss your skills requirements, available support and see live demonstrations of the training activities colleges are offering.

CIVIC RECEPTION AND GIANT NETWORKING EVENING

Sponsored by ***Siemens Energy***

The Civic Reception, courtesy of The Rt Hon Lord Provost of Glasgow, and Giant Networking Evening, sees over a thousand gather at the Glasgow Science Centre just a short stroll over the River Clyde from the SEC to network in an informal atmosphere with its interactive exhibits. Join us from 18:00 on 11 May ... just follow the sound of the piper and get networking!

The All-Energy and Dcarbonise App, A Community at your Fingertips

Download the **All-Energy** and **Dcarbonise** App and enjoy seamless experience with your smartphone, ensuring you get the quicker live navigation routes to exhibitor stands, conference rooms or any other show floor features.

Keep your eyes on the event agenda, save time and search the exhibitor and visitor directory, favourite exhibitors, conference sessions & speakers to create your personalised show plan and send exhibitors and industry colleagues messages and meeting requests.

Future Talent at All-Energy and Dcarbonise

Sponsored by bp

Supported by Skills Development Scotland

Future Talent is hugely important to all of us as we strive towards meeting our Net Zero ambitions. As such, this year boasts more youthful focus than ever before with free-to-attend sessions for both employers and candidates:

NEW – the Future Talent Hub, in the innovation zone, boasting a programme of sessions focussed around attracting new and re-skilled resource & talent to power an accelerated net zero future. Highlights include:

Panel discussion: 'Building a career in the energy transition: opportunities and challenges'
Moderated by Jo Reynolds, bp Gas solutions geophysicist & co-founder of bp's Global Sustainability Network, this panel brings together future energy leaders from bp, Solisco, Wood and CIERCO who will share their experiences of building a career to help achieve net zero. Find out what skills have helped them, and what they wish they knew when they were starting out. The panel will also discuss what the future energy in the UK could look like, and how careers in energy might evolve.

Further sessions include focus on the new **National Energy Skills Accelerator**, the Just Transition Skills Action Plan, **apprenticeships**, energy careers, **diversity, equity & inclusion**, training, **industry collaborations** and more. Check out the full programme in the theatre timetable, or via the show app

The Research Zone, also in the innovation zone, with posters and presentations from low carbon academic programmes across the UK.

NEW - Green Skills for a Net Zero Future demo area, at the back of Dcarbonise.
The Energy Skills Partnership, in conjunction with a number of their college members, are showcasing the proactive approach colleges across Scotland are taking to support the Climate Emergency and the Just Transition to Net Zero. Come and discuss your skills requirements, available support and see live demonstrations of the training activities colleges are offering.

Further sessions in the conference include "Offshore Wind: Supply chain and skills - Opportunities and Challenges" (14:00-15:30) and "Skills and Training: Recruiting and training the thousands of people needed" (16:00-17:30), both on Wednesday 11th May.

The Shell Eco-marathon is a global academic programme that challenges talented students to design & build cars, considering technical and behavioural factors, to achieve game-changing energy efficiency results.

We welcome two teams this year to showcase their marathon developments on stand R41:
- University of Strathclyde Eco-Vehicle Team
- PrototAU from the University of Aberdeen

Dcarbonise
EXHIBITION AND CONFERENCE 2022
11–12 MAY, SEC GLASGOW

Lowering Carbon Impact to Improve Sustainability

Dcarbonise, co-located with All-Energy and supported by the Scottish Government and Energy Saving Trust, is aimed at the end-user, and has lowering carbon impact to improve sustainability at its heart. With the focus on the built environment in general and heat decarbonisation in particular the majority of exhibitors in Dcarbonise focus on various heat solutions.

Being held on 11 and 12 May 2022, the two events share plenary sessions – the First Minister of Scotland is amongst the speakers on the morning of 11 May, and will then tour the exhibitions – first stop, Dcarbonise.

The built environment in focus

Patrick Harvie MSP, Scotland's Minister for Zero Carbon Buildings, Active Travel and Tenants' Rights will get the Dcarbonise conference off to a flying start with a 'Meet the Minister' session in the Built Environment stream. Mike Thornton, Energy Saving Trust's Chief Executive will also be speaking in the session, 'Energy efficiency is heat efficiency' that follows, embracing the need to retrofit, considering the current landscape in terms of energy efficiency and introducing Business Energy Scotland.

The session also looks at retrofit through the eyes of an inspirational Accredited Conservation Architect who sees the opportunity and potential that PAS 2035 provides the construction industry to establish 'building passports' for every home in Scotland; and at successful retrofit projects and low carbon and sustainable new build solutions.

Moving to heat

Scotland's Heat in Buildings Strategy sets out a pathway to zero emission buildings by 2045 and details a series of near-term actions, as well as a range of further, longer-term commitments to accelerate the transformation of the nation's building stock.

Heat decarbonisation is the topic for the two conference afternoon sessions, again involving experts from Energy Saving Trust - Pilar Rodriguez, their Supply Chain Manager with an overview; and Anthony Kyriakides, their Head of Renewables looking at how to encourage adoption of heat pumps; as well as experts from across the industry looking at solutions ranging from heat pumps to hydrogen.

Throughout both days two show floor theatres, one dedicated to the 'Built environment' and the other to 'Heat decarbonisation' will be in action with practical advice and solutions on offer.in quickfire sessions.

The Dcarbonise 'banner' also encompasses **Transport Decarbonisation** with its full conference programme including a second 'Meet the Minister' session this time with Jenny Gilruth MSP, Scotland's Transport Minister in the hot seat, and a Shell-sponsored show floor theatre programme amid display of low carbon vehicles and smart transport technologies. There are also conference sessions and streams on the decarbonisation of places; on innovation needs in supporting our urban environments; industry decarbonisation; and on decarbonising the supply chain.

Supported by:

Net Zero Scotland Scottish Government

energy saving trust

HYDROGEN NOW AND FOR THE FUTURE

2G®

See us on stand J40 at All-Energy 2022

Find out how we can reach your zero carbon targets.

READY FOR 100 % H_2

2G CHP units are ready for 100% hydrogen now or can be retrofitted on site when available.

2G Energy Ltd | sales@2-g.com | 2-g.co.uk

TMC
world of transformers

Visit us on Stand L48
www.tmctransformers.com

TMC has wide experience in the manufacturing of dry type transformers: green technology, full ambient compliant that is recyclable and usable in outdoor application.

All-Energy and Dcarbonise

Conference streams and sessions in 18 theatres over the two days will place a heavy focus on The Just Transition, The Green Recovery and energising the race to net zero.

All forms of renewable energy will be covered within All-Energy, as well as energy systems, energy integration and transition, hydrogen, the grid and networks, energy storage, finance and funding, community and local energy and much more.

Wednesday 11 May

	Lomond	Forth	Carron	Dochart	Boisdale 1
09:00 – 10:30	**Opening plenary session (Lomond Auditorium)** Speakers: (Chair) Keith Anderson, CEO, ScottishPower; Rt Hon Nicola Sturgeon MSP, First Minister of Scotland; Steve Scrimshaw, Vice President, Siemens Energy; Rachel McEwen, Chief Sustainability Officer, SSE; Professor Karen				
10:30 – 11:00	*Visit exhibition*				
11:00 – 12:30	**Offshore wind 1** **Looking back to look forward** *Sponsored by* SHEPHERD WEDDERBURN	**Hydrogen and fuel cells 1** **Deployment and scale** *In association with Scottish Hydrogen and Fuel Cell Association*	**Energy systems 1** **Planning the transition to net zero**	**Solar** **Delivering 4-6GW of solar in Scotland by 2030 – an agenda for change** *In association with Solar Energy Scotland*	**Marine energy 1** **The energy jigsaw - does marine energy fit?** *In association with UK Marine Energy Council*
12:30 – 14:00	*Visit exhibition*				
14:00 – 15:30	**Offshore wind 2** **Supply chain and skills: Opportunities and challenges** *Sponsored by* SHEPHERD WEDDERBURN	**Energy storage 1** **Keeping the lights on** *In association with Scottish Hydrogen and Fuel Cell Association*	**Energy systems 2** **Energy systems integration using hydrogen**	**Onshore wind 1** **The landscapes of the future**	**Marine energy 2** **TIGER – Tidal Stream Industry Energiser Project** *Organised by ORE Catapult with TIGER partners*
15:30 – 16:00	*Visit exhibition*				
16:00 – 17:30	**Offshore wind 3** **Offshore Transmission – what happens next?** *Sponsored by* SHEPHERD WEDDERBURN	**Hydrogen & fuel cells 2** **Transition to Net Zero** *In association with Scottish Hydrogen and Fuel Cell Association*	**Energy systems 3** **Security of supply in the future, zero carbon electricity system**	**Onshore wind 2** **Making the most of things: Wind farms and grid optimisation**	**Marine energy 3** **Moving forward**
18:00	*Show closes – Civic Reception and Giant Netw*				

Conference Programme

Part of that 'more and more' involves the topics covered by the co-located Dcarbonise. As you will find in this conference programme that covers the built environment in general and heat decarbonisation in particular, it also embraces transport decarbonisation, the decarbonisation of 'places' and of industry. And helps us all to take steps decarbonising the supply chain wherever we sit in it.

M2/M3	M4	Gala	Hall 1	Alsh 1	Alsh 2
Annemarie O'Donnell, Chief Executive, Glasgow City Council; Jonathan Brearley, CEO, Ofgem; David Bunch, Country Chair, Shell UK; Turner, Director, Centre for Energy Policy, University of Strathclyde					
Visit exhibition					
Bioenergy 1 **Bioenergy: An unsung hero in the Energy Transition?** *Organised with the REA*	**The Just Transition - what does it mean to you?** **This session builds on our 2021 webinar – 'Keeping it real: An inclusive transition to net-zero'**	**Innovate UK** **Energy Catalyst Brokerage by Innovate UK** **11:00 – 13:30**	**Finance and funding: Places** **The Great Decarbonisation Challenge - place based solutions and mobilising finance** *Sponsored by* SHEPHERD WEDDERBURN	**Transport decarbonisation** **Keynote address by Jenny Gilruth MSP, Transport Minister, Scottish Government** *Sponsored by* *In association with Transport Scotland*	**Built environment decarbonisation** **Energy efficiency is heat efficiency** Keynote address by Patrick Harvie MSP, Minister for Zero Carbon Buildings, Active Travel and Tenants' Rights *In association with The Scottish Government and Energy Saving Trust*
Visit exhibition					
Waste to Energy in 2022: Power production and beyond *Organised with the REA*	**Spotlight on Canada: smart grid and storage solutions to enable the energy transition** *Organised by the High Commission of Canada*	**Innovate UK** **Innovation needs in supporting our urban environments achieving net zero**	**Finance & Funding** **Greenbackers Climate Tech Tour at All-Energy** Investment for net zero Panel discussion **14:00 – 15:00** **Networking** **15:00-15:30** The Super Pitch and Fireside Chat **15:30 – 17:30** *Sponsored by* GREENBACKERS INVESTMENT CAPITAL	**Italy** **Decarbonisation solutions for transport infrastructure: Italian know-how and expertise** *Organised by The Italian Trade Agency OICE Italian engineering, architectural and technical economic consulting organizations association*	**Decarbonising heat 1** **Heat transformation: The case for low carbon heating solutions** *In association with The Scottish Government and Energy Saving Trust*
				Visit exhibition	
Bioenergy 2 **Biogas and biofuel to the fore** *Organised with the REA*	**Skills and training** **Recruiting and training the thousands of people needed**	**Industry decarbonisation 1** **Setting the scene**		**Supply chain decarbonisation** **What steps need to be taken by every organisation?**	**Decarbonising heat 2** **Innovative solutions: Identifying new technologies** *In association with The Scottish Government and Energy Saving Trust*
orking Evening at the Glasgow Science Centre					

All-Energy and Dcarbonise

Thursday 12 May

	Lomond	Forth	Carron	Dochart	Gala
09:00 – 10:30	**Opening Plenary Session (Lomond Auditorium)** **A national endeavour: Decarbonising the GB Power System by 2035** Speakers: (Chair) Matthew Knight, Head of Market Development, Siemens Energy UK; Chris Stark, CEO, Climate Lindsay McQuade, CEO, ScottishPower Renewables, and Hannah Bronwin, Director of Business Development, SSE				
10:30 – 11:00	*Visit exhibition*				
11:00 – 12:30	**Energy systems 4** **An Integrated Energy Vision economic opportunity: Scotland and global** Keynote address by Michael Matheson MSP, Cabinet Secretary for Net Zero, Energy and Transport, Scottish Government *In association with Net Zero Technology Centre*	**Hydrogen & fuel cells 3** **Innovation** *In association with Scottish Hydrogen and Fuel Cell Association*	**Offshore wind 4** **Floating wind: The road ahead** *Sponsored by* SHEPHERD WEDDERBURN	**Onshore wind 3** **The long game: Repowering and life extension**	**Industry decarbonisation 2** **Determining the mix - and getting finance** *Sponsored by* Petrofac
12:30 – 14:00	*Visit exhibition*				
14:00 - 15:30		**Energy storage 2** **Batteries not included? PHS, Kinetics & H2** *In association with Scottish Hydrogen and Fuel Cell Association*	**Offshore wind 5** **Floating wind: Opportunities and challenges** *Sponsored by* SHEPHERD WEDDERBURN	**Onshore wind 4** **Digitalisation: The path from extractivism to interactivism**	**Industry decarbonisation 3** **Solutions**
16:00	*Show closes*				

Conference Programme

Alsh 1	Alsh 2	Boisdale 1	M4	Hall 1

Change Committee; Guy Newey, Director of Strategy and Performance, Energy Systems Catapult; Thermal.

Visit exhibition

Alsh 1	Alsh 2	Boisdale 1	M4	Hall 1
Community & local energy **Community heat** *Organised jointly by Local Energy Scotland and Highlands & Islands Enterprise*	**Hydropower 2022** **11:15 – 12:45** *In association with British Hydropower Association*	**Grid & networks** **23 years till net zero: Can our networks achieve it?**	**ScotWind and INTOG – Progress and Plans** *Organised by Scottish Government – Marine Scotland Directorate*	**PPAs in focus** **Let's talk PPAs and their role in the energy transition**

Visit exhibition

Alsh 1	Alsh 2	Boisdale 1	M4	Hall 1
Taking a whole systems approach to energy – decarbonising islands **Island energy and local energy systems** *Organised jointly by Local Energy Scotland and Highlands & Islands Enterprise*	**Disruptive technology and digitalisation**	**Decarbonising Industrial Clusters** *Organised by UK Research & Innovation (UKRI)*		

Show closes

With thanks

As well as thanking all Chairs and speakers for their input to the All-Energy and Dcarbonise conference programmes; and the inspirational session organisers for coming to us with ingenious whole session, streams or show floor theatre ideas, we would like to thank stream and session sponsors, and also some largely un-sung heroes.

Those are the people who keep us on the straight and narrow at abstract selection time, amongst them: Peter Clive of Black & Veatch; Paul Dodds of University College London, Nigel Holmes of SHFCA, and Andrew Smith of Greenbackers Investment Capital; Gillian Hurding of ScottishPower joined their ranks this year. There are many more who are fantastic sounding boards – many of them are speakers in our conference. We thank you for that key role not only this year but some of you for many of the past 21 years.

Then there are the superb people at the Scottish Government who are so very helpful; the superb team at ScottishPower and ScottishPower Renewables. This year has seen some marvellous thinking and input from Ofgem, NZTC, SSE, Innovate UK UKRI;. Then too there are members of the Society for Underwater Technology's MREC ... so many marvellous 'hand holders'.

All-Energy and Dcarbonise owes you a great debt. Thank you.

The All-Energy and Dcarbonise 2022 conference programme

Welcome to the All-Energy and Dcarbonise 2022 conference

All sessions are free to attend without the need to pre-book.

The Lomond Auditorium, Alsh, Boisdale, Hall 1, Carron, Dochart, M2/3 and M4 conference halls and rooms are all located across the concourse from the exhibition hall. M2/3 and M4 are part of the 'Meeting Academy' and are above the concourse and accessible by lift or stairs; and Gala and Forth are in the SEC Armadillo (these two can be accessed by internal or external routes). The show floor theatres are located in the exhibition hall; and the 'Meet the Developer' Share Fair is within the Power Club also in the exhibition hall.

Main Conference Programme Wednesday, 11 May

Opening plenary session

Lomond Auditorium

09:00-10:30

Chair and Speaker: Keith Anderson, CEO, ScottishPower

- Civic Welcome: **Annemarie O'Donnell**, Chief Executive, Glasgow City Council

- A message from **Rt Hon Alok Sharma MP, President**, COP26

- **Rt Hon Nicola Sturgeon MSP**, First Minister of Scotland

- A message from **Rt Hon Greg Hands MP**, Minister of State for Bushiness, Energy and Clean Growth

- **Jonathan Brearley**, Chief Executive. Ofgem

- **David Bunch**, Country Chair, Shell UK

- **Steve Scrimshaw**, Vice President, Siemens Energy UK & Ireland

- **Rachel McEwen**, Chief Sustainability Officer, SSE

- **George Gillespie**, Glasgow City Council

- **Professor Karen Turner**, Director, Centre for Energy Policy, University of Strathclyde

Offshore Wind Track

Lomond Auditorium

Sponsored by: SHEPHERD WEDDERBURN

Offshore wind 1

Looking back to look forward

11:00 – 12:30

Chair: Colin Innes, Partner, Shepherd and Wedderburn LLP

Panellists:

- **Michelle Gallagher**, Global Bid Director, SSE Renewables
- **Charlie Jordan**, Offshore Wind Director for the UK and Ireland, ScottishPower Renewables
- **Richard Haydock**, Project Director, UK Offshore Wind, bp
- **Bless Kuri**, Head of System Planning and Investment, SSEN Transmission
- **Andrew Elmes**, Head of Business Development – UK+I, Siemens Gamesa Renewable Energy
- **Joanne Allday**, Strategic Business Development Manager, Port of Cromarty Firth
- **Mike Hay**, Commercial Director, RIDG
- **Panel discussion and audience Q&A**

The UK has just completed two major leasing rounds in the past 12 months (for the first time in over 10 years). The panel will consider the merits of each round:

- Was Round 4 too long awaited? Was it lacking in ambition? Was the lease premium model too aggressive? Is this creating a sustainable industry? How can such high annual costs be reconciled with permitting challenges, grid challenges, ongoing cost reduction, local industrial development? What changes could be seen in the next Round.
- Was ScotWind too ambitious? Did they give away too much too soon and too cheaply? Or is this exactly what is needed to get the industrial development that Scotland needs/wants?

In both cases, what are the major challenges now facing delivery:

- Grid challenges - in England/Wales, how can the grid connections be accelerated to mitigate developer premiums. In Scotland, what kind of strategic interconnection is needed to get power to demand centres (or exported)? What about the challenges of balancing the grid and incorporating so much variable generation? Is storage advancing quickly enough?
- Permitting - How do we meet stakeholder requirements without significant delays to the process? Are stakeholder expectations out of line with the challenges of achieving Net Zero? Is a new strategic framework needed? Can we make better use of existing data and reduce data gathering times?
- Supply Chain - Recent studies (such as the SOWEC report) all indicate major investment in enabling infrastructure is needed to get any meaningful industrial content - how is this to be stimulated? Who pays?
- Market - Is the CfD still the right mechanism for the industry? How low can CfD Strike Prices keep falling (at a time when wholesale prices are rising)? How much support is needed for floating offshore and for how long?
- Technology - Is hydrogen a distraction or a game changer (especially in Scotland, where they are going very 'long' on electricity supply)? Are we doing enough to prepare for the 'Hydrogen economy'?

Offshore wind 2
Supply chain and skills: Opportunities and challenges
14:00-15:30
The opening offshore wind session will touch on supply chain opportunities and challenges – now we dive deeper and also look at the vital issue of skills and training.
Chair: Eamon Hayes, Head of Procurement & Commercial – Offshore Wind, SSE Renewables
Panellists:
- ScotWind supply chain and skills - **Mandy Gloyer**, New UK Sites Manager, ScottishPower Renewables
- **Brian McFarlane**, Co-chair of the Scottish Offshore Wind Energy Council
- The Supply Chain Development Statement (SCDS) Process and Next Steps - **Gillian Morrison**, Development Manager - Supply Chain, Crown Estate Scotland
- **Melanie Onn**, Deputy CEO, RenewableUK
- **Anne-Marie Coyle**, Sales Director – Offshore Wind, GE Renewable Energy
- **Andrew Macdonald**, Offshore Wind Development and Operations Director, Offshore Renewable Energy Catapult
- **Paul O'Brien**, DeepWind, North of Scotland Offshore Wind Cluster
- **Panel discussion including audience Q&A with David Stevenson, Head of Offshore Wind Policy & Supply Chain, Scottish Government and Allan Taylor, Head of Offshore Wind Investment, BEIS joining the panel**

Offshore wind 3
Offshore Transmission – what happens next?
16:00-17:30
Chair: Maf Smith, Director, Lumen Energy & Environment
- Overview of offshore transmission and Offshore Transmission Network Review (OTNR) – **Chris Fox**, Deputy Director, Europe & Offshore Electricity Networks, Department for Business, Energy and Industrial Strategy (BEIS)
- Building regulatory policy to support the offshore network – **Mary Walsh**, Head of Offshore Coordination, Ofgem
- Why offshore coordination is important, and its challenges – Holistic Network Design – **Alice Etheridge**, Offshore Coordination Senior Manager, National Grid ESO
- What the offshore transmission regime needs to do to facilitate early delivery of renewables – **Adam Morrison**, Project Director, Ocean Winds
- **Panel discussion and audience Q&A**

Hydrogen and Fuel Cells Track
Forth
In association with Scottish Hydrogen and Fuel Cell Association

Hydrogen and Fuel Cells 1
Deployment and scale
11:00 – 12:30
Chair: Clare Lavelle, Energy Leader | North, Arup
- **Barry Carruthers**, Director of Hydrogen, ScottishPower
- An accelerated pathway to decarbonise heat in Scotland - **Fergus Tickell**, Head of System Transformation and Business Development, SGN
- UK: Roadmap to 5GWe H2 and Beyond - **Laura Fleming**, Business Development Director, Siemens Gamesa Renewable Energy
- Demonstrating a green hydrogen powered future for Edinburgh's outdoor festivals - **David Amos**, Managing Director, PlusZero
- Creating demand for green hydrogen for transport - **Amanda Lyne**, Managing Director, ULEMCo Ltd
- Scaling up clean hydrogen: Learning by doing – **Dr Nigel Holmes**, Chief Executive, Scottish Hydrogen and Fuel Cell Association
- **Panel discussion and audience Q&A**

Hydrogen and Fuel Cells 2
Transition to Net Zero
16:00 – 17:30
Chair: Dr Kerry-Ann Adamson, Global Strategic Advisor, Worley
- The role of Acorn Hydrogen in enabling net zero - **Jack Gomersall**, Hydrogen Commercial Advisor, Storegga
- Hydrogen - Australia's next energy frontier? - **Rebecca Hewlett**, Director, Renewables & Environment, Xodus
- Building a market for clean hydrogen - **Adam Brown**, Managing Practice Development Lawyer, Dentons
- Delivering green hydrogen in the Scottish Highlands - **Richard Hearnden**, Gordonbush Hydrogen Plant Project Manager, SSE Renewables
- Gigawatt scale green hydrogen – Ørsted's green hydrogen projects in Copenhagen and Edinburgh - **Richard Crossick**, Head of UK Public Affairs, Ørsted
- **Panel discussion and audience Q&A**

Energy Storage Track
Forth
In association with Scottish Hydrogen and Fuel Cell Association

Energy Storage 1
Keeping the lights on
14:00 – 15:30
Chair: Dr Keith MacLean OBE, Managing Director, Providence Policy
- Battery research and system integration as an enabler for the energy transition - in Europe and emerging economies - **Ian Ellerington**, Head of Technology Transfer, Faraday Institution
- Scaling next generation batters, a salty tale? - **Scott Lilley**, University of St Andrews
- A 20MW battery for central Bristol - **Monika Paplacyzk**, Investment Director, Thrive Renewables
- Optimising the size of storage co-located with renewables - **Dr Gruffudd Edwards**, Senior Data Scientist, TNEI Services
- Making small-scale energy storage economics work – **Dr David Kane**, Director, Trilemma Consulting Limited
- Battery storage – unlocking potential from multi-technology projects - **Maria Connolly**, Head of Future Energy & Real Estate, TLT LLP
- **Panel discussion and audience Q&A**

Energy Systems Track
Carron

Energy Systems 1
Planning the transition to net zero
11:00 –12:30
Chair: Paul Dodds, Professor in Energy Systems, University College of London
- Which way to Net Zero? Comparative analysis of seven UK decarbonisation pathways - **Dr James Dixon**, Research fellow in Transport-Energy Systems, University of Strathclyde / University of Oxford
- Integrating the South Wales Industrial Cluster Deployment - **Grant Spence**, Project Director – Energy Transition & Decarbonisation, Costain
- North of Scotland Future Energy Scenarios: the journey to net zero - **Imran Mohammed**, Senior Insights Analyst, SSEN Transmission
- The role of flexibility in delivering a smart net zero energy system in 2050 – **Andrew Lever**, Director, Policy & Innovation, Carbon Trust
- Designing the future energy ecosystem – **Dr Steve Freeman**, Head of Energy Transition, D&I, Schlumberger
- **Panel discussion and audience Q&A**

Energy Systems 2
Energy systems integration using hydrogen
14:00 – 15:30
Chair: Paul Dodds, Professor in Energy Systems, University College of London
- The role of Scotland's gas network in reaching net-zero - **Adam Frew**, Senior Energy Consultant, Arup
- Gas decarbonisation pathways for Scotland - **Rachael Mell**, Senior Energy Consultant, Arup
- Reducing future curtailment of renewable energy in Scotland via hydrogen production – **Dr Graeme Hawker**, Lecturer, University of Strathclyde
- Investing in shared hydrogen transmission infrastructure can unlock deep offshore wind energy - **David Wickham**, Hydrogen Consultant, ERM
- Panel debate - what is the speed of a transition, and what level of planning across the energy industry is required? – **Dr Nigel Holmes**, Chief Executive, Scottish Hydrogen and Fuel Cell Association
- **Panel discussion and audience Q&A**

Energy Systems 3
Security of supply in the future, zero carbon electricity system
16:00 – 17:30
Chair: Prof Keith Bell, ScottishPower Professor of Future Power Systems, University of Strathclyde
Panellists:
- **Dr David Joffe**, Head of Carbon Budgets, Climate Change Committee
- **Scott Mathieson**, Network Planning & Regulation Director, SP Energy Networks
- **Shurooque Baloch**, Operability Product Manager, National Grid ESO
- **Panel discussion and audience Q&A**

The UK has made fantastic progress in reducing greenhouse gas emissions from production of electricity. However, it needs to go much further as part of

progress towards net zero. To that end, in October 2021, the UK followed the Climate Change Committee's advice to commit to zero carbon electricity by 2035. That will involve use of very large volumes of renewable energy as the place of electricity within the wider energy system grows. However, it raises both a challenge in ensuring demand can be met when the wind isn't blowing and the sun isn't shining, and an opportunity to improve our energy security.

This session addresses security of electricity supply in 2035 and the steps that need to be taken now to ensure we get there.

- What will be the place of electricity in the future energy system and where will the electrical energy come from?
- Will we have the right mix of generation, storage, flexible demand and interconnectors?
- Will the system be operable in a stable manner?
- Will supplies to end users be sufficiently resilient?

Solar Track
Dochart

Delivering 4-6GW of solar in Scotland by 2030 – an agenda for change
In association with Solar Energy Scotland

11:00 – 12:30
Following opening remarks by **Thomas McMillan** – Chair Solar Energy Scotland, who will cover the story of solar in Scotland so far and where are we heading. Solar's role in the delivery of a Just Transition; and introduce 4-6W target and sector breakdowns, two panel discussions will be held:

How solar can deliver for Scotland

- Delivering long term sustainable jobs – **Josh King**, Operations Director, AES Solar
- Delivering for biodiversity and agriculture – **Belinda Howell**, Natural Power
- Decarbonising Heat & Buildings – **Christophe Williams**, Naked Energy/ **Kara Davies**, Solar Energy UK

Overcoming the barriers to solar deployment

- **George Baxter**, Green Power International
- **Chris Clark**, Director, Emtec Energy
- **Thomas McMillan**, Savills
  Emily Rice, Scotland Policy Analyst, Solar Energy UK

Onshore Wind Track
Dochart

Onshore Wind 1
The landscapes of the future
14:00 – 15:30
Wind energy is going to be a feature of our landscape as we work to achieve our decarbonisation targets and transition to a zero emission economy. In this session we review how this has been accommodated so far and plot a course for how better to integrate wind power into our landscape in the future.
Chair: Karen Anne Hutton, Head of Repowering & Life Extension, RES

- **Marc van Grieken**, Director, MVGLA
- Good design for energy infrastructure - **Alister Kratt**, Director, LDA Design Consulting Ltd
- Aviation lights: the experience of upgrading the existing fleet in the German Market, **Adriana Ramirez Rojas** - Strategy & Business Development Manager, Siemens Gamesa Renewable Energy
- Piloting a Development Framework for onshore wind at Hagshaw Hill - **Brendan Turvey**, Low Carbon Project Manager, NatureScot
- Onshore Development / Energy Park – **Grant Douglas**, Senior Planning & Environmental Policy Manager, ScottishPower Renewables
- **Panel discussion and audience Q&A**

Onshore Wind 2
Making the most of things: Wind farms and grid optimisation
16:00 – 17:30
Wind energy is not generated by exploitation of a simple fuelstock, but through the interaction of our generation assets with often complex environmental conditions in remote locations. This session is concerned with fine tuning this interaction to maximise production, and the challenges of transmitting the power generated to demand centres.
Chair: Robbie Gibson, Renewable Energy Services Director, Black & Veatch (U.K.)

- Case Study on optimising the UK's largest onshore windfarm – Whitelee, **Alan Mortimer**, Director of Innovation, Wood Group UK Ltd
- How do you solve a problem like TNUoS? - **Andrew Urquhart**, Head of Whole System, SSEN Transmission
- The commercial optimisation of wind farms - **David O'Hare**, Director – Europe, Clir Renewables
- Lowering GHG emissions in mining operations through renewable energy integration - **Paul Gordon**, Technical Director, SLR Consulting
- Developers and Grid working together - Wind farms and grid optimisation - **Jean Lewis**, Head of Technology Services, ITPEnergised
- **Panel discussion and audience Q&A**

Marine Energy Track
Boisdale 1

Marine energy 1
The energy jigsaw – does marine energy fit?
In association with UK Marine Energy Council

11:00-12:30
Sue Barr, Chair of the UK Marine Energy Council, who chairs and facilitates this panel discussion, is eager to find just where her panellists believe marine renewables fit into the energy landscape 'jigsaw'.

To do this, panellists will be asked:

- To identify the drivers – are they strategy, policy, jobs, economic benefit, system benefits, net zero targets, the need for ever-more electricity?
- How does world change, energy security, and resilience affect the sector?
- What are marine renewables' USPs? Grid balancing, jobs, technology creativity, diversification, ability to suit different markets – the list will grow longer during the discussion!
- What can we learn from floating wind where our devices do, and will, share much of the marine infrastructure – grid, cables, remotely operated vessels and more?
- How do we get an over-arching strategy that clearly identifies the sector's strengths and thus helps to identify the 'missing' piece to slot neatly into the energy success story 'jigsaw' to the benefit of all?

Chair: Sue Barr, Chair, UK Marine Energy Council
Panellists:

- **Anders Jansson**, Commercial Advisor, CorPower Ocean
- **Dr Martin Carruth**, Commercial Director, Marine Power Systems
- **Kerry Hayes**, Policy Engagement Manager, Simply Blue
- **Dr Cameron McNatt**, Managing Director, Mocean Energy
- **Andrew Scott**, CEO, Orbital Marine Power
- **Panel discussion and audience Q&A**
- Presentation of the Society for Underwater Technology's Lennard-Senior Memorial Prize by the SUT's Chair, **Sue John**

Marine Energy 2
TIGER – Tidal Stream Industry Energiser Project
Organised by ORE Catapult with TIGER Partners

14:00-15:30

- Welcome and introduction: Background to TIGER; Partners; sites and progress – **David Philipson**, Programme Manager – TIGER, Offshore Renewable Energy Catapult
- The Cost Reduction Imperative; Catapult 2018 report, route to cost reduction - **Dr Ciaran Frost**, Techno-Economic Analyst, Offshore Renewable Energy Catapult
- **Panel discussion and audience Q&A TIGER demonstrating the cost reduction pathway to £90MWh**
  o Chair: Simon Cheeseman, Wave & Tidal Energy Sector Specialist, Offshore Renewable Energy Catapult
  o Panellists:
  - **Andrew Scott**, CEO, Orbital Marine Power
  - **Philip Archer**, Project Director, SIMEC Atlantis Energy
  - **Raphaël Coquet**, Deputy Director/ Project Director, Hydroquest
  - **Jeremy Smith**, Managing Director, QED Naval
  - **Andy Baldock**, Director, Baldock Energy Ltd.

Marine Energy 3
Moving forward
16:00-17:30
Chair: Norma Hogan, Senior Development Manager, Marine, Hydrogen and Emerging Technologies, Highlands and Islands Enterprise

- Wave Energy Scotland (WES): an update – **Tim Hurst**, Managing Director, Wave Energy Scotland (invited)
  o Quick fire updates on successful WES projects
  - **Simon Grey**, Chief Executive, AWS

Ocean Energy
- LCOE reduction, focusing on industrialisation - **Alejandro Marques**, Business Development Manager, Magallanes Renovables
- Niche markets for marine renewables - **Johanna Money**, Researcher, Scottish Enterprise
- The role of a test centre – **Matthew Finn**, Commercial Director, European Marine Energy Centre (EMEC)
- **Panel discussion and audience Q&A**

Bioenergy Track
M2/M3

Bioenergy 1
Bioenergy: An unsung hero in the Energy Transition?
Organised with the REA

11:00 – 12:30
Chair: Mark Sommerfeld, Head of Power and Flexibility, Association for Renewable Energy and Clean Technology (REA)
- The Biomass Strategy from an industry perspective - **Mark Sommerfeld**, Head of Power and Flexibility, Association for Renewable Energy and Clean Technology (REA)
- Bioenergy: An unsung hero in the Energy Transition? - **David Butler**, Team Leader Low Carbon Transition, Scottish Enterprise
- Biomass in a circular net-zero economy - **Darren Williams**, Chief Executive, Eco2 and Chair Biomass UK
- Sustainable biomass, backed by data - **Tanisha Beebee**, Government Policy Senior Manager, Drax Group
- Biomass: A driving force for heat decarbonisation - **Bruno Berardelli**, Head of Asset Services, AMP Clean Energy
- The role of bioenergy carbon capture and storage (BECCS) is decarbonizing combined heat and power plants in the UK - **Dr Naser Odeh**, Associate Director, Ricardo
- **Panel discussion and audience Q&A**

Waste to Energy
Waste to Energy in 2022: Power production and beyond
14:00 - 15:30
Chair: Mark Sommerfeld, Head of Power and Flexibility, Association for Renewable Energy and Clean Technology (REA)
- What is the need for Energy from Waste in a circular economy and net zero world? – **James Martin**, Circular Economy Associate, SLR Consulting
- Risk Management in Executing a First-of-a-Kind Waste to Fuels Project - **Tom Sanders**, Senior Project Manager, Petrofac
- Syngas for a Net Zero Future: generating carbon-negative, baseload energy and biofuels - **Jeff Vander Linden**, COO, EQTEC
- Bridgwater Resource Recovery: a case study in funding and building a small Energy from Waste facility - **Ewan Gorford**, Asset Manager, Iona Capital
- Waste to wealth: An innovative project In Kabwe, Zambia - **Ian Johnstone**, Director, Aquatera
- **Panel discussion and audience Q&A**

Bioenergy 2
Biogas and biofuel to the fore
Organised with the REA

16:00-17:30
Chair: David Butler, Team Leader Low Carbon Transition, Scottish Enterprise
- Biogas Investment Landscape: Anaerobic Digestion - **Andrew Dougans**, Director, QMPF LLP
- Renewable Liquid Gas - An alternative to the all-electric heat future for off-grid users - **Gillian Baker**, Commercial Development Manager, UGI International
- Anaerobic Digestion with Carbon Capture and Use - **Euan Munro**, Associate Process Engineer, SLR Consulting
- **Richard Gueterbock**, Foodchains
- Celtic Renewables: An update - **Dr Eve Bird**, Research & Innovation Director, Celtic Renewables
- **Panel discussion and audience Q&A**

The Just Transition – what does it mean to you?
M4

11:00-12:30
Achieving a just transition requires resource and investment. Justifying resource and investment requires practical activities with meaningful impact and measurable outcomes.

But what activities should organisations undertake and how should they measure impact in a consistent and robust way to ensure maximum impact and value for money particularly in the context of an energy and cost-of-living crisis? How do they make sure their just transition plans and activities stay true to really driving the best outcomes for people and planet, rather than becoming a tick-box activity or retrospective pat-on-the back?

This session builds on our 2020 webinar - Keeping it real: An inclusive transition to net-zero and moves the discussion to the practicality of not only what activities are urgently needed, but how we measure and evaluate activities to successfully achieve a timely, just, transition. Speakers will offer perspectives and practical examples from the varied organisations they represent and end with a Q&A panel session.
Chair: Gillian Hurding, Senior CEO Office Analyst, ScottishPower
- Delivering a 'Just Transition' in the UK through the competitive, productive, affordable, and efficient deployment and uptake of low carbon options - **Dr Jamie Stewart**, Deputy Director, Centre for Energy Policy, Strathclyde University
- **Matthew Jacobs**, Xodus
- **Dr Ameena Camps**, Just Transition Commission
- **Amy Ritchie**, Sustainability Specialist, SP Energy Networks
- **Rona Mackay**, CEO, Community Energy Scotland
- **Zarina Ahmad**, Former Climate Change & Environmentalist, CEMVO Scotland
- **Panel discussion and audience Q&A**

Spotlight on Canada: smart grid and storage solutions to enable the energy transition
Organised by the High Commission of Canada
14:00-15:30

This session will shed light on the Canadian landscape as it relates to the energy transition and will highlight innovative Canadian capabilities that are enabling the transition to more decarbonised, decentralised, and digitised electricity grids. The session will provide a forum for learning and discussion around some of the key challenges and opportunities in this space, and provide insights on the key similarities, as well as differences, in the landscape across Canada as well as the UK.

Greg Robart, Chief Executive Officer of the Smart Grid Innovation Network (SGIN), will present and moderate a panel discussion. The SGIN supports Canada's clean energy transition by advocating for the smart energy sector.

Greg will be joined by a panel of representatives from innovative Canadian companies who will share their experience operating in the smart grid and energy storage space in Canada, the UK, and internationally:

The session is hosted by the Canadian Trade Commissioner Service (TCS). The TCS provides strategic market information and market access solutions for Canadian companies looking to export, invest abroad, or develop innovation and R&D partnerships using our extensive global networks. Located in more than 150 cities worldwide, and in 6 regional offices across Canada, the TCS also assists foreign companies planning to invest in Canada or current investors to expand their operations in Canada.

Skills and Training
Recruiting and training the thousands of people needed
16:00 – 17:30
As the renewables and low carbon energy sectors rapidly expand with net zero and security of supply as targets, how do we acquire the most precious resource of all – people. How do we recruit and train them? This panel discussion will explore what is needed to ensure a sustainable workforce can be developed and maintained at every level involving developers, operators, supply chain, universities and colleges.
Chair: Andy Rodden, Director, Offshore Renewables, ETZ
Panellists:
- **Jim Brown**, Director, Energy Skills Partnership
- **Lisbeth Meikle**, Learning and Development Manager, SSE
- **Andy Williamson**, Head of Energy Transition, OPITO
- **Gemma Head**, Head of Skills & Company Secretary, East of England Energy Group
- **Marion Beattie**, Head of Skills, Growth and Inward Investment, Skills Development Scotland
- National Energy Skills Accelerator - **Andy Rodden**, Director, Offshore Renewables, ETZ

- **Tom Hopkinson**, CEO, Taylor Hopkinson
- **Chris Clark**, Director, Emtec Energy
- **Panel discussion and audience Q&A**

Innovate UK
Energy Catalyst Brokerage by Innovate UK (includes networking lunch)
Gala

11:00-13:30
We are inviting ambitious organisations, that are interested in applying to future rounds of Energy Catalyst funding, to join Innovate UK and the KTN to learn about the Energy Catalyst programme and find potential partners.

Energy Catalyst accelerates the innovation needed to end energy poverty. Through financial and advisory support, and by building strategic partnerships and uncovering new insights, Energy Catalyst helps bring to market technologies and business models that can improve lives in Africa and Asia.

Since it started in 2014 it has invested more than £147 million in over 360 projects in 8 different rounds. It is hoping to launch new funding soon making All-Energy the perfect location to talk more about the programme and to provide the opportunity for companies to pitch in order to meet potential partners (with collaborative applications being a necessity for mid - late stage project applications). Those not pitching are encouraged to listen to information about the programme and watch the pitches.

- "What we think is most interesting about this programme is that Sub-Saharan Africa and South/South East Asia have a lot of similar challenges to the UK in that they are moving to a decentralised energy system based on renewables but they don't have the legacy infrastructure to get in the way. We are keen to engage more SMEs working in the wider energy systems space to encourage them to look at this as a new opportunity." Alice Goodbrook, Innovation Lead – Energy, Innovate UK

- Introduction from Innovate UK - **Amy Flynn**, Impact and Performance Manager - Sustainable Innovation Fund, Innovate UK
- Overview of the Energy Catalyst Programme - **Dr Stafford Lloyd**, Net Zero Innovation Lead at Innovate UK
- Case studies – Presentations from companies that have successfully applied to Energy Catalyst previously including:
  · Oaktec Engineering - **Tom Harrison**, Director
  · SolarisKit - **Dr Faisal Ghani**, CEO
  • What makes a good application? – Innovate UK KTN - **Jonathan Abra**, Knowledge Transfer Manager, Innovate UK KTN
  • Pitching opportunities for companies looking for partners
  • Networking

There will be a general networking lunch at the end of the session. So come along, make sure you don't miss out!

Innovation needs in supporting our urban environments achieving net zero
14:00-15:30
Organised by Innovate UK

Innovate UK are hosting a session to explore more about challenges that places are facing to achieve net zero. The City of Edinburgh Council will be sharing their challenges and progress to becoming a net zero city and Britain Thinks will share their research outputs outlining what solutions young people around the UK would like to see. Companies including EMEC and Thermafy will be presenting their solutions and experiences and we will finish with the opportunity for the audience to ask their questions in a panel discussion.
Chair: Guy Pattison, Stronger Stories
- **Paula McLeay**, Head of Policy & Insight, City of Edinburgh Council
- Insights from the Urban Futures Lab - **Lucy Bush**, Research Director, Britain Thinks
- **Neil Kermode**, Managing Director, European Marine Energy Centre (EMEC)
- **Amanda Pickford**, Founder and CIO, ThermaFY
- **Tom Harrison**, Commercial Director, Oaktec
- **Panel discussion and audience Q&A**

Industry decarbonisation 1
Setting the scene
16:00-17:30
Chair: Prof Stuart Haszeldine, Professor of Carbon Capture and Storage, University of Edinburgh
- Carbon sources for storage in Scotland: Bio or techno, and both? - **Prof Stuart Haszeldine**, Professor of Carbon Capture and Storage, University of Edinburgh
- Industry Decarbonisation - **Andy Hessell**, Managing Director, Kellas Midstream
- Industrial decarbonisation - getting it done - **Dr Chris Manson Whitton**, Director, Progressive Energy
- Designing the Future Energy Ecosystem to accelerate industrial decarbonisation - **Dr Steve Freeman**, Head of Energy Transition, D&I, Schlumberger
- CCUS Policy in 2021: Laying the foundations to build 4 world-leading CCUS clusters by 2030 – **Ruth Herbert**, CEO, Carbon Capture and Storage Association
- What's different about structuring CCUS projects in the UK this time round? - **Dalia Majumder-Russell**, Partner, CMS Cameron McKenna Nabarro Olswang LLP
- Panel discussion and audience Q&A

Finance and Funding track
Hall 1

Decarbonise EXHIBITION AND CONFERENCE 2022

Finance and funding: Places
The Great Decarbonisation Challenge - place based solutions and mobilising finance
Sponsored by SHEPHERD WEDDERBURN

11:00-12:30
How can cities, regions and other "places" achieve a step change in the great decarbonisation challenge?

Where are the easy wins in terms of collaboration and maximising impact... are place based net zero measures a more appropriate response?

What is the role of Westminster, devolved administrations, policy makers and private sector - how do we connect the dots?

How can we best mobilise finance ...do we need new financial instruments/market design or are we missing a trick in not adapting tried and tested methods?

When does this need to happen - we have that answer - it's now!

Join us as we debate the conundrum of decarbonisation, place and finance with a stellar cast of hugely knowledgeable panellists, who will challenge and demand better.

Chair: Clare Foster, Partner and Head of Clean Energy, Shepherd and Wedderburn LLP
- Acting local with global impact: place-based climate action offers more bang for your buck - **Polly Billington**, Chief Executive, UK100
- **Jamie Brogan** of the Edinburgh Climate Change Institute, and an Edinburgh Climate Commission Commissioner
- **Professor Andy Gouldson**, Director, Yorkshire and Humber Climate Commission
- **Panel discussion and audience Q&A**

Greenbackers Climate Tech Tour at All-Energy
Sponsored by GREENBACKERS INVESTMENT CAPITAL

14:00 – 17:30
Investment for net zero
Focus on earlier stage technologies – routes to market and the changing role and timing of the different sources of finance and funding

14:00 – 15:00
A session of short introductions and then watch out for those questions from Chair Andrew Smith, of Greenbackers Investment Capital, and the discussion that follows! An information- packed hour can be guaranteed.
Chair: Andrew Smith, Partner, Greenbackers Investment Capital
- **Paul Padaruth**, Head of Commercial, Innovate UK
- **Mark Munro**, Head of Investments, Scottish National Investment Bank
- **John Young**, CEO, Strategic Growth Services
- **Beverley Gower-Jones**, Managing Partner, Clean Growth Fund
- **Matthew Clayton**, Managing Director, Thrive Renewables
- **Stuart Turl**, Business Development Director – Energy Transition EMEA, Wood Group UK
- **Panel discussion and audience Q&A**

15:00-15:30
Networking

15:30-16:15
Greenbackers Super Pitch – Round 1
- Climate Tech Ventures Pitch for investment – Greenbackers hosts: **Andrew Smith** and **Mark Hannigan**, Partner and Head of Clean Energy, Greenbackers Investment Capital

The 2022 Greenbackers programme builds on its widely acclaimed 26ForCOP26 programme of last year and once again selects the most investable early stage climate technology ventures and helps them secure growth funding from their proven global climate tech investor base.

16:15-16:30
The intersection of new climate technology and the offshore sector
A Fireside Chat between **Andrew Smith** and **Clare Foster**
- Clare is a Partner in the banking team and is Head of Clean Energy at Shepherd and Wedderburn. She is widely recognised and a highly regarded practitioner in the project finance market, with a particular focus on power sector projects (particularly in the renewables arena) and infrastructure projects.

16:30-17:30
Greenbackers Super Pitch – Round 2
- Climate Tech Ventures Pitch for investment – Greenbacker hosts: **Andrew Smith** and **Mark Hannigan**

Climate Tech Ventures pitching include:
- **REDstack** - Sneek, nr Amsterdam, NL REDstack generates power out of contacting flows of fresh water and salt water. 100s of MWs 24/7.
- **Sitigrid** - London, England, UK Digital marketplace for the trading of clean energy and green certificates in a secure, near real-time environment.
- **Lambda** - Cambridge, England, UK Quantum light engineers'. Photonic materials to maximise performance of solar PV, crops & medical detectors
- **Precision Impulse** - Continuous high quality data from the sub surface - Precision Impulse seismic technology enables rapid, safe, non-obtrusive acquisition of critical subsurface data. Our source units can be deployed on virtually any vehicle or permanently positioned on or below the surface on land or the ocean floor, providing cost-effective data without environmental damage.
- **Katrick Technologies** - Glasgow, Scotland, UK Carbon-zero energy & cooling technologies based on innovative patented vibrational technologies.
- Kleanbus - Scarborough, England, UK Kleanbus converts diesel buses to electric, zero emission with minimal time, cost and risk.
- **Kubos Semiconductor** - Cambridge, England, UK Commercially compatible LEDs based on Gallium Nitride (GaN), enabling more efficient, green LEDs.
- **Propelair** - London, England, UK Reinventing the toilet for out-of-home premises, with a 1.5 litre flush, to save water resources
- **Blockchain Triangle** - Hamilton, Bermuda Platform providing investors with direct, unfettered access to over $4T in climate finance opportunities.
- **SolarisKit** - Realise the full potential of solar energy with SolarisKit's flat-packable solar heating technology; flat-packable solar thermal collector providing an affordable, easy to transport, simple to install, and visually attractive alternative to current solutions available.
- **Forev** - Edinburgh, Scotland, UK Public EV charging to parts of Scotland where demand is highest, enabling a faster transition to e-mobility

17:30-18:00
Networking at the Greenbackers stand (M60) in the exhibition.

Dcarbonise EXHIBITION AND CONFERENCE 2022

Transport decarbonisation
Alsh 1
Sponsored by Shell

In association with Transport Scotland

11:00 – 12:30
Transport is the largest contributor to harmful climate emissions in Scotland. In response to the climate emergency, the Scottish Government is committed to reducing our emissions by 75% by 2030 and to a legally binding target of net-zero by 2045.
Chair, Stuart Greig, Director of Low Carbon Economy, Transport Scotland
Meet the Minister
- Keynote address: **Jenny Gilruth MSP**, Minister for Transport, Scottish Government
- Audience Q&A
- Keynote address: **David Bunch**, Country Chair, Shell UK
- **Alex Hart**, EV & Storage Manager, Zero Carbon Operations, National Grid ESO
- Zero emissions heavy duty vehicles: Reducing emissions in transport - **Andy McDonald**, Head of Low Carbon Transition, Scottish Enterprise
- Supporting the public sector to decarbonise transport - **Neil Leckie**, Senior Programme Manager, Transport Scotland, Energy Saving Trust
- **Panel discussion and audience Q&A**

Note: The rest of the Transport decarbonisation programme takes place in the dedicated show floor theatre in the low carbon area of the exhibition from 10:30 - 17:00 on Day 1 and 10:30 -15:30 on Day 2.

Dcarbonise EXHIBITION AND CONFERENCE 2022

Italy
Decarbonisation solutions for transport infrastructure: Italian know-how and expertise
Organised by The Italian Trade Agency and OICE - Italian Association of Engineering and Architecture Companies

14:00 – 15:30
By means of case studies and presentations on projects, this session will focus on the great ability of Italian engineering, consulting and architecture companies in applying net zero emission solutions to the design of transport infrastructure.

This session will focus on the activities of several of the Italian companies at the show who are each playing a leading role in the market to apply hydrogen in transport (e.g. railways, ports, electrification of docks etc). These projects are funded by the EU's post-pandemic recovery fund in Italy.
Joining us online:
- **Manlio Di Stefano**, Italian Undersecretary for Foreign Affairs and International Cooperation
- **Marco Bucci**, Mayor of Genova

Panellists:
- Decarbonisation solutions for transport infrastructure - **Roberto Carpaneto**, Board Member for International Affairs, OICE - Italian Association of Engineering and Architecture Companies
- **Sauro Pasini**, Senior Consultant Green Energy, PROGER SpA
- Research Center Hydrogen Demo Valley Feasibility Study - **Rossella Bozzini**, Member for Environmental Group, OICE - Italian Association of Engineering and Architecture Companies - Environment & Sustainability Division Head, TEN Italy Solutions
- How to save 40% energy in an industrial water treatment plant - **Lorenzo Rizzoli**, Director of Operations, ETC Engineering
- Airports with carbon neutral emissions – 3TI Experience - **Giorgia Gunnella**, Senior Partner & Director International Business of 3TI, 3TI Progetti Italia - Ingegneria Integrata S.p.A.
- New Energies for Mobility – Hydrogen - **Paolo Alberti**, Business Unit Director, Artelia Italia SpA
- Waste to Hydrogen: the sustainable fuel of tomorrow - **Dr Stefano Cocchi**, Innovation Manager, Incico
- Environmental engineering in the Energy and permitting services - **Francesco Ventura**, Engineering, VDP SRL
- Biogas to Power Generation vs LBM production – Environmental performance - **Ana Gabriela Crisan**, Technical Director - Renewables and Energy Transitions BU, Seingim Global Service

Dcarbonise EXHIBITION AND CONFERENCE 2022

Supply chain decarbonisation
What steps do organisations of all sizes need to take?
16:00 – 17:30
Governments, regulators, investors, and customers are increasingly demanding that business play its full part in global efforts to tackle climate change. Companies are responding with a wave of public commitments to ongoing emissions reductions.

These commitments initially focused on the Greenhouse Gas (GHG) Protocol's

Scope 1 and Scope 2 emissions, which are produced directly by companies or indirectly through the purchase of energy. Today, however, more organisations are also pledging to reduce their Scope 3 emissions generated in the upstream and downstream value chain.

Whether you represent a large organisation eager to encourage your supply chain to target net zero, or an SME eager to take first steps but not too sure what you should be measuring (and how); how you can set meaningful targets; and how to go about reporting what you have achieved, this session and the discussion time is very much for you.

The session will have wide appeal, and for example be of interest to those decarbonising cities, regions and 'places' just as much as to those involved in the renewable and low carbon energy sectors.
Chair: Kevin Agnew, RELX
Panellists:
- **Charles Langan**, Finance & Resources Director, ScottishPower -
- **Shirley Robertson**, Head of Environment, Consents and Sustainability, SSE
- Public Sector Supply Chain Decarbonisation - **Robert Hatcher**, Associate Director, Carbon Trust
- **Kirsty Isla MacArthur**, Director, MacArthur Green
- **Adam Bastock**, Founder, Small99
- **James Barry**, Chief Executive, Renewable Parts
- **Panel discussion and audience Q&A**

Dcarbonise EXHIBITION AND CONFERENCE 2022

Heat And Built Environment Conference Track
Alsh 2
In association with The Scottish Government and Energy Savings Trust

Built environment decarbonisation: Energy efficiency *is* heat efficiency
11:00-12:30
Reducing the demand for heat by improving the energy efficiency of buildings is essential and makes sound common sense financially and morally.

Scottish targets state that by 2040 all Scottish homes will have an Energy Performance Certificate (EPC) rating of band C where technically feasible and cost effective, and all non-domestic buildings will have their energy efficiency improved to the extent that it is technically feasible and cost effective.

By 2032, the Scottish Government aims to reduce residential heat demand by 15% and non-residential heat demand by 20% by improving the fabric of Scotland's buildings and ensuring they are insulated to the maximum appropriate level.

This session begins with 'Meet the Minister' providing an opportunity to ask him questions after a keynote address. Then it looks at buildings through the eyes of an inspirational Accredited Conservation Architect who sees the opportunity and potential that PAS2035 provides the construction industry to establish 'building passports' for every home in Scotland.

Focusing on the work of Energy Saving Trust and the advice it gives on maintaining and improving the energy and heat efficiency of domestic and non-domestic buildings and sees the launch of their new Business Energy Scotland service. Practical results when retrofitting tenements and a very different form of building then come under the conference spotlight, before the session ends with a look at new build and the drive for low/net zero carbon and sustainable solutions.

Chair: Dr Mike Pitts, Deputy Challenge Director, Innovate UK
Meet the Minister
- Keynote address: **Patrick Harvie MSP**, Minister for Zero Carbon Buildings, Active Travel and Tenants' Rights
- **Audience Q&A**

Speakers:
- Sustainability and conservation: Key to retrofit and new build - **Joanne McClelland**, Director – Architect, EALA Impacts CIC
- **Mike Thornton**, Chief Executive, Energy Saving Trust
- Effective domestic energy efficiency in practice:
  o Tenement success story – **Barbara Lantschner**, Associate Director, Building Performance Specialist, John Gilbert Architects
  o Historic buildings – **Dr Moses Jenkins**, Senior Technical Officer, Historic Environment Scotland
- Meeting the Net-Zero Challenge in New Housing – **Kathryn Dapre**, Head of Sustainability, Cala Group Ltd
- **Panel discussion and audience Q&A**

Dcarbonise EXHIBITION AND CONFERENCE 2022

Decarbonising Heat 1
Heat transformation: The case for low carbon heating solutions
14:00 – 15:30
Scotland's Heat in Buildings Strategy sets out a pathway to zero emissions buildings by 2045 and details a series of near-term actions, as well as a range of further, longer-term commitments to accelerate the transformation of the nation's building stock. It sets out the principles we will apply to ensure our actions to decarbonise heat do not have a detrimental impact on fuel poverty rates.

The Strategy sets out a vision for over 1 million homes in Scotland to convert to zero emissions heating by 2030 and the equivalent of 50,000 non-domestic buildings. Emissions from heat in buildings will have to fall by 68% by 2030 as compared to 2020. To maintain progress towards our statutory emissions reduction targets, heating installations must scale up to provide at least 124,000 systems installed between 2021 and 2026. The installation rate will need to peak at over 200,000 new systems per annum in the late 2020's which is above the natural replacement rate for boilers.

Two sessions have one thing in common, demystifying the journey to net zero with a variety of forms of heating solutions.

Chair: Dr Anastasia Charalampidou, Senior Policy Advisor, Heat Planning Team Leader, Scottish Government
Moving forward
- Heat transformation- the challenge and the opportunity for the Scottish Supply Chain - **Pilar Rodriguez**, Programme Manager, Sustainable Energy Supply Chain, Energy Saving Trust
- An introduction to HeatSource; Scotland's low carbon heat network – **Emma Church**, Impact Manager, Built Environment - Smarter Transformation (BE-ST)
- Heat Pumps - supporting customers on their journey to low carbon heating – **Rob McGaughey**, Head of Heat, ScottishPower
- H100 Fife: A net zero solution for home heating – **Craig McCafferty**, Project Director H100, SGN
- Opportunities for Companies in the Transition to Net Zero – **Neil Kitching**, Energy Specialist, Scottish Enterprise
- **Panel discussion and audience Q&A**

Dcarbonise EXHIBITION AND CONFERENCE 2022

Decarbonising Heat 2
Innovative solutions: Identifying new technologies to decarbonise the built environment
16:00-17:30
Chair: Tessa Clark, Principal Analyst & Consulting Delivery Lead, Delta-EE
Speakers:
- How to encourage adoption of heat pumps - **Anthony Kyriakides**, Head of Renewables, Energy Saving Trust
- Delivery of low carbon heat solutions - **Jess Grant**, Energy Consultant, Carbon Trust
- Heat networks - the key to decarbonising our cities - **Caroline Bragg**, Director of Policy and Research, The Association for Decentralised Energy (ADE)
- Shared ground heat exchange for the decarbonisation of heat– **Dr David Barns**, Research Associate, University of Leeds
- Electrifying heat on the journey to net zero - **Scott Lutton**, Operations Director - North & Scotland, Vital Energi
- **Panel discussion and audience Q&A**
- **Note:** The rest of the Heat and Built Environment programme takes place in the two dedicated show floor theatres in the Dcarbonise 2022 area of the exhibition from 10:30 - 17:00 on Day 1 and 10:30 -15:30 on Day 2

18:00 Civic Reception and Giant Networking Evening - Glasgow Science Centre

Dcarbonise
EXHIBITION AND CONFERENCE 2023

Lowering Carbon Impact to Improve Sustainability

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Dcarbonise @DcarboniseEvent www.all-energy.co.uk

Co-located with ALL-ENERGY EXHIBITION AND CONFERENCE 2023

Organised by RX

Main Conference Programme Thursday, 12 May

Day 2 Plenary session

A National Endeavour: Decarbonising the GB Power System by 2035
Lomond Auditorium

09:00-10:30
Decarbonising electricity is a vital step to delivering a net zero UK. And the 2035 target is only 13 years from now. Delivery requires huge efforts across the energy industry and our customers. What must be delivered? What is already in place? And what more will it take?
Chair: Matthew Knight, Head of Market Development, Siemens Energy UK
Topics and speakers
A national endeavour – The CCC – Chris Stark, CEO, Climate Change Committee
- Why electricity by 2035 is vital for a net zero economy by 2050 and some of the big numbers required – offshore wind, CCS, hydrogen. With growing demand for electricity to help heat and transport.

A whole system challenge – Guy Newey, Director of Strategy and Performance Energy Systems Catapult
- How everything combines to make a decarbonised power system possible. From grid scale energy storage to smart EV charging. What do we already know we need and what more do we need to develop?

Delivering renewable electricity – Lindsay McQuade, CEO, ScottishPower Renewables
- The role of renewable energy is key - how will it play out?

Delivering dispatchable low carbon electricity – Hannah Bronwin, Director of Business Development, SSE Thermal
- Big investments are needed to store and release that renewable energy when needed and to create dispatchable low carbon electricity. How does an operator of fossil gas plant today make the transition?

Making it all work - a message from Jeremy Allen, Head of BEIS Energy Portfolio Office
- Turning strategy into delivery. 2021 was the year of strategy. What is BEIS working on to enable delivery?'

Energy Systems Track
Lomond Auditorium

Energy Systems 4
An Integrated Energy Vision economic opportunity: Scotland and global
In association with Net Zero Technology Centre

11:00 – 12:30
- What are the choices to be made to ensure we deliver an Integrated Net Zero North Sea and maximise its value?
- Emissions reduction on existing assets, offshore wind, CCUS and green hydrogen all have their own opportunities but what are these and how do we realise them to deliver an affordable net zero?

The Net Zero Technology Centre's (NZTC) **Martyn Tulloch** will give a short presentation on the economic opportunities and choices outlined in its Integrated Energy Vision and a case study of export potential being examined in the European Hydrogen Backbone project a panel session will then follow.
Chair: Professor Sir Jim McDonald, Principal and Vice-Chancellor, University of Strathclyde
Keynote address:
- **Michael Matheson MSP**, Cabinet Secretary for Net Zero, Energy and Transport, Scottish Government

Panellists:
- **Colette Cohen**, CEO, Net Zero Technology Centre
- **Andy Rodden**, Offshore Renewables Director, ETZ
- **Adrian Gillespie**, Chief Executive, Scottish Enterprise
- **Bethan Vasey**, Energy Transition Manager UK Upstream, Shell
- **Barry Carruthers**, Director of Hydrogen, ScottishPower - Scot2Ger
- **Scott Robertson**, Head of Operations, North Sea Transition Authority
- **Panel discussion and audience Q&A**

Hydrogen and Fuel Cells Track
Forth

Hydrogen and Fuel Cells 3
Innovation
In association with Scottish Hydrogen and Fuel Cell Association

11:00 – 12:30
Chair: Dr Katriona Edlmann, Chancellor's Fellow in Energy, The University of Edinburgh
- The commercial case for hydrogen as a route to market for floating offshore wind in the UK - **Molly Iliffe**, Principal Consultant, ERM Europe
- The role of hydrogen compression technologies in the energy transition - **David Barrie**, New Build Sales Leader – Power & Environmental – Mining, HOWDEN
- Mission Innovation Hydrogen Challenge: UK strengths and opportunities - **Dr Michaela Kendall**, CEO and Co-Founder, Adelan
- Energy-efficient into the future - The stationary fuel cell system by Bosch - **Ben Richardson**, UK&I Lead - Stationary Fuel Cells (SOFC), Bosch
- Hydrogen for Aberdeen's district heat networks - **David Hogg**, Senior Consultant, Arup
- **Panel discussion and audience Q&A**

Energy Storage Track
Forth

Energy Storage 2
Batteries not included? PHS, Kinetics, & H2
In association with Scottish Hydrogen and Fuel Cell Association

14:00 – 15:30
Chair: Dr Grant Wilson, Lecturer, University of Birmingham
- Pumped Storage Hydro: How to win the war against climate change - **Mark Wilson**, CEO, ILI Group
- Innovation in grid stability – pioneering flywheel technology - **Simon Mulley**
- 250kW concept demonstrator - **Charlie Blair**, Managing Director, Gravitricity
- HyStorPor: Geological storage of hydrogen in the UK - **Dr Katriona Edlmann**, Chancellor's Fellow in Energy, University of Edinburgh
- Utilising publicly available datasets for identifying offshore salt strata and developing salt caverns for hydrogen storage - **Craig Allsop**, Civil and Environmental Engineering PhD Candidate, University of Strathclyde
- **Panel discussion and audience Q&A**

Offshore Wind Track
Carron

Sponsored by SHEPHERD WEDDERBURN

Offshore Wind 4
Floating wind: The road ahead
11:00 – 12:30
Chair: Una Brosnan, Head of Offshore Strategy & New Markets, Mainstream Renewable Power
Panellists:
- **Henrik Stiesdal,** Stiesdal Technologies
- **Andrew Jamieson**, CEO, Offshore Renewable Energy (ORE) Catapult
- **Sian Lloyd Rees**, UK Managing Director, Aker Offshore Wind
- **Julia Roope**, Floating Offshore Wind Subgroup Co-Chair, DeepWind
- **Beccie Drake**, Offshore Wind Digital Lead, Arup
- **Panel discussion and audience Q&A**

Offshore Wind 5
Floating wind: Opportunities and challenges
14:00 – 15:30
Chair: Maf Smith, Director, Lumen Energy & Environment
Panellists:
- Floating offshore wind – a global opportunity - **Maf Smith**, Director, Lumen Energy & Environment
- **Katherine Phillips**, Managing Director, OWC
- Floating wind - Opportunities and challenges across an International Project Portfolio - **Adrian de Andres**, Director Market Development, Simply Blue Group
- **Vicky O'Connor**, Technical Manager, Development, Europe, Northland Power UK Limited
- Celtic Sea Cluster - **Simon Cheeseman** - Wave & Tidal Energy Sector Specialist, Offshore Renewable Energy Catapult
- **Panel discussion and audience Q&A**

Onshore Wind Track
Dochart

Onshore Wind 3
The long game: Repowering and life extension
11:00 – 12:30
Chair: Peter, Clive, Principal Wind Energy Consultant, Black & Veatch (U.K.) Ltd.
The opportunities to capitalise on advances made in turbine technology and improvements in operations and maintenance raise possibilities for generating more energy from a similar footprint by increasing the size of the turbines and extending their lifetime. This session is concerned with lessons learned and challenges we are meeting in repowering and lifetime extension.
- Wind turbine optimisation and life extension - to measure or model - **Dr Iain Dinwoodie**, Head of Advanced Performance Engineering, Natural Power
- Challenges of aging fleets: Life Extension and partial repowering solutions - **Paula Garcia Los Arcos**, Head of Service Sales, Siemens Gamesa
- Making the most of the UK's onshore wind: The importance of life extension and repowering – **Adrian Warman**, Head of Operations, Thrive Renewables
- **Anne Stevenson**, Associate, ITPEnergised
- **Panel discussion and audience Q&A**

Onshore Wind 4
Digitalisation: The path from extractivism to interactivism
14:00 – 15:30
Chair: Dr Joanna McKenzie, Head of Data Science, The Data Lab
As projects become de-siloed, developers and operators adopt full life-cycle perspectives, workflows become digitally integrated, and circular approaches to materials are adopted, we see that wind power is leading the way in the emergence of the paradigm that will replace the extractivism that has dominated our economies up until now.
- The use of machine learning techniques to assess performance in wind turbines - **Carlos Gonzalez**, Technical Director, Renewable Dynamics
- Project Collaboration and Interface - Key Considerations from a Legal Perspective – **Neil Bruce**, Partner, Burness Paull LLP
- The digital bottleneck in scaling up renewable energy – Will Higham, Data Scientist, ONYX InSight
- Wind data models for integration of wind energy digital workflows - **Peter Clive**, Principal Wind Energy Consultant, Black & Veatch (U.K.)
- **Leanne Ramage**, Director of Advisory and Analytics, Natural Power
- **Panel discussion and audience Q&A**

Dcarbonise EXHIBITION AND CONFERENCE 2022

Industry decarbonisation Track
Gala

Industry decarbonisation 2
Determining the mix - and getting finance
11:00 – 12:30
Sponsored by Petrofac

Chair and introductory remarks - Bryony Livesey, Challenge Director - Industrial Decarbonisation, UKRI
- Hydrogen – a key step to decarbonise the distilling sector ahead of wider regional transition to net zero – **Dr Susi Wiseman**, Hydrogen Development Manager, Storegga
- Case study - net-zero roadmap for an industrial manufacturing site using on-site generation by a combination of renewable technologies - **Victor Castaneda**, Consultant Locogen
- Considerations in deploying green hydrogen for industrial decarbonisation - **Dr Chet Biliyok**, Technical Director, Petrofac
- Disrupting data centres: Converting from energy gremlins to an efficient environmental future - **Karthik Velayutham**, Founder/Co-CEO, Katrick Technologies
- How can we make Industrial Decarbonisation happen - **Jenni McDonnell MBE**, Thermal Energy Systems KT Manager, Innovate UK KTN
o The Scottish industrial decarbonisation investment incentivisation programme - **Stuart Watson**, Head of Decarbonisation for Energy-intensive Industries, Energy and Climate Change, Scottish Government
- **Panel discussion and audience Q&A**

Dcarbonise EXHIBITION AND CONFERENCE 2022

Industry decarbonisation 3
Solutions
14:00 – 15:30
Chair: Mercedes Maroto-Valer, Champion and Director, Industrial Decarbonisation Research and Innovation Centre
- Deploying Direct Air Capture at scale in Scotland in the 2020s - **Sanjay Parekh**, Storegga
- The commercial opportunity for LOHC as an enabler of industrial decarbonisation - **Molly Iliffe**, Principal Consultant, ERM
- The UK Industrial Decarbonisation Research and Innovation Centre (IDRIC), an update - **Mercedes Maroto-Valer**, Champion and Director, Industrial Decarbonisation Research and Innovation Centre
- Investing in a "greener grid": tackling SF6 use in our substations as we build a network for net zero - **Matthew Barnett**, Electrical Plant Subject Matter Expert, SSEN Transmission
- Technology agnostic steps to net zero in Industry - **John Barclay**, Technical Director, ITPEnergised
- Where to start the industrial decarbonisation journey - **Neil Simpson**, Independent Consultant, AMETEK Land – Simpson Combustion & Energy Ltd
- **Panel discussion and audience Q&A**

Dcarbonise EXHIBITION AND CONFERENCE 2022

Community & Local Energy Track
Alsh 1

Organised jointly by Local Energy Scotland and Highlands & Islands Enterprise

Community heat
11:00 – 12:30
In the community heat session, we will explore the implications for community energy from the Scottish Government's Heat in Buildings Strategy. We'll focus on the support available for decarbonising community buildings and for other community heat projects, hear from a community organisation that has decarbonised their heating system with CARES support, and will take a look at the idea of collective financing for heat.
Panellists:
- Introduction – **Dr. Stuart Black**, Chief Executive, Highlands and Islands Enterprise
- Local Heat and Energy Efficiencey Strategies (LHEES), Heat in Buildings Strategy (HiBS) and decarbonising community buildings - **Scottish Government**
- Decarbonising community buildings –new community heat support programme support - **Chris Morris**, Local Energy Scotland Manager, Local Energy Scotland
- Decarbonising community buildings - case study - **George McMullan**, ISCKON Scotland
- Collective financing for community heat - **Dr Matthew Hannon**, Reader in Sustainable Energy Policy and Business Models, University of Strathclyde
- **Panel discussion and audience Q&A**

Taking a Whole Systems Approach to Energy – Decarbonising Islands

14:00 – 15:30

In this session, we will look at the opportunities and challenges presented in supporting off-grid island projects and will find out more about the interaction between local and national energy systems.

Chair: Melanie Macrae, Head of Energy Systems and Technical Policy, Scottish Government

Panellists:

- Carbon Neutral Islands – **Lewis MacAskill**
- Supporting off electricity grid islands - **Chris Morris**, Local Energy Scotland Manager, Local Energy Scotland
- Learning from Community Energy Scotland's work with island projects - **Mark Hull**, Head of Innovation, Community Energy Scotland
- Local and national energy systems- how they interact - **Simon Gill**, Director, REGEN Scotland
- **Katrina Wiseman**, Shetland Area Manager, Highlands and Islands Enterprise
- **Panel discussion and audience Q&A**

Alsh 2

Hydropower 2022

In association with British Hydropower Association

11:15 - 12:45

Chair: Simon Hamlyn, CEO, British Hydropower Association

- **Nicholas Troja**, Senior Policy and External Relations Manager, SSE Renewables
- Unlocking the potential for long duration energy storage - **Richard Gow**, Senior Government Policy Manager, Drax Group
- Low-Head Hydropower Innovation - **Lars Boerner**, Managing Director, VerdErg Renewable Energy
- Completing the Circle of Hydrokinetic River Turbine Development - **Richard Montague**, Director, Kinetic Hydro Ltd
- And includes Simon Hamlyn's update on BHA activity
- **Panel discussion and audience Q&A**

Disruptive technology, digitalisation and security

14:00 – 15:30

Innovation is usually either sustaining or disruptive. If your innovation incrementally improves the existing product, then the innovation is sustainable. But if it completely changes the way the product has been used so far, or if it serves a completely different set of customers, then the innovation is disruptive. This session collects together ideas from people/ organisations who reckon their solution ticks that 'disruptive box' or want to share a digitalisation solution with the audience. Presentations will be followed by some lively discussion and providing answers to your questions.

Chair: Fraser Pritchard, Director, Columbus Energy Partners

- Commodity conversion of power, case studies, and economic viability of off-grid systems - **Fraser Pritchard**, Director, Columbus Energy Partners
- Zero carbon is dangerously too much – **Professor Stephen Salter**, Emeritus Professor, University of Edinburgh, who looks at marine cloud brightening
- Opportunities for an Energy Digital Transformation – **Johanna Money**, Researcher Scottish Enterprise
- Critical infrastructure protection for the energy sector – **Rob Bennett**, Senior Market Development Manager, Abloy
- Stationary fuel cells: The future of electrical generation – **Ben Richardson**, UK&I Lead - Stationary Fuel Cells (SOFC), Bosch
- **Panel discussion and audience Q&A**

Boisdale 1

Grid and networks

23 years till net zero: Can our networks achieve it?

11:00 – 12:30

What will the transmission system look like in 2035?

As recently set out in the British Energy Security Strategy, the UK Government has reiterated its committed to fully decarbonise the power sector by 2035, with increased ambition of 50GW of offshore wind by 2030 alongside significant growth in other low carbon technologies.

In Scotland, the recent ScotWind leasing round vastly exceeded expectations, with up to 25GW of offshore generation awarded seabed leases. The Scottish Government is also considering a new onshore wind target for an additional 8-12GW of onshore by 2030, supporting its commitment to a 75% emissions reduction target for 2030.

To deliver these targets and our collective net zero ambitions will require significant reinforcements in new and upgraded electricity transmission network infrastructure. In this session, the three GB transmission owners will present their vision for the electricity transmission system for 2035.

Chair: Kersti Berge, Director of Energy and Climate Change, Scottish Government

- Security of electricity supply: challenges in a net zero system (scene setting at UK level) - **Prof Keith Bell**, ScottishPower Professor of Future Power Systems, University of Strathclyde

The GB transmission owners' vision

- **Bless Kuri**, Head of System Planning and Investment, SSEN Transmission
- **Nicola Todd**, Head of Strategy and Innovation, NGET
- **Stephanie Anderson**, Head of Regulation, SPEN

Other expert views

Our expert group of speakers will provide important context to the session's theme and outline some of the nuanced challenges and opportunities. Time is also ring-fenced for discussion to keep us focussed on the big questions - how do we practically move things forward at pace and scale? who pays? what can we learn from other industries or countries?

- A network that's ready to support Net Zero: the DSO evolution - **Mark Goudie**, Distribution System Operation Manager, SP Energy Networks
- Crunch time: the urgent need to renew the grid - **Frédéric Lesur**, Grid Engineering Design Lab Manager, Nexans
- Network net zero advances from around Europe and India – **Dr Parag Vyas**, Chief Commercial Officer, Panitek Power
- **Panel discussion and audience Q&A**

Dcarbonise
EXHIBITION AND CONFERENCE 2022

Decarbonising Industrial Clusters

14:00-15:30

Organised by UK Research & Innovation (UKRI)

UK industry is responsible for a significant percentage of carbon emissions, and needs to decarbonise to meet Net Zero targets. The Industrial Decarbonisation Challenge is supporting the UK's six largest industrial clusters in their mission to decarbonise, so that the UK can produce the world's first net zero industrial cluster by 2040.

Join the Industrial Decarbonisation Challenge to learn more about progress in decarbonising the UK's major industrial clusters. This is your opportunity to hear about work underway in the North West, Scotland, Teesside, Humberside, the Midlands and South Wales to move these traditional industrial regions towards Net Zero. Speakers from each of the industrial clusters will cover their regional plans, including the work underway to deploy Carbon Capture and Storage, hydrogen production and distribution, how industry is decarbonising, and will also reflect on key areas such as policy development, encouraging regional investment and how to engage the public in ensure that social impacts are understood and managed effectively.

Chair: Bryony Livsey, Challenge Director - Industrial Decarbonisation, UKRI

Panellists:

- Regulatory perspectives - **Jonathan Briggs**, VPI Immingham - Humber Zero
- Hydrogen Demand Scenarios in the North West - **Chris O'Connor**, North West Cluster Plan, Equans
- ED&I and the HyNet Academy - **Kirstie Simpson**, HyNet, University of Chester
- CO2 Shipping, UK as a CO2 import hub - Ralph Windeatt, Associated British Ports, several IDC Projects
- Zero Carbon Hubs - **Matthew Rhodes**, Repowering the Black Country, Camirus
- South Wales Cluster
- North Endurance Partnership

Hall 1

PPAs in focus
Let's talk PPAs and their role in the energy transition
11:00 – 12:30
Chair: Duncan Dale, VP Customers Facing Business UK & Ireland, Statkraft

- What does a successful Corporate PPA look like and why they are not for everyone – **Tom Abbott**, Head of PPA, EDF
- Has last year given us a glimpse into the future energy market? Is your PPA holding you back from capitalising on market volatility - **Angus Widdowson**, Head of Smart Generation, SmartestEnergy
- To see a growth in renewables, bankable PPAs for flexible energy are paramount - **Duncan Dale**, VP Customers Facing Business UK & Ireland, Statkraft
- How to improve your PPA price through cutting edge technology - **Kristina Rabecaite**, Director, PPAYA
- The Path to True Zero - 24/7 Energy Traceability - **Steve Hoy**, Founder and CEO, Enosi Australia
- **Panel discussion and audience Q&A**

M4

ScotWind and INTOG – Progress and Plans
11:00 – 12:30
Organised by Scottish Government – Marine Scotland Directorate

This session will provide an update on plans and actions ongoing in the wider Scottish Government family on the ScotWind and INTOG leasing rounds. The presentations will cover strategic planning, consenting and licensing alongside updates from the Scottish Government Directorate for Energy and Climate Change, NatureScot and ScotMer research.
Chair: Zoe Crutchfield

- Introductions: **Zoe Crutchfield**
- Sectoral Marine Plan, IPR and National Marine Plan - **Giulia Agnisola** and **Sophie Humphries**
- Scottish Government Directorate for Energy and Climate Change - **Lorna Finlayson**
- Consenting and Licensing – Updates and Streamlining: MS-LOT - **Mike Bland** and **Rebecca Bamlett**
- NatureScot Update - **Erica Knott** and **Karen Taylor**
- ScotMer and research project updates - **Alex Gilliland** and Marine Scotland Science

Panel session including:

- **Drew Milne**
- **Gayle Holland**
- **Lorna Finlayson**

'MEET THE DEVELOPER' SHARE FAIR

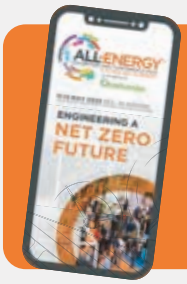
Over the two day event, All-Energy/Dcarbonise will host a series of 1-2-1 'speeddating' meetings in the Power Club meet the developer lounge. It's where you can literally 'Meet the Developers' looking to expand their supply chains; We have a range of owner/operators of energy projects and devices looking to work with you. To attend your pre-booked meeting; or to book a meeting, please visit the Share Fair reception at the Power Club, from 11:00-12:45; 13:00-15:00 and (only on day 1) 15:45-17:30

Here's who you can meet on Day 1:

- 13:00-15:00
  EDF Renewables – David Sweenie, Development Manager, EDF Renewables
- 11:00-12:45 and 13:00-15:00
  VerdErg – Lars Boerner, Managing Director
- 13:00-15:00 and 15:45-17:30
  Corio Generation – Benoit Lavinal, Head of Procurement
- 11:00-12:45 and 15:45-17:30
  Red Rock Power – Rob Lilly, Supply Chain Specialist
- 13:00-15:00 and 15:45-17:30
  Red Rock Power – Andrew Pringle, Construction Manager
- 13:00-15:00
  Floating Energy Allyance, Alasdair MacLeod, Project Director
- 11:00-12:45
  ScottishPower, Kirsty Adams, Senior Supply Chain Strategy Manager
- 15:45-17:30
  EnbW, Duncan Ayling, Supply Chain Manager, UK Offshore Wind
- 11:00-12:45 and 15:45-17:30
  Cierco, Alex Gauntt, Supply Chain Director
- 11:00-12:45
  Simply Blue Group, Erik Kiltie, Deputy Technical Manager, Salamander Floating Wind

And there are more on Day 2!

- 11:00-12:45 and 13:00-15:00
  Red Rock Power – Rob Lilly, Supply Chain Specialist
- 11:00-12:45
  ScottishPower, Kirsty Adams, Senior Supply Chain Strategy Manager
- 11:00-12:45
  Simply Blue Group, Huw Bell, Project Director
- 11:00-12:45
  Cierco, Alex Gauntt, Supply Chain Director
- 11:00-12:45 and 13:00-15:00
  EnbW, Duncan Ayling, Supply Chain Manager, UK Offshore Wind



Check the All-Energy and Dcarbonise App and the website for more information

OFFSHORE WIND SHOW FLOOR THEATRE

Wednesday 11 May

Sponsored by

SHEPHERD WEDDERBURN

10:30 **Future offshore wind scenarios**
Beccie Drake, Offshore Wind Digital Lead, Arup

10:45 **Delivering operator services in offshore wind**
Alex Fowler, Head of Offshore Service Sales - Aftermarket, Siemens Gamesa Renewable Energy

11:00 **Seabed Features & Hazards – Don't miss the unforgettable!**
Dr Neil Morgan, Principal Geotechnical Engineer, Lloyd's Register

11:15 **UXO Risk: A Developer's Perspective**
Andrew Kirkland, Lead Geophysical Engineer, ScottishPower Renewables

11:30 **Floating LiDAR standards and guidance: An update centred around the upcoming technical specification IEC 61400-50-4**
Dr Peter Clive, Principal Wind Energy Consultant, Black & Veatch (U.K.)

11:45 **The importance of environmental assessment in consenting offshore wind**
Alex Thompson, Principal Consultant – Offshore Renewables, ERM

12:00 **Break**

12:15 **Sponsor's slot:** Shepherd and Wedderburn
Powering your clean-tech start up - from IP rights to early stage investment, legal insights on how to accelerate growth
Join Shepherd and Wedderburn's specialists John Morrison (corporate finance) and Joe Fitzgibbon (intellectual property) in conversation with Andrew Smith of Greenbackers on key legal issues for clean tech start-ups on the road to commercialisation.

12:45 **Trialling environmental DNA (eDNA) fish surveys on offshore wind farms**
Michelle Elliott, Senior Environmental Consultant, The Natural Power and Dr Edward Wort, Technical Manager, NatureMetrics

13:00 **Informed and proportionate EIAs: The added bonus of test and demo windfarms**
Liz Foubister, Renewables Consenting Technical Authority, Xodus Group

13:15 **Offshore Energy Integration**
Rosy Jones, Offshore Environment Manager, Ørsted and Beatrice d'Eufemia, Technical Package Manager, Ørsted

13:30 **Investing in shared hydrogen transmission infrastructure can unlock deep offshore wind energy**
David Wickham, Hydrogen Consultant, ERM

13:45 **Break**

14:00 **Offshore Wind Cluster Builder: A strategic approach to developing a leading offshore wind supply chain in Scotland**
Kitty Dutton, Xodus Group

14:15 **Delivering a national offshore wind hub for Scotland**
Joanne Allday, Strategic Business Development Manager, Port of Cromarty Firth

14:30 **Offshore charging: Connecting maritime to offshore wind**
George Smith, Managing Director, Oasis Marine Power

14:45 **Sandeel Fisheries Management: Helping meet 2030 offshore wind targets while supporting the North Sea's marine ecosystem**
Jonathan Abbatt, Lead Consents Strategy Manager, SSE Renewables

15:00 **Generative design of floating wind turbine mooring systems**
Dr Sam Weller, Associate Consultant, Tension Technology International Ltd

15:15 **Fatigue monitoring of floating wind turbine moorings**
Dr Stuart Killbourn, Principal Engineer, Fugro

15:30 **Break**

15:45 **How to drive operational excellence through blade management**
Tim Bradshaw, Technical Director, MISTRAS Group

16:00 **Connecting offshore wind farms through superconducting cables**
Dr Arnaud Allais, Fellow Project Director, Advanced Grid solutions and Architectures, Nexans

16:15 **Diversity & Inclusion in the UK Offshore Wind Sector**
Ranjit Mene, Offshore Wind Business Development, RINA

16:30 **Using drones and artificial intelligence for detecting damages on wind turbines**
Robert Hörmann, CEO, Aero Enterprise GmbH

MARINE ENERGY SHOW FLOOR THEATRE

Thursday 12 May

Sponsored by

SHEPHERD WEDDERBURN

10:30 **Marine Energy Opportunities in Wales**
Jay Sheppard, Project Manager, Marine Energy Wales

10:45 **TIGER: Lessons learned**
Andy Baldock, Director, Baldock Energy Ltd.

11:00 **TIGER: Cost reduction**
Dr Ciaran Frost, Techno-Economic Analyst, Offshore Renewable Energy Catapult

11:15 **Concrete as a technology enabler for wave energy**
Rachael Mell, Senior Energy Consultant, Arup

11:30 **Benefits of tidal generation and electrolysis in supporting island and remote coastal communities to achieve net zero at optimum cost**
Nicholas Eraut, Project Manager, Energy Systems Catapult

11:45 **MeyGen: Lessons learned**
Andy Baldock, Director, Baldock Energy Ltd.

12:00 **Reduce the wait: Why marine quick connection systems could be a key technology for new marine renewables**
Beth Dickens, Director, Quoceant

12:15 **Ocean energy updates from EMEC and friends**
The annual quick-fire speed update session featuring EMEC, the developers testing at their sites in Orkney, and some of their project partners working on pioneering projects to transform the wave and tidal energy industry. More marine energy devices have been tested at EMEC that at any other single site in the world. EMEC has hosted 21 wave and tidal energy clients (with 34 marine energy devices) spanning 11 countries.
Chair: Carly Trait, EMEC
- The path to commercialisation – reducing the time, cost and risk of real-sea demonstration – **Matthew Finn**, EMEC
- Cost reduction and local content – tidal energy - **James Murray**, Orbital Marine Power
- Justice, innovation and emerging technologies - ocean energy's role in a just transition - **Lara Santos**, EMEC
- Shakedown testing – lessons learnt from scale testing at EMEC - **Simon Grey** - AWS Ocean Energy
- Tidal power innovation - pushing technology to the limit - **Alejandro Marques**, Magallanes
- Installing ocean energy devices at sea - lessons learnt - **Jason Schofield**, Green Marine
- Turnkey water-to-wire array demonstrations – **Sue Barr**, Verdant Power
- Alternative designs - **Ian Johnstone**, Flumill F3 Demo project / Director, Aquatera
- Wave power demonstration - from FaB Test to EMEC - **Martin Carruth**, Marine Power Systems

13:45 **Sponsor's session -** Shepherd and Wedderburn
Offshore applications, how can we collectively improve?
An open discussion between Marine Scotland and Shepherd and Wedderburn

Participating:
Patricia Hawthorn, Consultant, Shepherd and Wedderburn
Colin Innes, Partner, Shepherd and Wedderburn
Zoe Crutchfield, Head of Licensing Operations Team, Marine Scotland
David Pratt, Head of Marine Planning, Development and Crown Estate Strategy, Marine Scotland

14:15 **Combined wave energy converter and energy storage for the grid**
Calum Ramage, TWEFDA

14:30 **Best practice in benchmarking: TRL 1-5**
Andy Baldock, Director, Baldock Energy Ltd.

14:45 **Route to market: Technology qualification and certification to attract investment**
Caroline Lourie, Technical Manager, European Marine Energy Centre (EMEC)

15:00 **Case study: Performance verification TRL 6+**
Craig Dibb, Performance Test Engineer, European Marine Energy Centre (EMEC)

COMMUNITY AND LOCAL ENERGY SHOW FLOOR THEATRE

Wednesday 11 May

Organised jointly by Local Energy Scotland and Highlands & Islands Enterprise

Welcome and Introductions

10:30 **Welcome**
Elain MacRae, Head of Energy Strategy, Highlands and Islands Enterprise
Laura Campbell, Partnerships Manager, Local Energy Scotland

10:45 **Scottish Government support and priorities**
TBC, Scottish Government

Finance and funding

11:00 **Developing a fundable community investment structure**
Andrew Wilkinson, Partner, QMPF LLP

11:15 **Scaling up community and local energy**
Louise Daniels, Head of Communications & Marketing, Thrive Renewables

Islands

11:30 **ReFLEX Orkney – demonstrating the energy system of the future**
Ian Johnstone, Director, Aquatera

11:45 **ORION – Shaping Shetland as the UK's first energy island**
Gunther Newcombe, Energy Consultant, NewByrne Consultants

12:00 **Addressing fuel poverty through local energy generation and control on Hoy**
Dr Brenda Park, Director/COO, StorTera

12:15 **Automated archetyping and data harmonisation for future smart communities**
Dr Peter McCallum, Research Associate, Heriot-Watt University

12:30 **Break**

Local Energy Systems

12:45 **Smart Local Energy Systems - learning from the Prospering from the Energy Revolution Programme**
Rob Saunders, Challenge Director - Prospering from the Energy Revolution, UK Research & Innovation (UKRI)

13:00 **A contractors experience of supporting CARES projects**
Jamie Storry, National Sales Manager, Emtec Energy

13:15 **How to enable local energy supply from local energy assets**
Mark Meyrick, Head of Smart Grids & PPA, Ecotricity

13:30 **Local Energy Systems Scottish Industry Network (LESSIN) - Collaboration & Support to Help LES Flourish**
Natasha Madeira, Business Development Manager - Energy Systems, Energy Technology Partnership

13:45 **Local Energy Systems in India: Challenges and Opportunities**
Dr Parag Vyas, Chief Commercial Officer, Panitek Power

14:00 **Ditching diesel: the Renewable-fuelled microgrids for the green energy transition**
Dr Toby Gill, CEO, Intelligent Power Generation

Hydrogen

14:15 **Operational Experience of Hydrogen on Orkney: lessons learnt**
Jerry Gibson, Operations Technician, EMEC

14:30 **Demonstrating a green hydrogen powered future for Edinburgh's outdoor festivals**
David Amos, Managing Director, PlusZero Limited

14:45 **Break**

Case studies

15:00 **Climate Positive - a new model for smart local energy**
Alistair Roberts, Community Renewables Manager, Power Circle Ltd

15:15 **Community Energy - The enabler of a fairer and faster net zero**
Tom Nockolds, Project Manager, Scotland, Energy4All

15:30 **Creating a Local Energy System in Aberdeenshire**
Philippa Hardy, Associate Director, Locogen

15:45 **Commodity conversion of power, case studies, and economic viability of off-grid systems**
Fraser Pritchard, Director, Columbus Energy Partners

16:00 **Break**

Support for Community and Local Energy Projects

16:15 **Highlands & Islands Enterprise support**
Elain MacRae, Head of Energy Strategy, Highlands and Islands Enterprise

16:30 **Let's do more shared ownership**
Mark Brennan, Shared Ownership Manager Local Energy Scotland

16:45 **Close and invite to HIE pavilion**
Mark Brennan, Shared Ownership Manager Local Energy Scotland

HYDROGEN AND ENERGY STORAGE SHOW FLOOR THEATRE

Wednesday 11 May

Sponsored by

DOOSAN Babcock

10:30 **Renewable hydrogen for a sustainable Europe and future clean transport and industry sectors**
Paul McCormack, Innovation Manager, Belfast Met

10:45 **Is the UK ready for the green hydrogen revolution sparked by the offshore wind success?**
Jakub Vrba, Renewables Consultant, Xodus

11:00 **Addressing the barriers to integrating offshore wind and hydrogen**
Dr James Ferguson, Research Engineer – Hydrogen Systems, Offshore Renewable Energy Catapult

11:15 **North East Scotland's hydrogen ambition: Time to turn potential into reality**
Martin McCormack, Director, CCUS & Hydrogen, ETZ Ltd

11:30 **Scotland's Hydrogen Economy**
Jamie Robinson, Low Carbon Transition - Hydrogen Specialist, Scottish Enterprise

12:00 **Creating a market for hydrogen**
Darren Walsh, DWF Law LLP

12:15 **Hydrogen updates from EMEC and friends**
This quickfire session comprises a series of speed updates from EMEC and partners from hydrogen projects such as ITEG, HIMET, HyFlyer, SATE, Kirkwall Airport CHP, HYAI, and an innovative flow cell battery project.

The speed updates will showcase the hydrogen developments on Orkney and also address wider challenges such as constrained renewables, scalability, training and how developments in the hydrogen space can support the transition from fossil fuels to net zero.

- **Chair: Mairéad Connolly**, Hydrogen Development Officer, EMEC
- EMEC Hydrogen infrastructure update / EMEC Operational experience– **Jerry Gibson**, Operations Technician, EMEC
- Vanadium flow cell batteries coupled with tidal generation and hydrogen production - **Jeffrey Douglass**, Markets and Analytics Manager, Invinity Energy Systems
- Integration of AI with hydrogen operations - **Joshua Ivanhoe**, Machine Learning Lead, H2GO Power
- Hydrogen Territories Platform: Thinking local, acting global – **Dr Nigel Holmes**, Chief Executive, Scottish Hydrogen and Fuel Cell Association
- Decarbonising ferries with hydrogen: challenges and lessons learnt - **Leonore van Velzen**, Hydrogen Project Manager, EMEC
- Value of a hybrid system in shore-side applications (HIMET) – **Tom Harrison**, Oaktec
- Hydrogen and derivatives, synthetic gasoline creation on Orkney - **Pete Oswald**, Director, iGTL
- Hydrogen for heat: Kirkwall Airport CHP progress update **Stephen Cunnife**, Hydrogen Technology Lead, Doosan
- Technoeconomic modelling of renewable hydrogen supply chains on islands with constrained grids

James Ferguson, Research Engineer - Hydrogen Systems, Offshore Renewable Energy Catapult

13:45 **The role of hydrogen in Scotland's transport ecosystem**
James Paterson, Project Engineer, The Hydrogen Accelerator based at the University of St Andrews

14:00 **Sponsor session**
Perspectives on the emerging offshore wind to hydrogen market in the UK
Dolphyn: Project introduction, overview and developments - **David Caine**, Partner, ERM
Dolphyn:Technical integration challenges for offshore hydrogen production - **Stephen Cunniffe**, Hydrogen Development Lead, Doosan Babcock
Emerging market opportunities and challenges - **Everett Anderson**, Vice President, Advanced Product Development, Nel Hydrogen

14:30 **Break**

14:45 **Hydrogen, INTOG and an Integrated Vision for a Net Zero North Sea**
Mary Thorogood, Government Relations, External Affairs and Communications Director, Net Zero Technology Centre

15:00 **Green H2 production, distribution and refuelling for buses: A case study from Belfast**
Bill Ireland, CEO, Logan Energy

15:15 **Ports as hydrogen valleys and hubs**
Jon Jordan, Secretary, North Sea Hydrogen Ports and Maritime Community (NS HyMaP)

15:30 **Charting the course to maritime decarbonisation: challenges and lessons learnt**
Leonore van Velzen, Hydrogen Project Manager, EMEC

15:45 **Hydrogen storage, transport and use in a marine context : Learenings from UK industrial trials**
Molly Iliffe, Principal Consultant, ERM

16:00 **Flywheel storage for EV ultra-charging**
Prof Keith Pullen, Levistor

16:15 **Building the next generation of flow battery**
Dr Brenda Park, Director/COO, StorTera

16:30 **Feasibility of flow batteries for maritime electrification**
Anthony Price, Director, Swanbarton

HYDROGEN AND ENERGY STORAGE SHOW FLOOR THEATRE

Thursday 12 May

Sponsored by

DOOSAN Babcock

10:30 **Building the hydrogen economy across Scotland**
Dr Nigel Holmes, CEO, Scottish Hydrogen & Fuel Cell Association (SHFCA)

10:45 **Operational experience of hydrogen on Orkney: Lessons learnt**
Jerry Gibson, Operations Technician, EMEC

11:00 **Recent developments in UK energy markets: What it means for Vanadium flow batteries**
Jeffrey Douglass, Markets and Analytics Manager, Invinity

11:15 **Feasibility of a 100% green hydrogen hub on the Outer Hebrides**
Dr Stephen Livermore, Senior Consultant, Frazer-Nash

11:30 **Utilising Hydrogen Technologies in Scotland's Transport Ecosystem**
Dr Gerry Agnew, Director, Hydrogen Accelerator based at the University of St Andrews

11:45 **ORION – Shaping Shetland as the UK's first energy island**
Gunther Newcombe, Energy Consultant, NewByrne Consultants

12:00 **Power to X - Decarbonising vital industries**
Dr Paul Webb, Royal Society Industry Fellow at University of St Andrews

12:15 **Sponsor session**
Doosan Babcock: Supporting hydrogen infrastructure build-out and technology demonstration
Stephen Cunniffe, Hydrogen Development Lead, Doosan Babcock

Aker Solutions: Energy resilience through large-scale hydrogen storage
Jonathan Minnitt, Business Development & Study Manager, Aker Solutions

12:45 **Benefits of tidal generation and electrolysis in supporting island and remote coastal communities to achieve net zero at optimum cost**
Nicholas Eraut, Project Manager, Energy Systems Catapult

13:00 **Decarbonising the distillation process via direct fuel switching from fossil fuels to hydrogen**
Jack Byres, Senior Renewable Energy Consultant, Locogen

13:15 **Performance results from an AI-based smart grid project**
Katie Inthavong, StorTera

13:30 **Combined wave energy converter and energy storage for the grid**
Calum Ramage, TWEFDA

13:45 **Emissions of hydrogen in a future hydrogen economy**
Dr Stephen Livermore, Senior Consultant, Frazer-Nash

14:00 **100% hydrogen CHP technology**
Martin Kenzie, UK Sales Manager, 2G Energy UK ltd

14:15 **HydroGlen Project – A 'hydrogen-based' solution to satisfy power demand**
Steve Elliot, Director, Power (Europe), RINA Tech UK Ltd

TRANSPORT DECARBONISATION SHOW FLOOR THEATRE

Wednesday 11 May

In association with Transport Scotland

Sponsored by

10:30 **Shell Eco-marathon: Brilliant minds coming together to help build a lower carbon world**
Mairi McKay, Community Liaison Officer, Shell UK

10:45 **Shell Eco-marathon contenders: USEV**
Emma Burnley-Davis, Team Captain, University of Strathclyde Eco-Vehicle Team and Lauriana Luchita, Team Captain, PrototAU – University of Aberdeen

11:00 **Top tips for planning and implementing public charging infrastructure in Scotland**
Dominic McMahon, Technical Analyst - Transport, Energy Saving Trust

11:15 **Hydrogen fuel cell bus retrofits: Zero emissions for half the cost**
Andy Ennever, Service Leader – Hydrogen Fuel Cell Systems, Ricardo

11:30 **Lowering the cost of hydrogen refuelling using the MC method of dispensing: A world first**
Bill Ireland, CEO, Logan Energy

12:00 **The role of hydrogen in Scotland's transport ecosystem**
James Paterson, Project Engineer, The Hydrogen Accelerator based at the University of St Andrews

12:15 **Scottish hydrogen train project**
James Alton, Senior Consultant, Arup

12:45 **Sponsor's session: Shell Recharge TBC**

14:00 **Making aviation sustainable: A deep dive on ZeroAvia's HyFlyerII initiative**
Julian Renz, Head of Programmes, ZeroAvia

14:15 **Break**

14:30 **EMEC and friends: Hydrogen and low-carbon aviation speed update session**
- **Chair: Caron Oag, Senior Marketing Officer (Hydrogen), European Marine Energy Centre**
- Scotland's plans in decarbonization - Terry Shevlin, Transport Scotland
- Highlands and Islands: Centre of excellence for aviation technology testing – Lynda Johnston, Highlands and Islands Airports Ltd
- HyFlyer test flight programme / role of hydrogen in regional aviation - Julian Renz, Head of Programmes, ZeroAvia
- HyTruck: refuelling on HyFlyer programme – Beth Dawson, Fuel Cell Systems
- Developing the safety case for hydrogen use at an airport environment

Ed Macfarlane, Principal Consultant, Abott Risk Consulting

15:30 **Emissions from 'Last Mile' deliveries in Scotland**
Fergus Worthy, General Manager, Scotland, Cenex

15:45 **Break**

16:00 **ReFLEX Orkney: demonstrating the energy system of the future**
Ian Johnstone, Director, Aquatera

16:15 **TBC**

16:30 **Rapid to deploy hydrogen vehicle refuelling: solving the chicken and egg dilemma**
Dean O'Connor, CEO, NanoSUN

TRANSPORT DECARBONISATION SHOW FLOOR THEATRE

Thursday 12 May

Sponsored by

10:45 **A first look at hidden costs of road maintenance due to increased weight of zero emissions vehicles**
John Low, PhD Researcher, University of Edinburgh

11:00 **Either here or there: Demand planning and optimal siting of public EV charging infrastructure – Challenges & Opportunities**
Ryan Sims, Lead R&D Engineer, Power Networks Demonstration Centre, University of Strathclyde

11:15 **Hydrogen solutions for 'hard to treat' transport**
Dr Nigel Holmes, CEO, Scottish Hydrogen and Fuel Cell Association

11:30 **Low carbon shipping: options for ship electrification. Lessons from a DfT funded feasibility study**
Anthony Price, Director Swanbarton; Jonathan Williams, MSE International

11:45 **Charting the course to maritime decarbonisation: Challenges and lessons learnt**
Leonore van Velzen, Hydrogen Project Manager, EMEC

12:00 **Decarbonising the maritime sector in the Shetland islands**
Alec Davies, Consultant, Ricardo

12:15 **Break**

12:30 **Sponsor's session - Shell**
How to pick up the pace when creating your public EV charging network: What we've learnt from rolling out 5000 public charge points in the UK
Based on our experience of rolling out over 5000 public charge points. Identifying the main issues councils have faced when rolling out their EV strategy. Focusing on: The unique role that LAs have to play when it comes to on street charging.
Understanding & accessing funding
Not overcomplicating the EV strategy
Letting the public lead the way

Toby Butler from Ubitricity (public charging infrastructure)

13:00 **Importance of data collection and recording for decarbonisation**
Alex Foyn, Technical Analyst, Energy Saving Trust

13:15 **The Dawn of the Electric Pedal Assisted Vehicle**
Moira Forsyth, Specialist, Scottish Enterprise

13:30 **The power of engagement to support decarbonisation**
Iain MacLeod, Assistant Manager – Scottish Transport, Energy Saving Trust

13:45 **Heavy duty fuel cell electric vehicles: From the future to the present**
Richard Kemp-Harper, Ballard Power Systems

14:00 **Developing the next-generation zero emission refuse collection vehicles**
Kevin Crowder, Sales & Marketing Director, Farid Hillend Engineering

14:15 **Net zero transport: Spatial planning and place-based solutions**
Paul Curtis, Director, Vectos – part of SLR

BUILT ENVIRONMENT SHOW FLOOR THEATRE

Wednesday 11 May

In association with the Scottish Government and Energy Saving Trust

10:30	**What does the green recovery look like for your business?** **Dimo Peev**, Business Advisor, Business Energy Scotland
10:45	**Net Zero Public Sectors Building Standard - Sustainable Value Engineering: reconciling energy efficiency, embodied carbon and circularity of materials** **Ranald Boydell**, Director, Ecohus and Associate Professor Heriot-Watt University
11:00	**Green skills for a net zero future** **John Renwick**, Sector Manager – Construction, Energy Skills Partnership
11:15	**Whole person: Whole place energy solutions** **Dr Iain Cairns**, Research Associate, University of Strathclyde
11:30	**Energy savings through improved water treatment in buildings** **Robert Wilson**, Director, SafeSol Ltd, South Shields
11:45	**Transitioning to a low carbon future with Salix Finance** **Heather Jones**, Programme Manager, Salix
12:00	**Break**
12:15	**Power of HOMEs: How UK homes can join the energy revolution** **Eleonore Glendinning**, Head, Voltalis UK
12:30	**Achieving Net Zero Through Modular Design** **Rehan Khodabuccus**, Operations Director, ZED Pods
12:45	**Active Building Centre** **Chris Brierly**
13:00	**Net Zero Public Sectors Building Standard** **Ross Ramsay**, Associate Director for Net Zero, Scottish Futures Trust
13:30	**Break**
14:45	Meet **Joanne McClelland**, Director - Architect, EALA Impacts CIC. The inspirational speaker in the opening conference session on the built environment who sees the opportunity and potential that PAS2035 provides the construction industry to establish 'building passports' for every home in Scotland
14:30	**An introduction to Business Energy Scotland** **Ryan Felber**, Business Advisor, Business Energy Scotland
14:45	**Break**
15:00	**Existing research on householder energy retrofit decision-making and the retrofit journey** **Orlaith McGinley**, PhD Researcher, National University of Ireland Galway
15:15	**Datasets for decarbonisation using big data to plan energy efficiency retrofits** **Dai Grady**, Data Management Officer, Energy Saving Trust
15:30	**How Artificial Intelligence can accelerate the journey to net-zero** **Paul McCorquodale**, CEO, Grid Edge
15:45	**Retrofit room-level control of the heating in commercial & public buildings to save 30%** **Janette O'Hagan**, Managing Director, Heatboss
16:00	**Break**

BUILT ENVIRONMENT SHOW FLOOR THEATRE

Thursday 12 May

In association with the Scottish Government and Energy Saving Trust

10:30	**Greening of housing developments – heat and power solutions** **Judith Stephenson**, Shepherd and Wedderburn [30 minutes]
11:00	**Glasgow's COP26 Zero Carbon House** **Peter Smith**, Lead architect behind the house, Associate at Roderick James Architects
11:15	**Financial schemes: accessing support to decarbonise energy for business** **Emma Dunsmuir**, Business Advisor, Business Energy Scotland
11:30	**Why is energy efficiency important to an energy provider?** **John Taylor**, Business Transformation Specialist, UGI International
11:45	**How energy efficient are your houses, warehouses, office and commercial buildings?** **Alex Gow**, Sales Director, SatelliteVu
12:00	**HIPER® Pile: Reduce embodied carbon by up to 84%** **Stuart Norman**, Managing Director, Keltbray Piling
12:15	**Embodied carbon assessment – a must for sustainable construction** **Jim Hart**, Director, JH Sustainability
12:30	**Optimising Scotland's heating and cooling systems for low carbon and low energy costs** **Jack Welch**, Sales Manager Scotland, Hysopt
12:45	**Break**
13:00	**Digital energy networks for building energy reductions** **Gillian Brown**, Energy Manager, University of Glasgow

HEAT DECARBONISATION SHOW FLOOR THEATRE

Wednesday 11 May

In association with the Scottish Government and Energy Saving Trust

10:30 **A decade-long journey to bring river heat systems from Norway to the UK**
David Pearson, Group Sustainable Development Director, Star Renewable Energy

11:00 **Heat in building strategy opportunities for supply chain**
Pilar Rodriguez, Programme Manager, Sustainable Energy Supply Chain, Energy Savings Trust

11:15 **Break**

11:30 **Delivering Low Carbon heat in Greater Glasgow**
John Sammon, Account Director, Vattenfall Heat UK

11:45 **Optimising Scotland's heating and cooling systems for low carbon and low energy costs**
Jack Welch, Sales Manager Scotland, Hysopt

12:00 **Q-zeta - cost effective, grid-integrated domestic heat storage**
Dr Richard Yemm, Director, Q-zeta Ltd

12:15 **Break**

12:30 **A just transition to low carbon heat in off-gas rural Scotland**
Freya Burns, Senior Research Consultant, Changeworks

12:45 **Using heat system performance data to reduce resident bills and carbon emissions**
Casey Cole, CEO, Guru Systems

13:00 **Mitigating the network impacts of electrifying heating while giving customers the outcomes they want**
Roxanne Pieterse, Senior Analyst, Delta-EE

13:15 **Retrofit room-level control of the heating in commercial & public buildings to save 30%**
Janette O'Hagan, Managing Director, Heatboss

13:30 **Impacts of centralised air-source heat pump location and design in urban heat networks**
Dr Joel Gustafsson, Director, Joel Gustafsson Consulting and **Lyall Archer**, Process Engineer, SSE - Energy Solutions

13:45 **The solution for net zero heat: Exploring the potential for integrated ambient heat networks and networked heat pumps**
Karl Drage, Director, The Kensa Group

14:00 **Gas decarbonisation in Scotland**
Jacob Kane, Associate - Hydrogen, Arup

14:15 **Break**

14:30 **rDME – the challenges of putting a new sustainable fuel in the market: Why, how and when**
Luca Vailati, Director of Business Development, Dimeta B.V.

14:45 **Low Carbon heat delivered in Amsterdam**
Paul Steen, Head of Scotland and North Region, Vattenfall Heat UK

15:00 **Start solving our carbon problem in the UK today by maximising heat networks**
Finian Parrick, Founder/Director, Minibems

15:15 **Break**

15:30 **Hydrogen for Aberdeen's district heat networks**
David Hogg, senior Consultant, Arup

15:45 **Smart Efficient Compression: Reliability and Energy Targets (SECRET)**
Prof Ahmed Kovacevic, Howden and Royal Academy of Engineering Research Chair in Compressor Technology, City, University of London

16:00 **Technical solutions for decarbonising the distilling sector**
Jack Byres, Senior Renewable Energy Consultant, Locogen

16:15 **Accelerating low carbon heat uptake by 2030 with hydrogen**
Dr Nigel Holmes, CEO, Scottish Hydrogen and Fuel Cell Association

HEAT DECARBONISATION SHOW FLOOR THEATRE

Thursday 12 May

In association with the Scottish Government and Energy Saving Trust

10:30	**Decarbonising residential heating: Cost-benefit analysis to support policy design** Jennifer Penman, PhD Student, University of Bath
10:45	**Retro fit, low carbon solution** Jim Bisset, Managing Director, Hydro Genie Systems
11:00	**Transitioning to a low carbon future with Salix Finance** Heather Jones, Programme Manager, Salix
11:15	**Break**
11:30	**Teaching the use of heat pumps with a digital twin** Vesa-Matti Ruismaki, Lecturer, Lapland UAS
11:45	**A mine water geothermal energy facility for research and product development - the UK Geoenergy Observatory in Glasgow** Dr Alison Monaghan, UK Geoenergy Observatory, Science Lead, British Geological Survey
12:00	**Mine water heat: Can we de-risk subsidence hazards?** Fiona Todd, PhD Researcher, University of Edinburgh
12:15	**Break**
12:30	**How energy communities can help overcome the energy crisis** Stefano Nebiolo, Analyst, Delta-EE
12:45	**Decarbonising the InchDairnie Distillery** David Hogg, Senior Consultant, Arup
13:00	**Delivering low carbon heat in Lothians and Edinburgh** Benjamin Carter, Account Director, Vattenfall
13:15	**Smart heat network dispatch based on real time marginal emissions** Dr Graeme Hawker, Lecturer, University of Strathclyde Geoff Miller, Engineering Manager, Thermal Energy, SSE Energy Solutions
13:30	**TBC**

INNOVATION SHOW FLOOR THEATRE

Thursday 12 May

10:30	**European Collaboration for a Clean Energy Transition** Karen Fraser, Specialist, Low Carbon Transition, Scottish Enterprise
10:45	**Giving EV batteries additional life and value in energy storage systems** Nigel Dent, Head of Sales, Connected Energy Ltd
11:00	**Ultrasonic sensor array for internal wall thickness measurements** Dr Jon Alston, Inductosense
11:15	**World's most maintainable and lowest cost large scale AI Li-ion battery system** James Kong, Alp Technologies
11:30	**Digital LAEPs and LHEES: How to convert strategic plans into project pipelines** Lily Cairns Haylor, Head of Product, Advanced Infrastructure Technology
11:45	**Remote inspections of submerged assets with portable underwater drones** Igor Martin, CEO, Hydromea
12:00	**Bringing space technology down to earth to enable net zero** Dr Hamish Nichol, Energy Sector Lead, Reaction Engines Ltd
12:15	**Transforming the installation and service of large wind turbines** Sandra Eager, Corporate Development Manager, SENSEwind
12:30	**Stability - the key to performance and reliability** George Adams, Business Development Manager, OSI Renewables
12:45	**Break**
13:00	**Revolutionising subsea robotics operations with the use of AI** Mike Gallo, Technology Business Development Manager, Vaarst
13:15	**Commodity conversion of power, case studies, and economic viability of off-grid systems** Fraser Pritchard, Director, Columbus Energy Partners
13:30	**Break**
13:45	**Combining Low Carbon Concrete Solutions with Nature Inclusive Design** Steve Wright, Commercial Director, ARC Marine Ltd
14:00	**SMART-DAC, a start of a new short cycle for CO_2** Jeffrey Felix MM EMP BSc, CEO, CO2CirculAir
14:15	**Electric vehicle(s) charging, energy and the grid future** Ian Glasscock, CITA EV Charger

ACADEMIC POSTERS

Ensuring adequate community engagement, democracy and empowerment; smart local energy projects from conception to fruition
Dr Luke Gooding, Research Associate, University of Strathclyde

Designing project financing renewable energy systems in eastern Indonesia – based on community energy
Henny Gunawan, PhD Research Student, International Centre for Island Technology, Heriot-Watt University

Contaminated land Remediation through Energy crops for Soil improvement to liquid biofuel Strategies CERESiS
Benjamin Nunn, Research Assistant, University of Strathclyde

Seasonal thermal energy storage in smart energy systems to provide flexibility
Dr Andrew Lyden, Research Associate, University of Edinburgh

Design, Fabrication and testing of wave energy converter structure using FRP composites
Akash Pisharody, Post Doctoral Researcher, National University of Ireland, Galway

Disaggregating the spatial and demographic characteristics of Scotland's Energy Economy to examine its 'just transition' credentials
Josh Oxby, PhD Researcher, The University of Strathclyde

The Impact of integrating a liquid piston in a small scale liquefaction processing anthropological methane
Luke Middleton, PhD Student, Advanced Engineering Centre, University of Brighton

Participation of Distributed Residential Batteries in Energy Markets
Dr Benoit Couraud, Research Associate, University of Glasgow

The suitability of geological formations for inter-seasonal storage of hydrogen
Natasha Marino, PhD Student, University of Bath

Hollow Fibre-based Adsorption Units: The Key to Low Carbon Transport
Collette Larkin, PhD Researcher, The University of Edinburgh & Repsol

Low carbon and competitive? The economics of Ultra-Low Temperature District Heating (ULTDH) Networks
Michael Taylor, Research Associate, Cardiff University

A 'Just Transition' to Low-Carbon Heat
Jennifer Penman, PhD Student, University of Bath

System benefits of ocean energy
Dr Shona Pennock, Research Associate in Marine Energy, University of Edinburgh

GPSFLOW: A Novel Simulator for Modelling Underground Hydrogen and Gas Mixture Storage
Dr Zuansi Cai, Lecturer, Edinburgh Napier University

Hydrogen flow through porous media
Eike Marie Thaysen, The University of Edinburgh

Storage security for hydrogen underground storage in porous rocks within selected regions of the UK waters
Lubica Slabon, Eng Researcher University of Edinburgh

Accelerating the Transition to a Renewable Energy Powered Grid in Nigeria
Racheal Adedokun, Doctoral Researcher/ Lecturer, Robert Gordon University

A survey of cross-cutting barriers and enablers for the hydrogen value chain
Mahieddine Emziane, University of Birmingham

Current status, future ambitions and challenges for hydrogen energy technologies
Mahieddine Emziane, (presenter), University of Birmingham & **Paul Blackwell** (co-author), University of Strathclyde

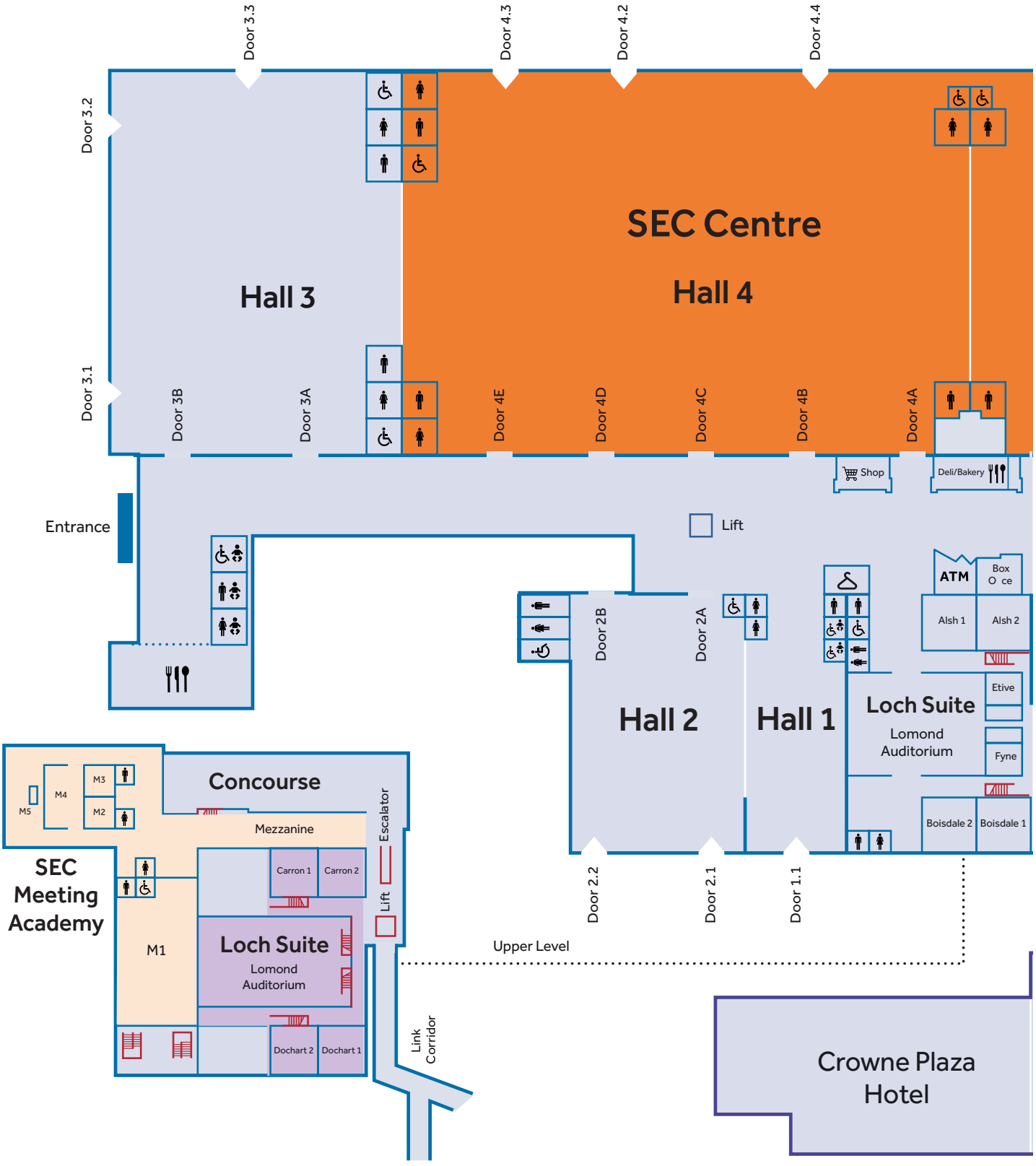
Catalytic Hollow Fibre-Based Converters: the Key to a Nitrogen-based Fuel Economy
Claire Leishman, PhD Candidate, University of Edinburgh

Experimental analysis of performance improvements in a small scale waste methane liquefier using a liquid piston gas compressor
Luke Middleton, Doctoral Candidate, University of Brighton

Multi-level Modelling of Low-Carbon Heating Systems: Integrating Household-level Cost-Benefit Analysis with National-level Value Chain Optimisation
Jennifer Penman, PhD Student, University of Bath

Towards a Robust Offshore Wind Health and Safety Risk Governance Regime: Lessons from the UKCS
Dr Eddy Wifa, Energy Law Lecturer, University of Aberdeen

Site Plan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Door 3.2
Door 3.1
Door 3B
Door 3A
Door 4E
Door 4D
Door 4C
Door 4B
Door 4A
Hall 3
SEC Centre
Hall 4
Shop
Deli/Bakery
Entrance
Lift
Door 2B
Door 2A
ATM
Box O ce
Alsh 1
Alsh 2
Hall 2
Hall 1
Loch Suite
Lomond Auditorium
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Boisdale 1
Door 2.2
Door 2.1
Door 1.1
Upper Level
Concourse
Mezzanine
Escalator
Lift
M5
M4
M3
M2
M1
SEC Meeting Academy
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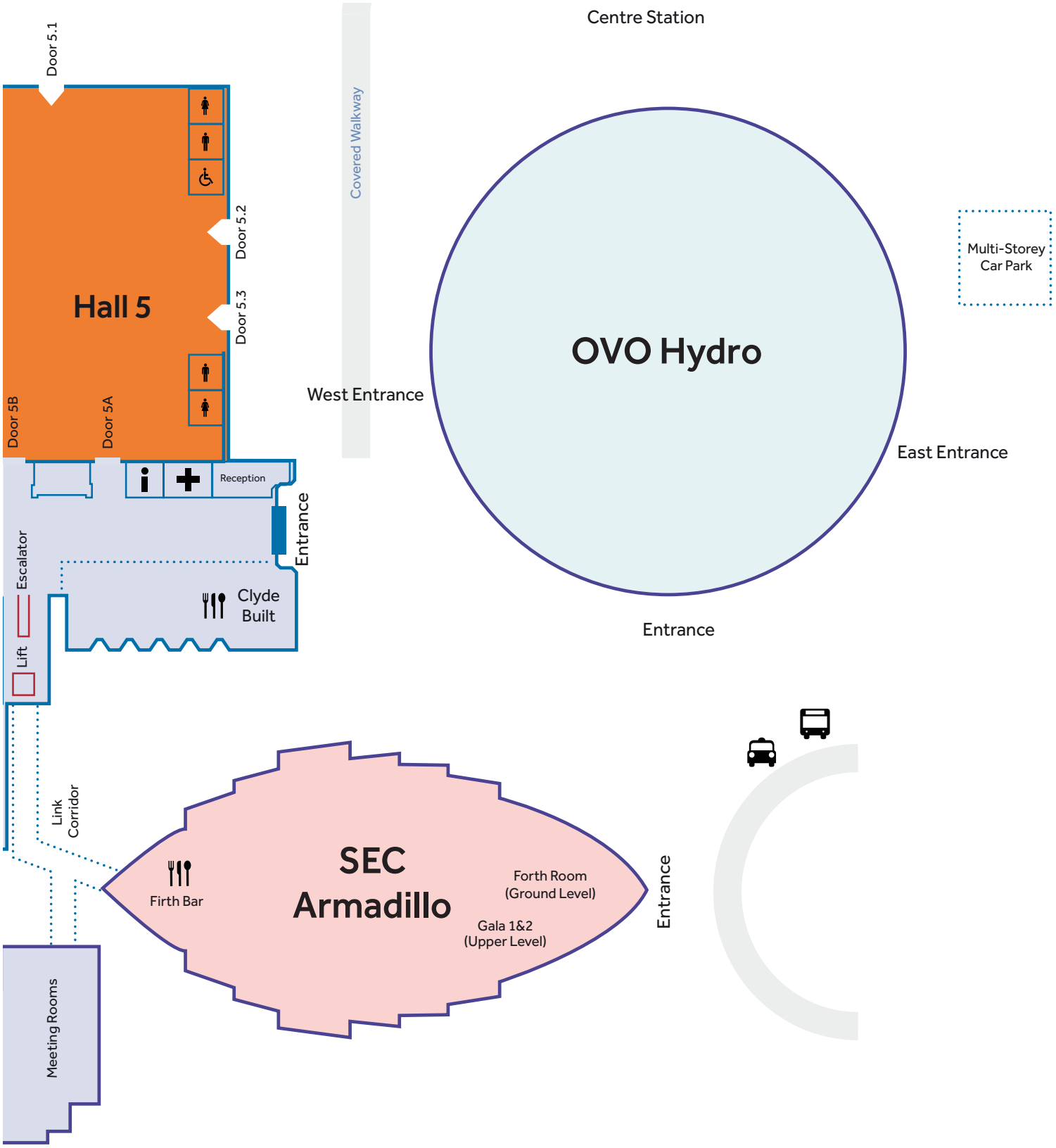
Carron 2
Loch Suite
Lomond Auditorium
Dochart 2
Dochart 1
Link Corridor
Crowne Plaza Hotel


Centre Station
Door 5.1
Hall 5
Door 5.2
Door 5.3
Door 5B
Door 5A
Covered Walkway
OVO Hydro
Multi-Storey Car Park
West Entrance
East Entrance
Reception
Entrance
Escalator
Lift
Clyde Built
Entrance
Link Corridor
Firth Bar
SEC Armadillo
Forth Room (Ground Level)
Gala 1&2 (Upper Level)
Entrance
Meeting Rooms

Floorplan

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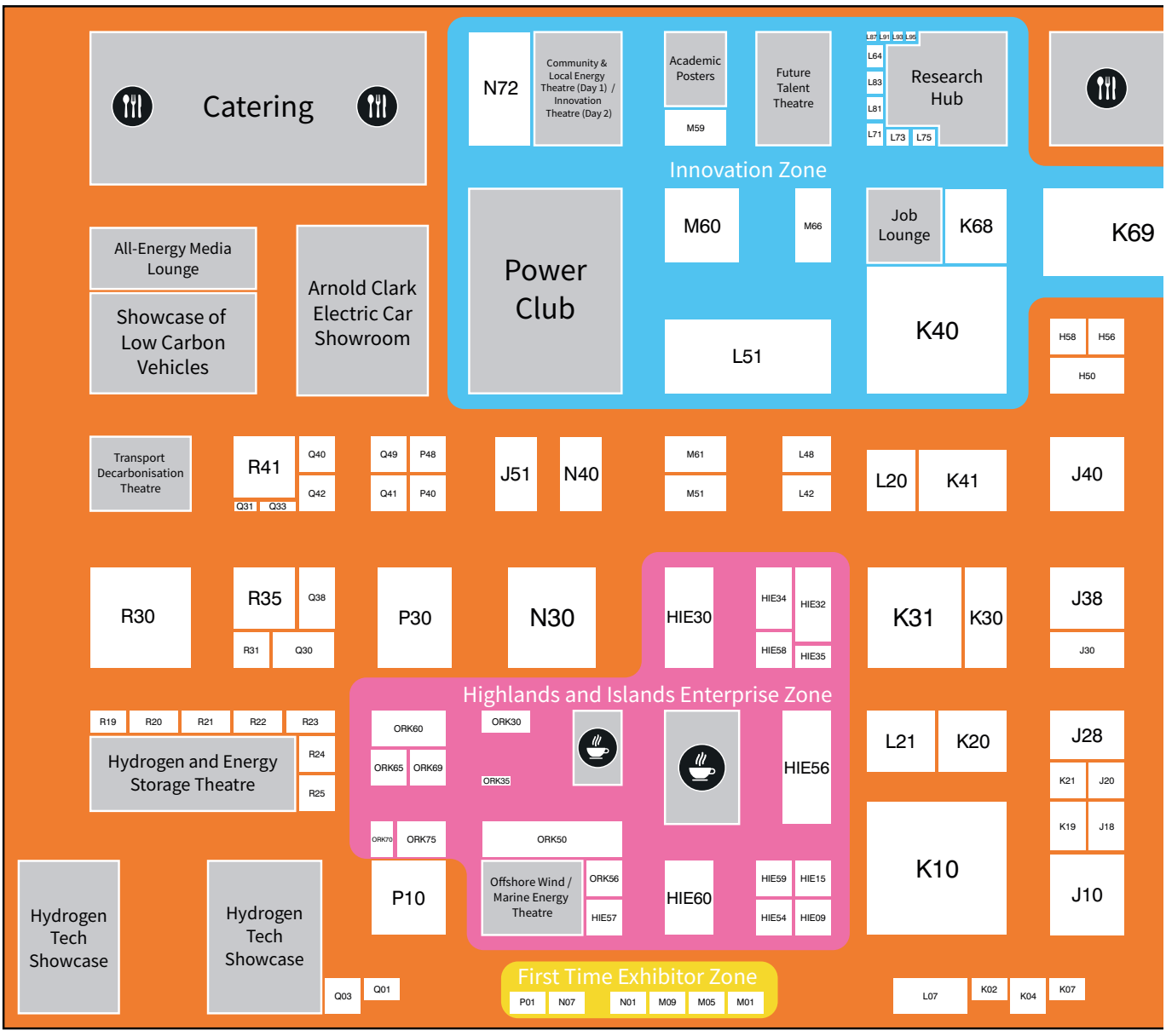

Exhibitors Parking

4D Entrance

4C Entrance

4B Entrar

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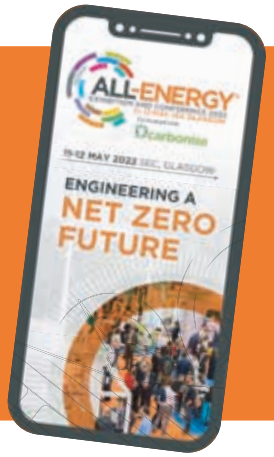

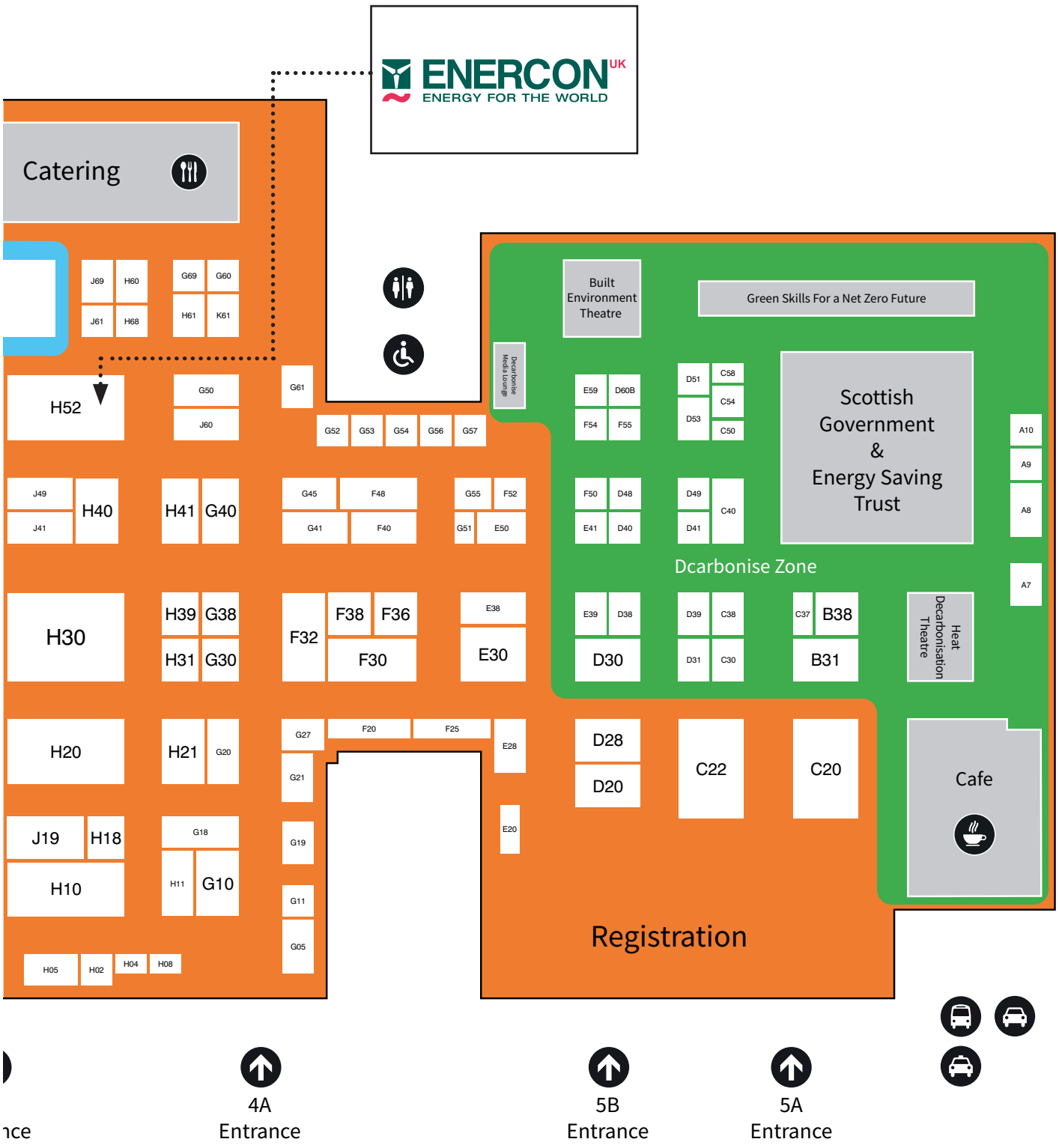

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2022 EXHIBITORS

2022 Exhibitors

List correct as of 29th April 2022, check the All-Energy and Dcarbonise App for the latest list of exhibitor's

1st Line Defence Ltd	D48
2G Energy Ltd	J40
3Ti Progetti Italia - Ingegneria Integrata Spa	N40, P30, N30

A

Abloy UK	Q41
ADVANCED TECHNOLOGIES SRL	N40, P30, N30
Aero Enterprise GmbH	L42
Alimak	Q01
Altra Renewable Energy	J20
AMP Clean Energy	B31
Aquatera Limited	ORK75
Architecture & Design Scotland	C37
Argyll & Bute Renewable Alliance	HIE60
ARTELIA ITALIA	N40, P30, N30
Aspect Land & Hydrographic Surveys	H41
AST Marine Sciences Ltd	K63
Atlas Copco Rental UK	G19
Atmos Consulting	HIE58
Aubin Limited	L73

B

Black & Veatch	G18
Blackhall & Powis	G54
Boltight Ltd	G11
BP International Ltd.	L51
British Geological Survey	L20
Bruce Stevenson Insurance Brokers Limited	E59
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C

Clarke Energy Limited	E28
Clarus Networks Ltd	J69
Clean Growth Fund and Carbon Limiting Technologies	F20
Clyde Training Solutions	J28
Coast Renewable Services	H05
Collett & Sons Ltd	D41
Compound Semiconductor Applications Catapult	M66
Connected Kerb	Q40
Conrad Energy Limited	F50
Cooper Software	R25
COPA-DATA UK Ltd	G11, D31
Corpay	E30
Costain	J41

D

DCS Duct Seal	Q30
Delta-Xero	N07
Deutsche Windtechnik	G41
Doosan Babcock Ltd	R19
Draeger Safety UK Ltd	K21
DWF LLP	G69

E

Ecotricity Ltd	K61
EDF Energy	K20
Edinburgh Innovations	F25
Emergya Wind Technologies (EWT) DirectWind UK Ltd	G45
Emissis Coolnomix	Q49
ENERCON	H52
Energy Institute	A9
Energy Saving Trust	A21
Energy Systems Catapult	M66
Enspec Power LTD	F52
Erova Energy	H18
ETC ENGINEERING SRL	N40, P30, N30
ETP	L75
European Energy Heating UK Ltd	D30
European Marine Energy Centre	ORK50
European Marine Energy Centre (EMEC) Ltd	L81

F

F&S Energy Limited	R24
Falcon Foodservice Equipment	R20
Farrans Construction	G61
FeTu Ltd	C58
Forsyth of Denny	F32
Full Circle Wind Services Ltd	H40

G

GBE S.p.A.	G40
Geo Structural Ltd / NRS Training Services Ltd	H02
Gilbert Gilkes & Gordon Ltd	HIE59
Global Wind Technology Ltd	M09
Government of Canada	K68
Green Cat Contracting Ltd	G60
Green Cat Renewables Ltd	H60
Green Marine(UK)	ORK69
Greenbackers Investment Capital	M60
GreenCom Networks	C40
Ground Source Heat Pump Association	C54

H

Headland Archaeology (UK) Ltd	J61
HeatSource	G57
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Highlands & Islands Enterprise	ORK32
Historic Environment Scotland	K04
HMS Industrial Networks	D53
Hresys Energy Solutions Europe Ltd	M61
Hydrasun	R31
Hydro Genie Systems	C50
Hydrowheel Ltd	L71
Hysopt	E41

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INCICO SPA	N40, P30, N30
Indian Chamber of Commerce	A87
INGETEAM UK Ltd	F30
Innovate UK	K40
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Italian Trade Agency	N40, P30, N30
Italian Trade Agency	N40, P30, N30
ITH Bolting Technology UK Ltd.	F40

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Knights Brown Construction Ltd	H31
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Peterson Energy Logistics	F38
Petzl UK	G20
Pexapark Ltd	G55
Port of Cromarty Firth	HIE15
Ports of Scotland Yearbook	G11
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Powersystems UK Ltd	G10
PROGER SPA	N40, P30, N30

R

Randox	N01
Red Rock Power Limited	L21
Reed Exhibitions	ALLEN22
REHAU Ltd	A7
Renewable Energy Association	P48
Renewable Parts Ltd	G30
reNEWS	G05
RES	K30
RINA	N40, P30, N30
Ritchie Services Ltd	M01
Royal Bank of Scotland Plc	E38
RSK Group Ltd	D60B
RTS TEST COMPANY - EU BASED	L89
RTS TEST COMPANY THREE - USA BASED	J40
RTS TEST COMPANY TWO - UK BASED	L42, Q01, Q39, Q41, C30

S

Scottish & Southern Electricity Networks	G50
Scottish Enterprise	K10
Scottish Government	A21
Scottish Hydrogen & Fuel Cell Association	R23
ScottishPower UK LTD	H30
SEINGIM GLOBAL SERVICE SRL	N40, P30, N30
Sequentec Ltd	H04
Shell U.K Limited	K31
Shepherd and Wedderburn LLP	D20
SIA Compressors and Generators	L07
Siemens Gamesa Renewable Energy A/S	H20
SLR Consulting	K07
Smarter Utility Ltd	P01
SmartestEnergy Ltd	J51
Smith Brothers Contracting Ltd	H50
SNIPEF Management Ltd	L91
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Solar Energy Scotland	D51
SOLIDpower GmbH	C30
SRSL	HIE54
SSE	C22
Stanley Black & Decker	J38
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T

T.EN ITALY SOLUTIONS SPA	N40, P30, N30
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The Bryden Centre	L64
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TNEI Services Ltd	P40
Triodos Bank UK	F54
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TÜV SÜD	K19

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Visualwind	H08
Vital Energi	B38

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Wave Energy Scotland	HIE30
Wilson Power Solutions	G27
WINERGY	G21

X

XOCEAN	K41
Xodus	J10

NEWS

Securing Sustainability-Linked Finance

In August 2021, RSK confirmed the news of the largest private credit backed sustainability-linked financing deal ever agreed on the market that is providing a £1 billion debt facility to the business. The funding boost has facilitated further investment in RSK's existing and new business lines and has fuelled its acquisition pipeline so the company can continue to strengthen its offering in the energy sector.

Adding to its existing full-lifecycle offering of services within the renewable energy sector across all technologies, the recent acquisition of Optisol, which specialises in solar construction, operation and maintenance services, and Fishtek Consulting, an industry-leading fisheries and engineering consultancy specialising in the design of fish and eel passes, further strengthens RSK's technical and global coverage. This financing demonstrates RSK's deep commitment to driving sustainable business practices, including energy transition, both within its clients' businesses and its own.

Powerhouse Asset Management

For over 165 years Gilbert Gilkes & Gordon have been producing hydropower equipment for customers in over 80 countries around the world.

Nobody quite understands our equipment like we do and that is why we are utilising all our experience as the designer and manufacturer to move our clients away from a 'breakdown & fix' mindset to a strategy whereby we 'predict & prevent'.

Gilkes will now offer a powerhouse asset management agreement to our clients, starting with a fully detailed condition assessment by our experienced engineers specifically designed to assess the risk of individual component failure and the impact that that failure would have on generation; this allows us to then produce detailed OPEX and CAPEX plans to mitigate these risks and predict expenditure over a rolling 5-year period.

Carried out alongside regular service visits, this allows our experienced personnel to regularly assess the risk of break down, mitigate that risk, and maximise generation.

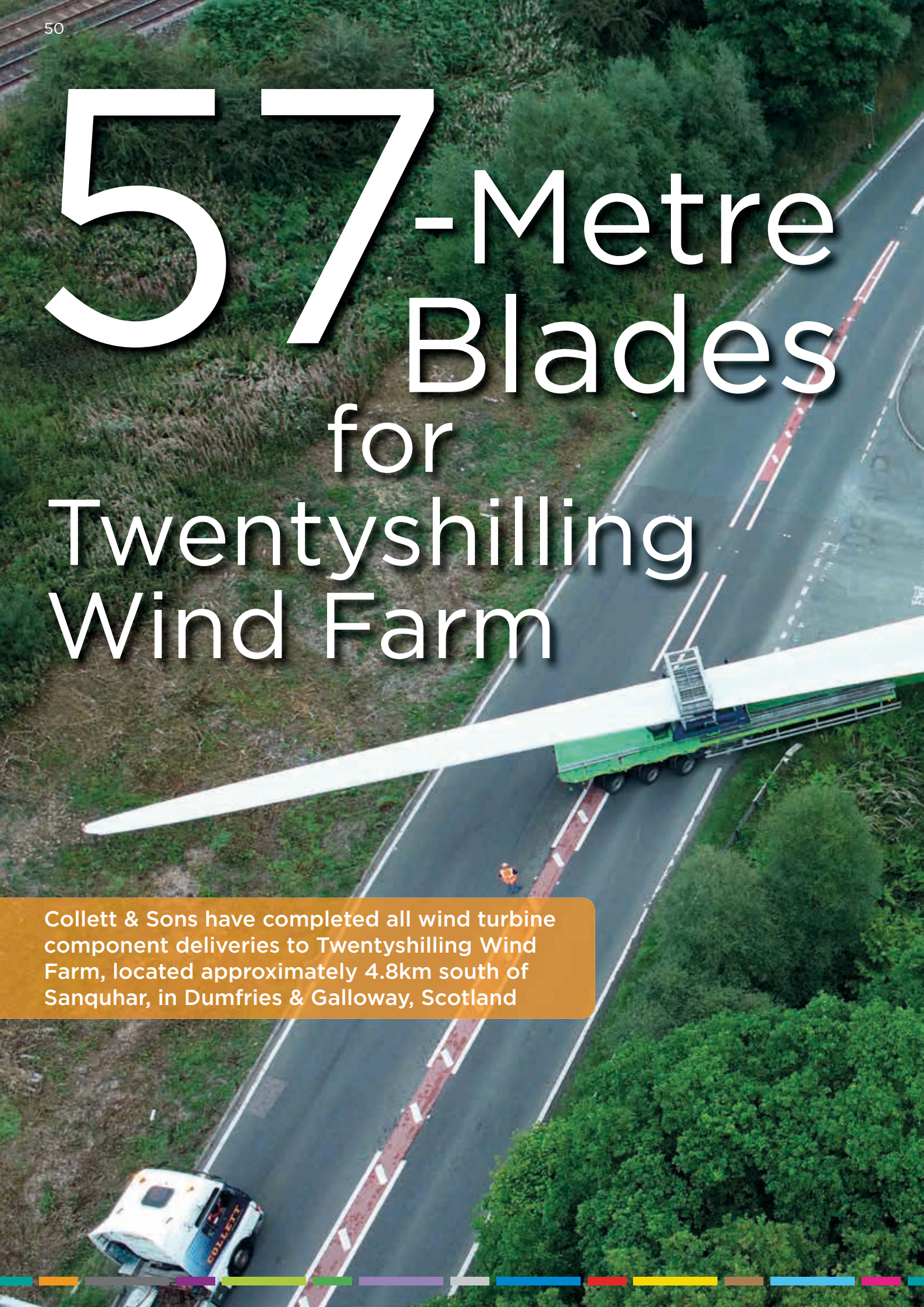
The Grid Gets Smart

Ecotricity came to All Energy in 2018 announcing our partnership with German VPP operator and platform software provider Next Kraftwerke.

From platform to production is a long haul, but we're excited to launch our fully automated Smart Grids platform this year, a completely 'own design' VPP which optimises, controls and – using our in-house 24/7 algo trading bot – trades flexible assets, be they wind, solar, battery or industrial plant-based.

The optimisation model we've built is vital for our own, and client batteries (given their range of capabilities and opportunities), where we have really thought about the optionality inherent in this asset type. This is critical for batteries in order to maximise their revenue capabilities. With so many Grid products on stream, temporal optimisation and logic will become the key differentiator between aggregators, as well as transparent service and revenue sharing arrangements.

57-Metre Blades for Twentyshilling Wind Farm



Collett & Sons have completed all wind turbine component deliveries to Twentyshilling Wind Farm, located approximately 4.8km south of Sanquhar, in Dumfries & Galloway, Scotland

Appointed to undertake all planning and deliveries for the 9 Vestas V117 turbines, in June 2021 Collett began transporting the components from King George V Dock. Each of the components for each complete turbine, the three towers sections, three blades, nacelle, drive train and hub, would require specialist transport logistics for the 170-mile journey to site.

With Collett Consulting having already surveyed the route in detail, including undertaking a test drive of the 170-mile journey from the port, simulating the loaded blade components, Collett identified several necessary route modifications. Most importantly, this highlighted the access to the wind farm site itself.

Two miles from the construction site, on the approach to the wind farm, the 57m loaded blades could not be taken through the necessary left turn for access. The construction of a turning head was proposed at this location, to provide the required clearance allowing all 27 blades to safely navigate the turn.

Identifying this pinch point during the test drive allowed for the construction of a turning head at Eliock Bridge ahead of the component deliveries, ensuring that the vehicles could safely turn around off the main road and complete the right turn on the approach to site.

Working to a two-day delivery schedule, with three deliveries per convoy, Collett called upon their specialist fleet to deliver the 81 individual components. Super wing carriers were used to transport the 57-metre, 14.9-tonne blades. The use of these specialist super wing carriers also allowed Collett to overcome issues of the vertical alignment from the main road to Eliock Bridge, avoiding the need for works to be undertaken on the listed structure. For the other components, the 25m-long bottom and 26m middle towers, with weights of 67 and 44.5 tonnes, utilised specialist clamp trailers, whilst the remaining components, the top towers, nacelle, drive trains and hubs were transported using Collett's 5 and 6-axle step-frame trailers.

"Two miles from the construction site, on the approach to the wind farm, the 57m loaded blades could not be taken through the necessary left turn for access"

Working to a detailed delivery schedule, produced in line with the site construction needs, over a period of 14 weeks the Collett Team delivered each of the components from King George V Dock to the Dumfries & Galloway construction site. All components travelled under Collett escort, with Police escorts in attendance for the blades, tower sections, nacelles, and drive trains.

All deliveries to the 38MW Twentyshilling Wind Farm are now complete, with the 9 Vestas V117 140-metre tip turbines expected to be fully operational in 2022.

About Collett & Sons Ltd

Experts in Motion since 1928, Collett have a wealth of experience transporting difficult and abnormal loads throughout the UK, Europe and worldwide. Their specialist fleet operates across depots in Halifax, Goole, the Port of Grangemouth, and most recently Collett (Ireland) Ltd in Dublin. Experts in the transport of abnormal loads, Collett are your global professional partner for transport, heavy lift, marine & transport consulting.

Hydrogen Industrialisation – Are We There Yet?

By Dean O'Connor, NanoSUN CEO

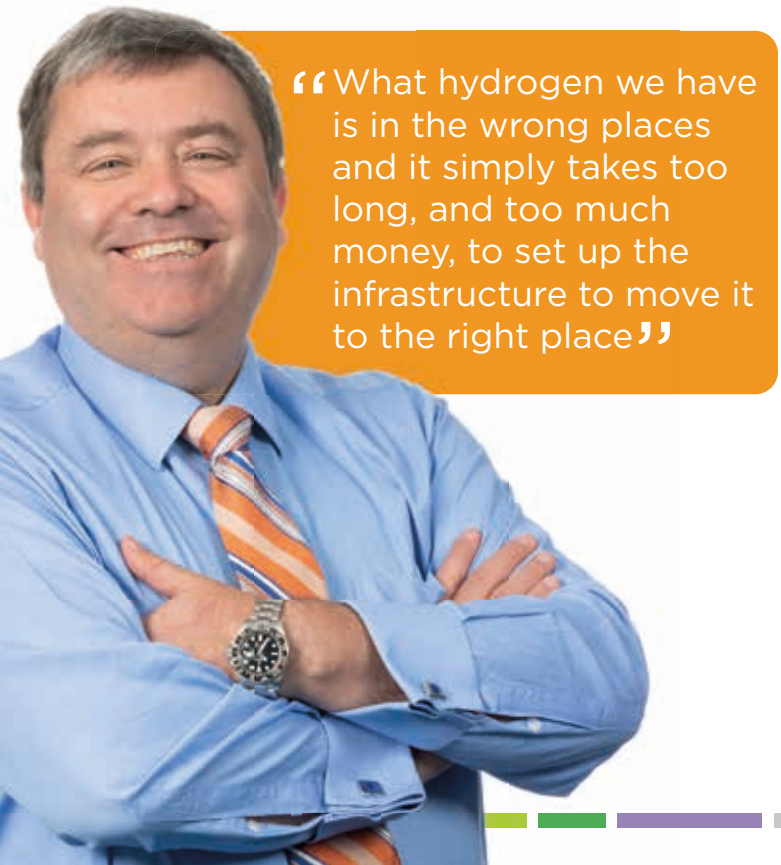
The acceleration of hydrogen that has occurred throughout the transportation industry during the last few years has challenged perceptions and has addressed many technology constraints needed to get hydrogen vehicles off the ground. But are we truly there yet? What more needs to be done?

We need to focus on transitioning hydrogen technology from lab-scale to industry.

Some years ago, I had dinner with a former senior exec from one of the big Taiwanese TFT-LCD panel manufacturers. He told me the story of their entry into the 17" desktop monitor market in the early noughties. Desktop monitors were the killer app and 17" was the gateway size that could put clear water between CRT and the new TFT-LCD technology. This company wanted a piece. So, they decided to launch – early – at a price point of $3,000 per panel!

As eye-watering as this price was, the cost to produce each panel was $3,500! After a few years of making panels for laptops at scale, however, this company had confidence that industrialisation would turn the numbers right side up. And so it happened: Throughout the following 20 years, the cost of producing TFT monitor panels dropped to less than $100. Technology got better and monitors got bigger. This all happened through pure industrialisation, standardisation, and scale.

So, what's the relevance of this as we enter another year of growth within the hydrogen sector?



> "What hydrogen we have is in the wrong places and it simply takes too long, and too much money, to set up the infrastructure to move it to the right place"

Having seen a few of these transitions now, where decades-old technologies transitioned from lab-scale to industry, my instincts tell me that we may well look back on 2021 as the point where hydrogen also truly started its transition into an industry.

The major electrolyser players, like ITM and Nel, launched Giga factories to scale production of a core building block for a green hydrogen transition; most of the major heavy-duty OEMs have launched or accelerated bus and truck programmes; Government incentives have swung towards favouring projects at scale and the debate has become much more about "how" and "when", rather than "if". We have also started to see more activity from the oil and gas giants and utility companies, with BP, Scottish Power and Octopus especially initiating some big plays in the UK.

We do still, however, have a significant issue with speed of deployment. At the recent COP26 summit in Glasgow, we saw limited demonstration of hydrogen mobility. Why? In large part, this is because the UK has a shortage of hydrogen. What hydrogen we have is in the wrong places and it simply takes too long, and too much money, to set up the infrastructure to move it to the right place. What we need is a solution that is much more flexible, cheaper, and faster to deploy... and we need more hydrogen!

The 'more hydrogen' side of the equation does look to be in hand. This year, McKinsey and the Hydrogen Council reported that Europe is experiencing a wave of investment in, mostly green, hydrogen production worth over €30B. NanoSUN's mission in 2022 is to address the other side of the challenge; to industrialise production of our Pioneer Hydrogen Refuelling Station, to ensure that the 'more flexible, cheaper and faster to deploy' infrastructure option is available for any fleet operator or fuel provider that needs one!

2022 will see NanoSUN industrialise Pioneer to ensure that we are ready to bridge the gaps between producers of hydrogen and operators of hydrogen vehicles, wherever they may be in Europe! We are confident this transition will be a pivotal step in reducing hydrogen refuelling costs and will further drive industry innovation to accelerate the roll out of heavy-duty, hydrogen fleets in the thousands over the coming years.

Our early customers have largely filled the order book for 2022, ensuring that Pioneers WILL be coming to a depot near you... very soon!

We look forward to seeing you out in the field in 2022, where we'll be making a difference.

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ScotWind

Alan Mitchell, Technical Discipline Manager at SLR Consulting describes a once in a generation opportunity for social and economic change

Monday 17 January 2022 was a historic day in the lifetime of the renewable energy sector in Scotland. On this day, Crown Estate Scotland announced the successful bidders for the 17 licence areas which would form the new generation of offshore wind farms around the Scottish coastline, aka ScotWind. Successful bidders included renewable energy heavyweights like ScottishPower Renewables, SSE and Vattenfall together with newer entrants to the renewables space like Shell and BP. If the number of household names that secured licences is a measure of confidence, then the January announcement was a ringing endorsement for offshore wind in Scotland. Crown Estate Scotland, and other key stakeholders such as Scottish Renewables, the Scottish Government, and the Aberdeen Renewable Energy Group (AREG) can be rightly proud. We were promised big names, and this is a truly star-studded cast.

Now the real work starts. Every project will require a mixture of consents and permits from a range of regulatory bodies including the Scottish Government, local planning authorities and Marine Scotland before a single pile can be driven or cable laid. Resources in these bodies will be stretched to their limits as developers request pre-submission engagement airtime and mandatory tasks are completed once applications are lodged. The environmental impact assessment (EIA) process for these projects will run for many years. Many of the licensees have already commenced surveys and will be starting to get to grips with the key challenges that lie ahead of them. Challenging marine environments, such as deeper waters, and new technologies being considered, such as floating turbines, will mean that many EIA practitioners and regulators are assessing environmental effects which have rarely or perhaps never been encountered before.

The renewable energy sector is already a major employer in Scotland. Scottish Renewables estimates that there are over 22,000 full time equivalent (FTE) jobs in renewables in Scotland (including indirect and induced employment). Around 3,000 of these jobs are in construction with around half of these in indirect positions further down the supply chain. Unlike Scotland's historical sources of energy – oil, gas, and coal – the jobs aren't concentrated in pockets of the country like the north-east or the central belt. Employment in the sector is widely spread, covering highlands, lowlands, and the islands. Offshore wind comprises a relatively modest 4,700 of the total 22,660 FTE. ScotWind will see this number shoot upwards to levels never seen before.

The concept of 'Social Value' has been around for over ten years but it's rapidly becoming a buzz-phrase. For several years it has been a feature of local government procurement and organisations like the NHS and groups like the Supply Chain School are helping to make it become part of the lexicon of the world of construction now. Like many great buzz-phrases, it means many different things but in the development sector it is fundamentally about looking at how a project can enhance the social, economic, and environmental welfare of a community through steps such as maximising opportunities for local supply chain companies or supporting skills programmes in local colleges or universities. So, it's a big part of the 'levelling up' you might have heard the Westminster government talking about recently.

Much has been said about Social Value in the media coverage around the ScotWind auction process and we will hear a lot more about it over the coming months. Exciting initiatives like re-skilling Scotland's oil and gas workforce, supporting STEM education in local schools, and strategic partnerships with local

ports have filled our LinkedIn feeds throughout 2021. Much excitement has been generated as schools, universities, and trade organisations central to these initiatives have been invited to photo shoots and quoted in press releases. Many Scottish regions can look forward to significant socio-economic benefits if even a fraction of these measures is implemented.

This is not new territory for the renewables industry in Scotland of course. Over the past two decades developers have injected significant funds into local communities and supported local jobs, predominantly during the construction phase (although many would argue that investment could have gone further). This has helped to diversify the order book for local supply chain companies and to re-skill their workforce. Energy transition companies like Shell are doing this on a massive scale globally, primarily through their oil and gas activities. Shell's 2020 Sustainability Report states that they spent $39.3 billion on goods and services during the year, of which a huge 84.5% was purchased from suppliers based in the same country of operation. You can see why some are optimistic that ScotWind has the potential to add rocket fuel (or green hydrogen perhaps!) to local economies.

As an environmental consultancy that works for several of the successful ScotWind bidders across the UK and Ireland, SLR Consulting will be doing its bit. SLR already employs over 100 skilled professionals in our Scottish offices, but we will be adding to this workforce by using local supply companies and individuals for activities like survey work for onshore grid connections. Our teams will be staying in local privately run accommodation and buying supplies like food and fuel in local shops and services. We will continue to support organisations like Earth Energy Education with their excellent work to promote STEM subjects in local schools by offering our consultants time for presentations to local school children. We'll also continue to recruit into our graduate network to ensure that Scotland's top university talent is working on ScotWind over the coming decades adding to the labour pool. Scaling this across multiple consultants and multiple projects will have significant benefits for many parts of Scotland.

> "Unlike Scotland's historical sources of energy – oil, gas, and coal – the jobs aren't concentrated in pockets of the country like the north-east or the central belt. Employment in the sector is widely spread, covering highlands, lowlands, and the islands"

As a native of Scotland's north-east (having grown up there in the eighties and nineties), I have seen what energy 'booms' look like. At the heart of the colossal growth of the oil and gas industry during that period was a group of companies that made a genuine long-term commitment to the area building offices, funding infrastructure projects and some even building housing for their workers. Whilst nobody is expecting anything like this degree of societal change to arise out of ScotWind, projects of this scale have a track record of being game-changing for local communities. A solid foundation combined with a group of licence holders with track records of adding Social Value on a massive scale is an exciting mix. These are indeed very exciting times for the offshore renewables sector and Scotland.

About the author

Alan Mitchell leads SLR's European Environmental & Social Impact Assessment team. His team coordinate EIAs and permit applications for clients in a range of sectors including renewable energy. Their current caseload of projects includes several of the offshore wind farms currently being consented and developed in the UK and Ireland.

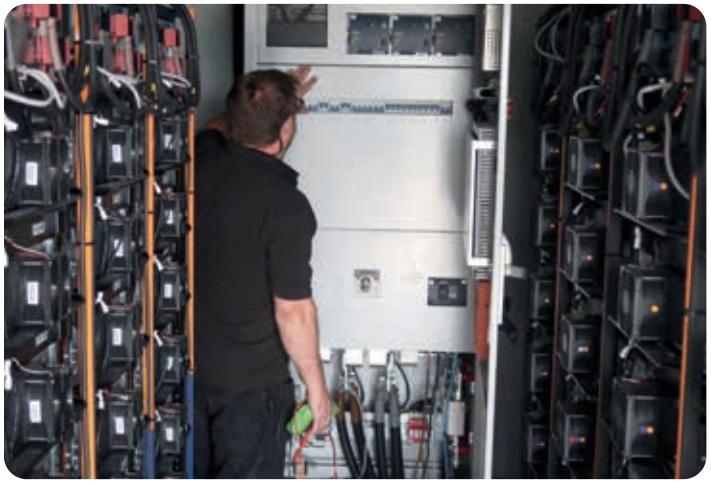
Generating New Revenue during the Energy Crisis

POWERSTAR anticipates a win-win for emissions reduction and lower energy bills through resilient energy management

The ongoing energy crisis is putting mounting pressure on business energy costs and the current volatile energy market looks set to continue. Businesses need to look to their energy management strategy, to work towards Net Zero while negotiating ongoing cost challenges for the foreseeable future. Alastair Morris, Chief Commercial Officer at Powerstar, considers this balancing act and the technology that can help meet both agendas.

For many businesses already operating on narrow margins, mitigating rising energy costs is crucial to long-term viability. Improving energy efficiency is, clearly, one vital aspect of that – after all, the cheapest and the greenest energy is the energy you don't use. This is especially true for energy-intensive businesses and organisations where reducing operations isn't an option. Technologies such as voltage regulation can deliver a significant reduction in energy costs without impacting on productivity, while battery energy storage (BESS) can deliver the flexibility to purchase and use electricity more strategically, further driving down costs – all while reducing carbon emissions. Here, we focus in on the short-term and long-term wins of BESS.

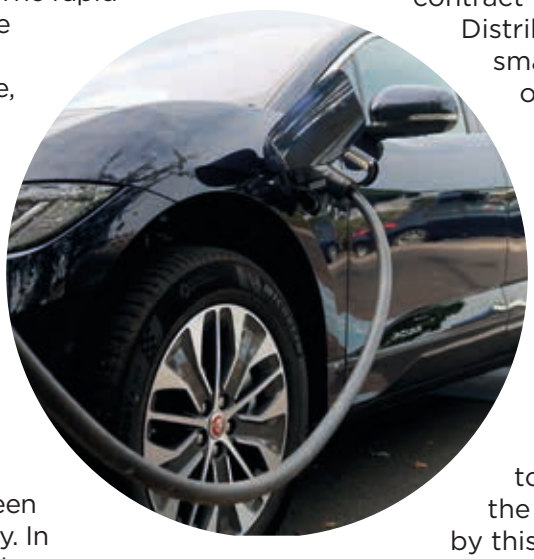
Battery energy storage opens up the possibility of offsetting rising energy costs by generating additional revenue from your asset through engaging with a number of grid-balancing services. The rapid increase in the amount of renewable generation in the UK has led to the grid becoming increasingly unstable, often struggling with either too little or too much electricity, depending on weather conditions. When the weather is unfavourable, we are still largely dependent on gas to make up the shortfall, contributing significantly to the ongoing energy crisis and doing nothing to reduce emissions. National Grid are increasingly using a range of flexible balancing services to try to establish more equilibrium between supply and demand more effectively. In the long-term, this flexibility will be key to maintaining a robust grid supplied predominantly, or entirely, by renewable generation.



Servicing a BESS

So, how do you generate revenue? This is where your battery energy storage system can be used to actively generate new revenue streams. Batteries are ideal for providing balancing services, given their ability to rapidly draw electricity from the grid and to release it back during periods of high demand. Critically, this presents the opportunity to engage with grid balancing services.

To begin generating revenue through these mechanics, you will need to enter into a contract with National Grid or your local Distribution Network Operator. For smaller scale batteries, this is often done through the use of an aggregator that combines large amounts of distributed technology, including batteries, to create a grid scale balancing provider.



Businesses taking part in balancing services receive a payment to provide standby flexibility, generating passive income by allowing an aggregator to use their battery to balance the grid. The revenues generated by this aren't typically enough to cover the cost of a battery alone but, with the growing need for additional site flexibility and resilience, it can be a compelling additional benefit.

Battery Energy Storage System (BESS)

> “By using a battery energy storage system to fulfil a Demand Side Response (DSR) contract, you can ensure that you sell surplus energy when it is most in demand”

By using a battery energy storage system to fulfil a Demand Side Response (DSR) contract, you can ensure that you sell surplus energy when it is most in demand and therefore has the best price. If you have generated the energy yourself through on-site generation, then you will also be able to ensure you get value from all the energy you generate, rather than just what you need. For example, storing solar-generated electricity when it is sunny but when you may not need it for your own site, and then selling it to the grid when it is most in demand.

The general benefits of a BESS are well-established but, in relation to achieving Net Zero, the technology is particularly relevant when considering on-site EV charging. To enable the rapid adoption of EVs, there is an urgent need to create access to charging facilities, and a fleet of service or delivery vehicles will need these rapid chargers on site. But this may require an additional or upgraded grid connection which your DNO may well refuse to grant, particularly if you are in an area already experiencing grid constraints. Connecting EV chargers to the grid means you have very little control over how the energy is used and where it comes from. BESS technology can be used as a buffer between your EV chargers and your grid connection. The battery can be charged more gradually and constantly than the vehicles, which can remove the requirement to upgrade your electrical infrastructure and avoid the hefty fines that can be levied for exceeding your authorised capacity from the grid. This, again, can mean cost savings alongside reducing emissions.

While there is still a need to purchase energy from the grid – in the absence of total on-site power generation – the battery energy storage system can be charged when electricity is cheap, generally overnight, and can then charge EVs throughout the day when electricity is more expensive; and when your employees are, largely, more likely to want to charge their vehicles.

In summary, as a behind-the-meter technology, battery energy storage presents a range of compelling benefits: power resilience through uninterruptible power supply; maximised on-site generation, by storing energy for use at different times; access to grid services to sell electricity back to National Grid for revenue generation; cost savings by shifting when you use energy from the grid, and buffering large loads (such as EV charging) from the grid so that they can be more easily and cheaply connected.

If your site already has a BESS, or you have identified better power resilience or an aim to achieve Net Zero as part of your energy strategy, then generating additional, passive revenue can be a useful way of offsetting some of the pain of the energy crisis: a win-win for reduced emissions and lower energy bills.

The Onshore Wind Imperative

Matthew Clayton, Managing Director at Thrive Renewables, explains why we must build more onshore wind to improve UK energy security and achieve net zero

Energy independence and security are now a top priority for the Government. As one of the cheapest forms of new electricity generation, we have long called for official recognition of the vital role to be played by onshore technologies such as wind and solar in creating a secure, clean energy system.

Onshore wind in particular offers significant opportunities, with RenewableUK (RUK) suggesting we should aim to double current onshore wind capacity to 30GW by the end of the decade. In doing so, we could save around 6 million tonnes of carbon emissions a year, the equivalent of removing 1.1 million cars from the road annually.

RUK's wind report found that increasing onshore capacity could reduce consumer bills by £16.3 billion over the course of a decade and generate £45 billion in economic activity. This includes the creation of 27,000 full-time jobs.

The need to accelerate our renewable capacity comes at a time when consumers are facing soaring energy bills, primarily due to increased demand for gas globally. Urgent action is required, and every clean technology will be to increase energy security and achieve net zero.

What do we need to do to achieve this?

Since 2015, getting new onshore wind built in England has been nearly impossible. Changes in planning conditions meant that onshore wind applications in England had to demonstrate that the project would be sited in an area designated for wind development by the local authority and stated so in the local plan. The problem is some local plans have a lifecycle of 30 years so will not be updated in time to support legally binding national net-zero targets. Moving forwards, we want to see the Government reflecting public opinion and actively supporting onshore wind, setting an official target, and easing planning restrictions while maintaining vital local involvement.

It's also important to explore where older turbines can be replaced with modern, efficient models, so we hope to see policy progress in favour of repowering and life extension. We carried out a repowering exercise with our Caton Moor wind farm in

2006. With two fewer turbines and only a small increase in the size of each, output from the site was increased sevenfold.

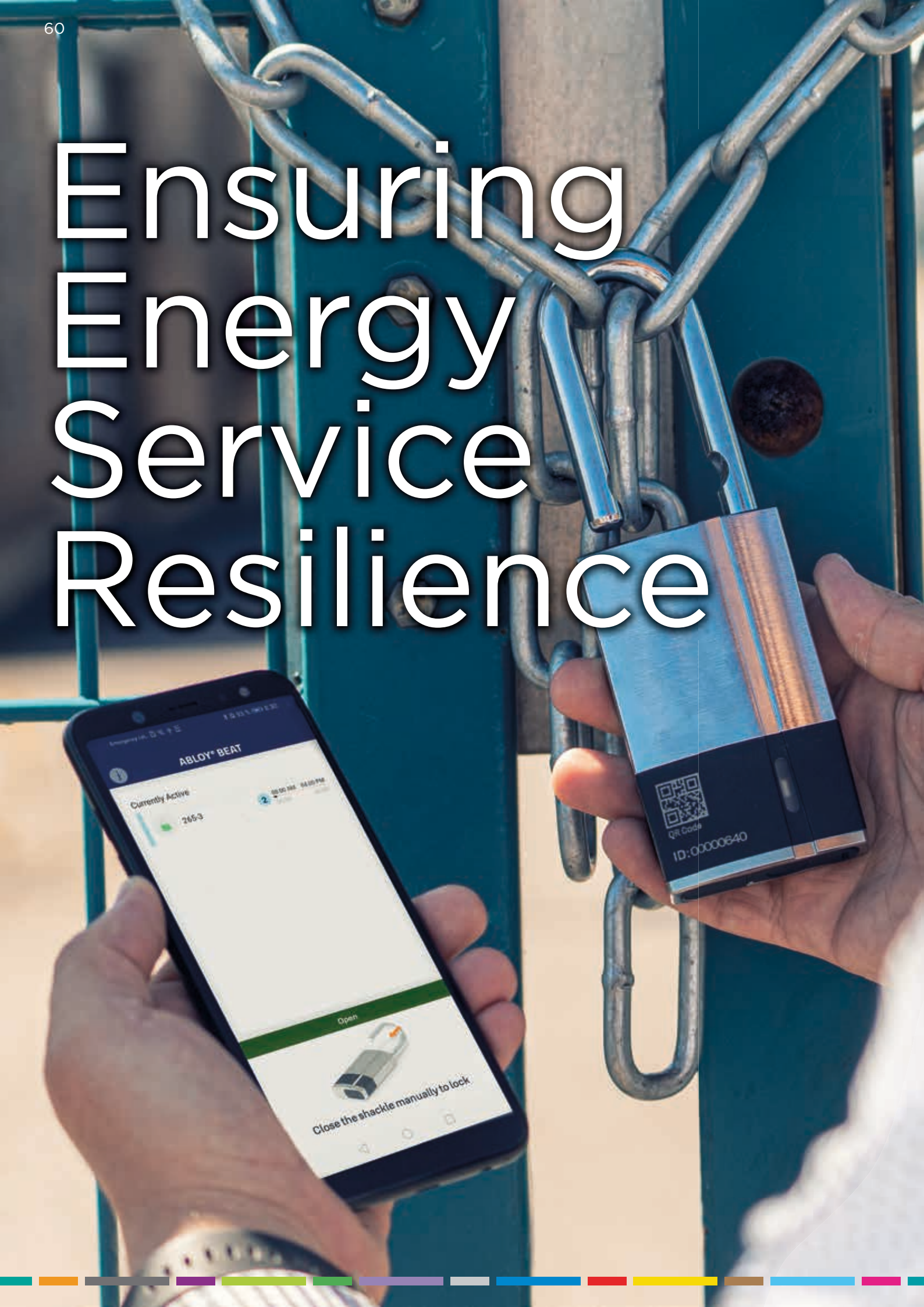
Changes to the Government's Contracts for Difference (CfD) scheme would also be welcomed. In the current auction, onshore wind has been included in a modest pot of £10 million but we believe a greater allocation should be given to these technologies. The change to an annual auction from 2023 is a positive step forward and we hope the Government backs this up with greater incentives for onshore development.

Alongside the CfDs, developers should also be considering other business models such as corporate power purchase agreements or 'direct wire' arrangements, where solar and wind projects are installed on site at an industrial host. Developers could take a hybrid approach, which would require them to bid for part of their generation into the CfD and part exposure to the market, creating a 'price hedge' at a portfolio or project level. Establishing additional options for routes to market will ultimately accelerate the much-needed deployment of new renewable electricity generation projects.

The UK's electricity demand is projected to increase by almost 40 per cent by 2035 as heating and transport transitions from fossil fuels to electricity. This creates an opportunity to deliver 60 to 80GW of renewable electricity generation, with onshore wind showing huge potential as part of meeting this. Ultimately, the way to increase the country's energy security is to keep supporting the roll-out of clean technologies, including onshore.

> “RUK’s wind report found that increasing onshore capacity could reduce consumer bills by £16.3 billion over the course of a decade and generate £45 billion in economic activity”

Ensuring Energy Service Resilience



Digital access control from Abloy UK safeguards this critical issue for energy providers, where controlled access of personnel is vital to protect areas and valuable assets

Access is required not just for areas such as overhead lines, underground cables, gas pipes and transformers, but also to data centres housing servers that hold customer data.

To ensure security of these assets, it's essential that hardware such as padlocks and cylinders can be relied upon to protect against attack. Maintenance and repair teams also need dependable locks that enable access for their staff in some of the most extreme environments.

Key management is crucial for any security system, as lost or stolen keys put assets at great risk. It can be an extremely expensive issue to rectify, resulting in lost revenue from lost customer minutes, seriously damaging an organisation's reputation.

In order to meet these challenges, many organisations are turning to digital and mobile access control. Research shows over that two-thirds of organisations will have adopted mobile access control to some extent within the next two years, with extensive benefits such as increased security, health and safety compliance, efficiency and reduced CO_2 emissions.

With this is mind, Abloy offers a range of innovative digital and mechanical access systems that can be combined in several ways. These include the new CIPE Manager, the BEAT digital padlock, and the tried and trusted PROTEC2 CLIQ® system.

CIPE Manager

CIPE Manager from Abloy UK brings together a keyless solution, an electro-mechanical key solution and a mechanical key solution that can secure all applications with easy management – with all three elements working together.

CIPE Manager is tailored to give a comprehensive situational overview and increase operational efficiency in energy and critical infrastructure access management. The solution allows organisations to manage all their keys, locks, and access rights from any location, with a user-friendly, cloud-based management system.

CIPE Manager connects with every locking solution in Abloy's digital portfolio, including the BEAT keyless Bluetooth padlock, the electromechanical PROTEC2 CLIQ® system, as well as Abloy's high-security mechanical master key systems.

BEAT

BEAT combines three main components: a digital key, a mobile application and a heavy-duty, Bluetooth padlock, all managed with the visual CIPE Manager user-interface.

BEAT is IP68 rated and is designed specifically for the physical protection of energy and critical infrastructure, businesses, and remote sites. BEAT physically secures property while offering improved operational efficiency, reducing both logistics and costs.

It utilises Seos® credential technology for best-in-class security and privacy protection and is made to perform in the most demanding environments. It is functional both online and offline, and allows flexible access and remote activation of user rights via the mobile app.

BEAT is especially useful in remote areas, with busy schedules and in cases of emergency, as travel and key logistics are drastically simplified, reducing CO_2 emissions, saving time, and reducing costs.

BEAT is also now available with a removable shackle, specifically designed with energy and critical infrastructure needs in mind. When operating the lock, the shackle is detached by pulling it away from the lock body, meaning it can be situated behind a security shroud.

PROTEC2 CLIQ®

PROTEC2 CLIQ® is an innovative easy-to-use electrochemical locking system that enables remote key management, and provides comprehensive audit trails on locks and padlocks, and can be integrated with CIPE Manager.

Approved for UK government use, PROTEC2 CLIQ® is trusted by many energy and critical infrastructure organisations across the globe and fulfils the requirements of regulators.

The risk of lost or stolen keys is eliminated as they can quickly be removed from the system, so security can be confidently maintained in circumstances where a key has been misplaced.

CLIQ® combines programmable physical keys and a range of wire-free locks and padlocks with user-friendly admin software. This solution improves site and building security and offers flexible access rights and key management, which can be controlled any time and from anywhere.

These solutions can contribute to a reduction in lost customer minutes due to the added flexibility of changing access rights on the move, meaning the nearest engineer can respond to any maintenance or emergency when required, and simultaneously reduce CO_2 emissions from unnecessary travel.

Integration with third-party ticketing systems also helps to automate and manage an individual's competencies for working in high-risk environments, such as high-voltage, gas, or nuclear settings.

What's more, the number of keys in circulation can be significantly reduced, which in turn reduces the risk of lost or stolen keys. For example, HELEN Energy in Helsinki previously had 30,000 keys in circulation, but with the implementation of PROTEC2 CLIQ®, this number was reduced to 1,300 keys.

The Value of Good Design

Alister Kratt, Head of Infrastructure at LDA Design, discusses the company's commitment to putting utility and social value at the heart of infrastructure design projects

We are in a period of significant investment in the UK's transport, digital and energy infrastructure. At the time of writing, the Government is expected to include big targets for offshore wind and nuclear power in its new energy strategy. Renewables are key to the country meeting its net-zero ambitions.

We also live in uncertain times. Climate breakdown and biodiversity loss require us to be much more purposeful about the curation of the built environment and committed to protecting the natural environment. Every new plan, at every scale, should present a credible response to the climate emergency. Zero carbon is an important step towards genuine re-engagement with the environment, but it is not the only one.

With renewables now part of a safe and secure future, can energy infrastructure projects also be made to work harder to meet wider environmental and societal needs? Is renewable energy also a way of creating a greener, fairer, and more pleasant land?

Design for the future

National planning policy is clear that good design is a necessary part of infrastructure promotion and delivery. But there is also a myth that energy infrastructure is incapable of being 'designed', or that design is simply an irrelevance because the focus is firmly on operational outcomes. This short-changes society and means we fail to benefit fully from investments.

Let's roll back. The Victoria Embankment shows how infrastructure worth its salt should look beyond the operational. Joseph Bazelgette's original commission was to save Londoners from a cholera epidemic, with a new pipe to safely dispose of foul water. Deciding that the project could deliver much more, his design provided also for new underground rail and river frontage. He went beyond operational requirements and took the broadest view of the commission, aiming for lasting legacy that has endured.

North Lincs Offshore Windfarm ©LDA Design

Good design is always about people and place. It is not merely about how the final project 'appears' but is as much about design process, minimising environmental effects, supporting landscape and environmental integration, securing beneficial outcomes and community acceptance.

Swansea Bay Tidal Lagoon ©LDA Design

When it comes to new energy infrastructure, we need to be 'more Bazelgette'. All of those working in the planning and delivery of projects should see themselves as changemakers intent on securing the widest possible positive outcomes from the projects delivered through the DCO process and not merely 'mitigating' them. Delivering infrastructure projects at scale requires real dialogue and collaboration so that proposals can develop in a transparent, democratic way, giving stakeholders and communities clarity – the DCO process is structured to allow that to happen.

Social value

Good design also means embedding social value in the heart of decision-making. Swansea Bay Tidal Lagoon was a pathfinder project for which the Government proved unprepared. It demonstrated how an energy project can create social value in myriad ways. The lagoon would protect Swansea from tidal surges and flooding, would enable regeneration of the port and create new beach and saltwater marshland. It would also provide an attractive setting to Swansea University's new Bay Campus and support tourism.

The Lagoon was always about more than energy generation. It was about designing infrastructure to strengthen local culture and protect the environment as well as to promote equity through more affordable energy. The project has faltered, but tidal energy remains part of the agenda and is a huge opportunity that the UK shouldn't miss out on. The UK's National Infrastructure Strategy (2020) states that the process of assessing infrastructure projects "will ensure government is valuing wider economic, social and environmental benefits of a project." All energy projects of scale have a responsibility to think beyond the red line boundary to secure positive legacy outcomes.

Good design means starting and finishing well. Establish design principles early in the process to support the governance of design through the life of a project and seek multiple beneficial outcomes from the investment. The vision for renewable infrastructure in the UK should represent the kind of country we want to become and support future generations.

A sketch of ENSO Larks Green Solar Farm in South Gloucestershire ©LDA Design

EXHIBITOR ENTRIES

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1st Line Defence are one of the leading providers of Unexploded Ordnance (UXO) risk mitigation measures in the UK. We provide solutions to the risk posed across the UK and around the world both on land and offshore from unexploded bombs and munitions related to current and former military land use, aerial bombing and conflicts. With headquarters in the UK and an office the USA, 1st Line Defence have the capacity and capabilities to safely remove UXO risk across the UK and Internationally, both on land and at sea.

2G Energy Ltd — J40

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T: +44 (0) 1928 718533 E: i.forsyth@2-g.com
W: www.2-g.com/en

2G Energy is a global leader in the CHP industry. Specialists in the supply of high-efficiency CHP systems for natural gas, biogas and hydrogen, we have a power range between 20 and 2,000 kilowatts, for all the electrical power you need. Our technology reduces long-term energy costs and creates independence from the ever-increasing electricity prices. View our full range at www.2-g.com

3Ti Progetti Italia - Ingegneria Integrata Spa — N40, P30, N30

Via delle Sette Chiese 142 00145, ROME,

For further information on our products and services please visit our stand.

Abloy UK — Q41

Portobello Works, School Street, Willenhall, West Midlands, WV13 3PW
T: 01902 364500 E: info@abloy.co.uk
W: www.abloy.co.uk/en/abloy/abloy-co-uk

Abloy provide innovative locking solutions including as digital padlocks that offer mobile updates and contribute to businesses achieving their sustainability targets by improving efficiency. Our locking solutions include the use of mobile credentials using the authorised persons Smartphone to allow access to secure remote sites, protects the resilience and security of local energy supplies, digital padlocks that offer mobile updates contribute to businesses achieving their sustainability targets by improving efficiency, reducing travel and eliminating abandoned site visits due to non-access.

ADVANCED TECHNOLOGIES SRL — N40, P30, N30

Via Matteo Boiardo n°12 – Roma 00185,

For further information on our products and services please visit our stand.

Aero Enterprise GmbH — L42

Industriezeile 35/2, Linz, 4020
T: +43 732 210330
E: office@aero-enterprise.com
W: aero-enterprise.com

Aero Enterprise was founded in 2014 by Robert Hörmann as a start-up in Linz/Austria. Co-founder and Managing Director Peter Kurt Fromme-Knoch joined in 2015. Aero Enterprise focuses on digital and automated inspection of vertical objects of all kind – especially at on- and offshore wind turbines – with hardware and software, both developed in-house. The image data acquired with the AERO-SensorCopter and other autonomous drones are analysed for anomalies, supported by the in-house developed AERO-Software Package. Aero Enterprise has been part of the German Buss Energy Group since 2020.

Alimak — Q01

Northampton Road, Rushden,
Northamptonshire, NN10 6BW
T: +44 (0) 1933 354700
E: simon.mitchell@alimakgroup.com

Alimak is a global leader and pioneer in the design and manufacture of vertical access solutions for industrial and construction industries. We provide permanent and temporary high-quality lifts, construction hoists and work platforms using rack and pinion and traction technologies. Alimak has an installed base of over 23,000 vertical access solutions.

Altra Renewable Energy — J20

Jernbanevej 9, Vejstrup, Syddanmark, 5882
T: +45 521 40477 E: britt.lightbody@altramotion.com
W: www.altra-renewables.com

The Altra Renewable Energy family, AMERIDRIVES, STROMAG, SVENDBORG BRAKES, TWIFLEX & WARNER ELECTRIC (all part of the Altra Motion Group) is your access to a uniquely wide range of power transmission and motion control products and services - supporting the global renewable energy market.

AMP Clean Energy — B31

Lochaber Rural Complex Torlundy, Fort William, Inverness-Shire, PH33 6SQ
T: +44 (0) 1397 706412
E: iain.macfarlane@ampcleanenergy.com
W: www.ampcleanenergy.com

AMP Clean Energy is the market-leading biomass heat services supplier with thousands of customers and depots located throughout Great Britain. From the supply of biomass fuel, service and maintenance, fully funded installations and design, to biomass heat contracts and boiler buy backs, AMP Clean Energy can offer a complete biomass heating service.

Aquatera Limited — ORK75

Old Academy Business Centre, Back Road, Orkney, rkney KW16 3AW

Environmental, sustainability and operational support delivered internationally. Clients include technology developers, utilities, agencies and government. Aquatera provides fully integrated renewables support, strategic planning, public, stakeholder engagement, environmental assessment and surveying.

Architecture & Design Scotland — C37

Level 11, Clockwise, Savoy Tower, 77 Renfrew Street, Glasgow, G2 3BZ
T: +44 (0) 131 556 6699 E: alex@ads.org.uk
W: www.ads.org.uk

We are Scotland's design champion. We believe in the power of design to improve people's lives. We bring people together to make better places for everyone. We visualise a Scotland whose places are healthy, sustainable and thriving, where everyone works together to shape their future.
Our Aim is to see the benefits of the Place Principle become an everyday reality in the way Scotland's places are created, adapted and sustained. Design can help realise the country's ambitions, captured in initiatives such as Housing to 2040, 20 Minute Neighbourhoods, Community Wealth Building.

Argyll & Bute Renewable Alliance — HIE60

Highlands, The Enterprise Centre, Lochgilphead, Argyll, PA31 8SH
T: +44 (0) 1546 605522

For further information on our products and services please visit our stand.

ARTELIA ITALIA — N40, P30, N30

Palazzo Italia Piazza Marconi, 25 00144 Roma,

Artelia is a multidisciplinary independent group offering a full range of engineering-related services over the mobility, water, energy, building and industrial sectors, from technical expertise through to complex project delivery: consulting, master planning & feasibility, design & engineering, construction & project management, asset & facility management, turnkey solutions.

Aspect Land & Hydrographic Surveys H41

Thornhouse Business Centre, 30 Ballot Road, Irvine, Ayrshire, KA12 0HW
T: +44 (0) 1294 313399
E: mail@aspectsurveys.com

An ISO PAS99 accredited survey company offering topographic, hydrographic, oceanographic, marine environmental & aerial surveys throughout the UK & Europe. Our expertise comes from experience across a range of survey disciplines, offering fully integrated turn-key solutions to a wide range of clients.

AST Marine Sciences Ltd K63

8 White Lodge Business Park, Hall Road, Norfolk, Norwich, NR4 6DG
T: +44 (0) 1493 416566 E: info@ast-msl.com
W: www.theastgroup.com

AST Marine Sciences is part of the larger AST Group of companies and was started in 2003. We deliver remote telemetry solutions using Satellite and GSM which are able to be used within the renewables, water management and control markets. We offer a solution for any telemetry requirement.

Atlas Copco Rental UK G19

Unit 2 Waldridge Way, Simonside Industrial Estate, South Shields, NE34 9PZ
T: +44 (0) 1382 778999
E: rentaluk@atlascopco.com
W: www.atlascopco.com/en-uk/rental

With extensive expertise in offshore and renewables, we provide cost and energy efficient rental solutions for long or short-term demands, planned maintenance or unexpected emergencies. This includes compressed air, specialist subsea cleaning, power generation and nitrogen generation solutions. Our equipment is designed, manufactured, and tested to comply with ISO-1217 regulations; our machinery is built with API specifications in mind, and all units are fitted within DNV 2.7-1 lifting frames for offshore deployment, as well as rig safe compliance.

Atmos Consulting HIE58

Rosebery House, 9 Haymarket Terrace, Edinburgh, EH12 5EZ
T: +44 (0) 131 346 9100
E: marketing@atmosconsulting.com
W: www.atmosconsulting.com

Atmos Consulting is a leading independent environmental & planning consultancy offering a comprehensive range of solutions to the energy sector. Our purpose is to enable sustainable development that realises our client's vision, protects the environment and enhances the world we live in.

Aubin Limited L73

Unit 1, Castle Street, Castlepark Industrial Estate, Aberdeenshire, AB419RF

Aubin Group is globally recognised as a leading developer and supplier of chemical solutions to the energy market. Supporting the move towards net-zero, the team commits resources to develop effective and reliable products that reduce greenhouse gas emissions and are sourced from sustainable materials.

Avanti Wind Systems Q01

Northampton Road, Rushden, Northamptonshire, NN10 6BW
T: +44 (0) 1933 354700
E: darren.medenica@alimakgroup.com

Avanti Wind Systems is one of the global leaders in safe work in wind turbines. Through high quality safety products and solutions for wind turbine towers. Avanti helps customers make wind energy cost competitive.
Avanti has one of the largest installed bases with over 35,000 service lifts installed worldwide.

Black & Veatch G18

Black & Veatch, 1 Farnham Road, Guildford, Surrey, RH1 1LQ
T: +44 (0) 148 331 9300

B&V has involvement in some of the largest utility scale renewable energy projects in the world, using global best practice to deliver locally. Our expertise and knowledge of technical challenges, risks, drivers and opportunities in regional markets means our clients come back to us time and again.

Blackhall & Powis G54

Suite 11, The Garment Factory, 10 Montrose Street, Glasgow, G1 1RE

For further information on our products and services please visit our stand.

Boltight Ltd G11

Unit 2, Junction 10 Business Park Bentley Mill Way, Bentley Mill Way, Walsall, West Midlands, WS2 0LE

For further information on our products and services please visit our stand.

BP International Ltd. L51

Chertsey Road, Sunbury on Thames, Middlesex, TW16 7BP

For further information on our products and services please visit our stand.

British Geological Survey L20

Nicker Hill, Keyworth, Nottingham, NG12 5GG
T: +44 (0) 1159 363100
E: ukgeosenquiries@bgs.ac.uk
W:www.ukgeos.ac.uk/?utm_source=all_energy&utm_medium=referral&utm_campaign=All%20Energy%202020

New clean energy is closer than you think.

Bruce Stevenson Insurance Brokers Limited E59

76 Coburg St, Leith, EH6 6HJ
T: +44 (0) 131 553 2293
W: www.brucestevenson.co.uk

We are the leading insurance advisor to the UK Renewable Energy Industry. We provide insurance solutions across all primary technologies such as On-shore wind (single wind turbines and wind farms), Hydro and Solar. The Renewables sector is constantly evolving and we have embraced more recent developments with battery and hydrogen storage. Our team's specific expertise in the energy arena has also been applied to a variety of CHP systems including Capacity Market power plants.

BSG Ecology H61

Worton Park, Worton, Oxfordshire, OX29 4SX
T: +44 (0) 1289 302004
E: p.clayton@bsg-ecology.com

For further information on our products and services please visit our stand.

Clarke Energy Limited E28

Power House, South Boundry Road Knowsley Business Park, Liverpool, Merseyside, L33 7RR
T: +44 (0) 151 546 4446
E: toni.pedder@clarke-energy.com
W: www.clarke-energy.com/uk

Clarke Energy is an award winning multinational power project business, with a focus on resiliency, efficiency and sustainability. We specialise in distributed energy, hybrid power and engineering, procurement and construction (EPC) solutions. We mitigate the risk from our customer's projects having a strong balance sheet of >£700m deployed assets and >£3b of installed power projects. Clarke Energy is the authorised distributor for INNIO's Jenbacher gas engines in 28 countries and offer a service including, feasibility, project management and aftersales support.

Clarus Networks Ltd J69

19 Shairps Business Park, Houston Industrial Estate, Livingston, West Lothian, EH54 5FD
T: +33 01 24 48 05
E: connect@clarus-sitesolutions.com
W: www.clarus-networks.com

Mobile Private Networks, LEO, IoT & DAS Specialists. Formed in 2014, The Clarus Networks Group offers an extensive portfolio of specialist connectivity solutions, tailored to keep your workforce in touch and online 24/7. We harness the power of major satcoms and telecoms providers, combined with state-of-the-art technology, to provide effective solutions and reliable communications coverage for each site and project, including in remote areas where terrestrial signals are poor or non-existent.

Clean Growth Fund and Carbon Limiting Technologies F20

Pennine Place, 2a Charing Cross Road, London, WC2H 0HH
E: info@cleangrowthfund.com
W: www.cleangrowthfund.com

We are clean and climate technology specialists with decades of experience in scale-up and commercialisation. Our team draws on deep networks across cleantech, industry and government to provide a clear route to growth for our portfolio companies. Clean Growth Fund is a £100m early stage venture capital fund investing in innovations across all sectors to achieve Net Zero. Carbon Limiting Technologies provide portfolio companies with specialist consulting support in areas including IP, manufacturing and growth strategies.

Clyde Training Solutions J28

Change House, Cable Depot Road, Clydebank, Dunbartonshire, G81 1UF
T: 07789 630005
E: adam.wright@clydemarine.com
W: www.clydetrainingsolutions.com

As the first and only training centre in the central belt of Scotland to offer an extensive suite of offshore, maritime and renewables training, Clyde Training Solutions recognises what is required to offer something unique. From day one we have sought to ensure that the training needs of delegates are not simply served through certification, but rather that they leave us confident, informed and equipped to deal with any emergency scenarios they may find themselves in.

Coast Renewable Services H05

Dundee Harbour, Fish Dock Road, Dundee, DD1 3LZ
T: 01382 458101
E: sales@coastrenewableservices.com
W: www.coastrenewableservices.com

Coast Renewable Services has been growing significantly since its inception in 2013. The Coast team is led by Mark Robson, a professional with decades of experience within the industry. We offer our full round services to support wind farms, over the years we have successfully delivered projects throughout the UK & Europe. We invest heavily in our team which is the heart of our business. We strive to make Coast a great place to work and have a dedicated team who love what they do.

coast
Renewable Services

Collett & Sons Ltd D41

Victoria Terminal, Albert Road, Halifax, HX2 0DF
T: +44 (0) 8456 255 233 E: info@collett.co.uk
W: www.collett.co.uk

Experts in abnormal load movements, Collett are your global professional partner for specialist logistics management, heavy haulage, heavy lift, marine and consulting services. Our expertise, skill and years of experience allows us to provide bespoke haulage logistics for the movement of abnormal indivisible loads throughout Europe. Our dedicated fleet of trucks, specialist trailers and self propelled modular transporters (SPMTs) operate across our strategically placed depots in Halifax, Goole, Grangemouth and Ireland, positioning us perfectly to provide the ideal haulage solution.

Compound Semiconductor Applications Catapult M66

Imperial Park, Innovation Centre, Celtic Way, Newport, NP10 8BE,

For further information on our products and services please visit our stand.

Connected Kerb Q40

C/O James Cowper Kreston, 5 Chancery Lane, London, UK, EC4A 1BL

For further information on our products and services please visit our stand.

Conrad Energy Limited F50

Suites D & E, Windrush Court, Abingdon, Oxfordshire, OX14 1SY
T: +44 1235 427290
E: info@conradenergy.co.uk
W: conradenergy.co.uk

Leading energy services provider to generators leveraging our automated optimization platform. We own and operate 650MW of battery storage and flexible generation assets. As an owner, operator, supplier and trader we have a unique understanding of the energy market, giving us an edge when it comes to optimising energy for our clients. We also provide bespoke power solutions to commercial and industrial customers. Our mission is to support the journey to net zero through facilitating flexible and resilient power plants as well as renewables.

conrad
energy

Cooper Software R25

1st Floor, St. Davids House, Dunfermline, Fife, KY11 9NB

As a systems integration specialist Cooper Software focuses on making your business systems work harder for you. Offering IFS as a comprehensive enterprise-wide business support for sales and contract management, engineering, project management, document management, asset and service management, supply chain subcontracting – including finance and human capital management for companies with onshore and offshore operations.

COPA-DATA UK Ltd G11, D31

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T: 02920 10 88 77 E: sales@copadata.co.uk
W: www.copadata.com/en/industries/energy-infrastructure

zenon® software platform developed for the automation & control of power generation, transmission, distribution, infrastructure and buildings. zenon includes the features you need to meet scalability, security & connectivity challenges. We are leaders in IOT and makes connecting and automation easy!

Corpay E30

40 Strand, London, WC2N 5RW
T: +44 (0) 20 7680 8208
E: james.campbell@corpay.com
W: www.corpay.com

At Corpay Cross-Border, we aim to deliver unmatched service and expertise with respect to moving money globally. Utilising our proprietary payment automation technology and currency risk mitigation solutions, we connect businesses large and small with the global financial markets and other businesses all over the world. Corpay Cross-Border is supported by its parent company, FLEETCOR Technologies, Inc. (NYSE:FLT), a Fortune 1000, S&P 500 firm with more than USD $18.2B in enterprise value and revenues in excess of USD $2.83B (as of December 31, 2021).

Costain J41

Costain House, Vanwall Road, Maidenhead, Berkshire, SL6 4UB
T: +44 (0) 1628 842444
E: smart.thinking@costain.com
W: www.costain.com/energy

Costain is supporting the decarbonisation of the UK's energy infrastructure by improving existing asset efficiency and life extension while leading the transition to a sustainable, clean energy future. From decarbonisation of industrial clusters to advising clients on transitioning their vehicle fleets to low carbon fuels, we are supporting the UK's journey to net zero.

DCS Duct Seal Q30

Unit 1 Hardengreen Industrial Estate, Dalkeith, UK, EH22 3NX
T: +44 (0) 131 660 1071
E: ben@ductcleanscotland.co.uk
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DCS is a ventilation maintenance company with 4 main aims: Clean / Seal / Monitor / Maintain. We have clients from across all sectors but specialise in healthcare and energy sectors.

Delta-Xero N07

Unit 5, Pennant Park, Standard Way, Fareham, UK, PO16 8XU
T: +44 (0) 2393 874755
E: support@delta-xero.com
W: delta-xero.com

Delta-Xero is a UK manufacturer of smart media, offline, nano filtration systems for a range of oils/fluids across a diverse range of industry applications. The patented DX technology filters oils and fluids down to 0.1microns, dramatically increasing longevity and effectiveness. DX filter systems remove sub micron particles, water and varnish from oils and also prevent oxidisation and varnish propagation. This really is a case where prevention is better than cure. Increased oil life and effectiveness deliver increased component life, reduced maintenance, downtime and emissions with rapid ROI.

Deutsche Windtechnik G41

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T: +44 (0) 131 230 0515
E: info-uk@deutsche-windtechnik.com
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Deutsche Windtechnik offers a single-source full technical maintenance package for wind turbines in Europe, the USA and Taiwan. The company operates both onshore and offshore. More than 7,600 wind turbines are serviced worldwide by over 2,000 employees under permanent maintenance contracts (basic and full maintenance). The company's system engineering focuses on Vestas, Siemens, Nordex, Senvion, Fuhrländer, Gamesa and Enercon turbines.

Doosan Babcock Ltd R19

Porterfield Road, Renfrew, PA4 8DJ
T: 0141 886 4141 E: db.info@doosan.com
W: www.doosanbabcock.com/en

Using best-in-class technical expertise, Doosan Babcock builds, maintains and extends the life of customer assets worldwide to ensure they are reliable, efficient and most of all, safe. We operate in infrastructure, low carbon, energy, petrochemical and process industries, globally. Working in partnership with our customers towards a cleaner and more sustainable future. Our depth and breadth of technical know-how is backed by over 130 years of energy industry experience, pioneering OEM technology reference all delivered by our highly qualified workforce.

Draeger Safety UK Ltd K21

Unit E1, ABZ Business Park, International View, Dyce, Aberdeen, AB21 0BJ
T: +44 (0) 1670 352891
E: Marketing.UK.contractor@draeger.com

Dräger has been providing complete safety solutions to the energy sector since oil first flowed from the North Sea, and can be your safety partner of choice now and for the future. This can include providing flexible hire or purchase options for protection and detection equipment, fire, rescue, safety and lifesaving products and also related services such as maintenance, repair, and training.

DWF LLP G69

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DWF is a leading global provider of integrated legal and business services and we are energy sector experts. Our global renewable energy team includes experts across the areas of solar, wind, wave and tidal, biomass, energy from waste, waste disposal and recycling, combined heat and power. We listen to our clients and there is a growing desire for legal and business services to be delivered in an easier and more efficient way. So, we've built our business and designed our range of services on this principle.

Ecotricity Ltd K61

Unit House, 7 Russell Street, Stroud, Gloucestershire, GL5 3AX
T: +44 (0) 1453 756111
E: kathryn.adams@ecotricity.co.uk

The World's first green electricity company. Green Electricity didn't exist in the world back in 1996. When we offered it for the first time, we became not just Britain's but the world's first Green Electricity company – and we kick-started the now global Green Electricity movement.

EDF Energy K20

W: www.edfenergy.com/large-business/sell-energy

EDF is helping Britain achieve Net Zero by leading the transition to a cleaner, low emission electric future and is Britain's biggest generator of zero carbon electricity. EDF's PPA team work with industry partners, investors and independent generators to support the wider development of renewable generation, to help build the renewable capacity we need for the future. This includes structuring some of the largest and most complex Power Purchase Agreements (PPAs) in the UK and matching renewable energy generators to businesses of all sizes.

Edinburgh Innovations F25

The University of Edinburgh, Murchison House, King's Buildings, Edinburgh, EH9 3BF

For further information on our products and services please visit our stand.

Emergya Wind Technologies (EWT) DirectWind UK Ltd G45

EWT UK Ltd, Thistle Court, 1-2 Thistle Street, Edinburgh, City of Edinburgh, EH2 1DD
T: +44 (0) 131 560 1661
E: infouk@ewtdirectwind.com
W: ewtdirectwind.com

EWT is the leading medium scale wind turbine manufacturer in its class, providing reliable solutions in distributed generation. For industrial users with medium to high electricity demand, those looking to decarbonise and take control of their energy costs, EWT turbines are an excellent fit. With a wide range of tip heights and rotor diameters, important to maximise production, but suit a variety of conditions. EWT offers high-quality Direct Drive wind turbines spanning 250kW to 1MW. Power your business with EWT.

Emissis Coolnomix Q49

Unit 2, Ellerbeck Court, Stokesley, Middlesbrough, TS9 5PT
T: 01642 049024 E: james.beck@emissis.com
W: www.emissis.com

Emissis Coolnomix is a low cost, high impact, globally patented, retrofit technology that reduces kWh consumption by between 20% and 40% when installed across AC or Refrigeration appliances, without affecting output. Suitable for over 2 Billion units worldwide, Coolnomix is saving clients millions £££ in wasted electricity overspend and in CO2 emissions. Over 20% of any buildings CO2 emissions emanate from air conditioning & refrigeration and the problem is only getting more acute as the world continues to warm up. Emissis are proud to be helping businesses on their journey towards Net Zero.

ENERCON H52

24 St. Johns Road, Edinburgh, EH12 6NZ
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W: www.enercon.de/en/home

As a pioneer of wind energy technology and a partner of the energy transition, ENERCON specialises in the turbine and technology development, production, sales and servicing of onshore wind energy converters. Pursuing its mission of 'Energy for the world', ENERCON has driven sustainable energy generation from onshore wind since 1984. Thanks to its innovative wind energy converter technology, high quality standards and a total installed power of 56.74 GW (31,325 WECs in total as at 12/2021), it is one of the world's leading manufacturers. Learn more at enercon.de/en

Energy Institute A9

61 New Cavendish Street, London, W1G 7AR

For further information on our products and services please visit our stand.

Energy Saving Trust A21

30 North Colonnade, Canary Wharf, London, E14 5GP
T: 02920 451302 E: events@est.org.uk
W: energysavingtrust.org.uk

Energy Saving Trust is an independent organisation dedicated to promoting energy efficiency, low carbon transport and sustainable energy use. We aim to address the climate emergency and deliver the wider benefits of clean energy as the UK transitions to net zero. We empower householders to make better choices, deliver transformative programmes for governments and support businesses with strategy, research and assurance – enabling everyone to play their part in building a sustainable future.

Energy Systems Catapult M66

7th Floor, Cannon House, 18 The Priory Queensway, Birmingham, B4 6BS
T: +44 (0) 121 203 3700
E: info@es.catapult.org.uk
W: es.catapult.org.uk

Energy Systems Catapult was set up to accelerate the transformation of the UK's energy system and ensure UK businesses and consumers capture the opportunities of clean growth. The Catapult is an independent, not-for-profit centre of excellence that bridges the gap between industry, government, academia and research. We take a whole systems view of the energy sector, helping us to identify and address innovation priorities and market barriers to decarbonise the energy system at least cost.

Enspec Power LTD F52

29-31 Shaw Street, St. Helens, Merseyside, WA10 1DG
T: +44 (0) 7481 818740

For further information on our products and services please visit our stand.

Erova Energy H18

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Erova is an energy trading company based in Dublin with offices in London and Amsterdam. Services inc. interconnector trading, imbalance management, renewable certificates, trading analytics, renewables forecasting and risk management. We provide 24 hour trading and market coverage 365 days a year.

ETC ENGINEERING SRL N40, P30, N30

Trento (38121) via dei Palustei 16, Meano,

For further information on our products and services please visit our stand.

ETP L75

Technology & Innovation Centre, 99 George Street, Glasgow, Scotland, G1 1RD
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ETP is the Scottish academic, autonomous alliance of 14 independent Scottish Higher Education Institutions providing world-class capability and resources in energy RD&D. ETP's vision is to build on the existing areas of excellence and collaborative working to ensure that Scotland remains a globally competitive driving force in energy research & innovation.

European Energy Heating UK Ltd D30

14D iPark Industrial Estate, Innovation Drive, HU5 1SG
E: dak@eeheating.com
W: europeanenergy.com/green-solutions/green-heating

European Energy Heating delivers standard and bespoke, large-scale electric heat pumps for commercial uses such as district heating networks, public buildings, schools, hospitals, and horticulture. European Energy already has a large portfolio in the wind and solar sectors and entered the green heating sector in recent years with the aim to offer green heating solutions throughout Europe. European Energy Heating UK is the first such heating division outside of Denmark.

HEATING
EUROPEAN ENERGY

European Marine Energy Centre ORK50

Old Academy Business Centre, Back Road, Stromness, Orkney, KW16 3AW
E: info@emec.org.uk
W: www.emec.org.uk

EMEC was founded in 2003 in Orkney, Scotland and is the only accredited wave and tidal test centre for marine renewable energy in the world. We provide pre-consented and cost-minimising test and demonstration facilities in major wave and tidal resources, suitable for testing multiple grid-connected devices, sub-systems and tools simultaneously. We're also pioneering the development of a green hydrogen economy in Orkney, and have set up a hydrogen production plant onshore, next to the Fall of Warness substation.

European Marine Energy Centre (EMEC) Ltd L81

The Charles Clouston Building, ORIC, Back Road, Stromness, Orkney, UK, KW16 3AW

For further information on our products and services please visit our stand.

F&S Energy Limited R24

87-91 Springfield Road, Chelmsford, UK, CM2 6JL

F&S Energy was founded in 2011, by industry professionals with a vision to increase competition in the renewable energy sector by taking a fresh and dynamic approach to the industry. F&S Energy purchase power from renewable generators throughout the UK, offering market leading rates and top levels of customer service for all of our clients. We sell the power we purchase on to business customers, providing each customer with 100% true renewable power sourced from local generators at prices that beat traditional suppliers.

Falcon Foodservice Equipment R20

Wallace View, Hillfoots Road, Stirling, UK, FK9 5PY

Falcon Foodservice is the UK's leading manufacturer of professional cooking equipment. providing operators and chefs with a comprehensive range of reliable, innovative and efficient products all built in accordance with the internationally recognised ISO 9001:2015 quality management standard. As a responsible manufacturer, we have implemented a number of environmental initiatives within the business, in addition to having developed some of the most energy-efficient products available, for example the development of hydrogen-fuelled appliances, ready for whenever the infrastructure is available.

Farrans Construction G61

99 Kingsway, Belfast, BT17 9NU
E: construct@farrans.com
W: www.farrans.com

We have had a proud legacy in Scotland for 75 years, bringing to life projects of national significance, including Edinburgh Trams 7km extension to Newhaven, Halsary Wind Farm and this year we will commence works on the innovative Govan to Partick Bridge in Glasgow. Our people are experts in the renewables and marine sectors, and we are playing an important role in Scotland's ambitious net zero bid. Our teams are currently working on several high profile and complex renewable projects, with key organisations including SSE, RWE, Bord Na Mona and Scottish Power.

FeTu Ltd C58

Gas Works Lane, Elland, West Yorkshire, HX5 9HH
E: info@fetu.co.uk
W: www.fetu.co.uk

FeTu are an innovation driven enterprise, their novel 'Positive Displacement Turbine' seamlessly and intrinsically translates between rotational and volumetric sources, essentially it is an energy conversion platform. The fundamental principle of all compressors, vacuum pump, expanders and engines.

Forsyth of Denny F32

Easterton, Stirling Road, Denny, UK, FK6 6RF

Mobile Cranes and Contract lift capabilities up to and including heavy Cranes • Lorry loader and abnormal transport capabilities for delivery of all major components • With 3 Strategic locations with covered and abnormal load storage options • GWO trained and experienced Wind turbine technicians crews fully equipped with tool containers and all required equipment. • Major Component exchange • Lifting solutions and lift plans with in house cranes • Transport, offload and storage of Major components • GWO trained and experienced maintenance technicians • All resources in house.

Full Circle Wind Services Ltd H40

Thistle Court, 1-2 Thistle Street, Edinburgh, Midlothian, EH21DD

For further information on our products and services please visit our stand.

GBE S.p.A. G40

Via Teonghio 44, Orgiano, VI, 36040
T: +39 04 44 77 43 34
E: info@gbeonline.com
W: www.gbeonline.com

GBE is an Italian company specialized in the production of cast resin and VPI transformers up to 30MVA in all voltage classes up to 52kV (BIL 250KV), and oil immersed transformers up to 50MVA, 145kV (650kV BIL), air insulated, resin and oil reactors up to 10MVAr. GBE UK Limited based in Leeds, is the UK Commercial Office and Workshops for GBE SpA Italy. GBE UK Limited always offers a personal service and advise the best solution possible to meet our customer needs. Which includes the supply and fitting of MV and LV Switchgear to offer the full package substation solution.

Geo Structural Ltd / NRS Training Services Ltd H02

Unit 01 Drumbreck Farm, Eastfield Rd, Caldercruix, ML6 7RP
T: 07780 693730
E: scott.smith@geo-structural.co.uk
W: www.geo-structural.co.uk/renewables

Geo-Structural Ltd was established to provide solutions in the inspection and repair of both onshore and offshore wind turbine generators. (Blades, foundations, tower displacement) NRS Training Services Ltd is a certified GWO training provider located in central Scotland offering several approved Global Wind Organisation training courses.

Gilbert Gilkes & Gordon Ltd HIE59

Canal Head North, Kendal, Cumbria, LA9 7BZ
T: +44 (0) 1539 790045
E: j.chaplin@gilkes.com
W: www.gilkes.com

Gilkes Hydro manufacture Pelton, Francis and Turgo turbines from 50kW to 30MW. We offer customised, engineered solutions for hydroelectric developments, including design, manufacture, installation, commissioning and testing. We also offer service & maintenance on existing schemes as well as full plant modernisation.

GILKES Hydro

Global Wind Technology Ltd M09

unit 22 40 Edison St Hillington, Glasgow, G524JW

For further information on our products and services please visit our stand.

Government of Canada K68

Canada House, 5 Trafalgar Square, London, SW1Y 5BJ

A branch of Global Affairs Canada, the Canadian Trade Commissioner Service (TCS) provides strategic market information and market access solutions for Canadian companies looking to export, invest abroad, or develop innovation and R&D partnerships using our extensive global networks. Located in more than 150 cities worldwide, and in 6 regional offices across Canada, the TCS also assists foreign companies planning to invest in Canada or current investors to expand their operations in Canada.

Green Cat Contracting Ltd G60

Green Cat Contracting, Starlaw Business Park, Livingston, West Lothian, EH54 8SF
T: 01506 416614
E: info@greencatcontracting.co.uk
W: www.greencatcontracting.co.uk

Green Cat Contracting Ltd (GCC) was formed in January 2013 with the aim of providing contracting services to a number of small to medium sized renewable energy and other construction projects. The business was initially intended to cover small scale wind energy (250kW to 10MW) and small-scale hydro schemes (100kW to 1MW). As the market has matured and the scale of projects has increased so has the target market, with projects up to 40MW now being pursued.

Green Cat Renewables Ltd H60

Bethany Hall, 29A High Street, Biggar, Lanarkshire, ML12 6DA
T: +44 (0) 1899 309100
E: info@greencatrenewables.co.uk
W: greencatrenewables.co.uk

The company was established with an aim of driving down the costs associated with the development of renewables projects, identifying an opportunity to improve efficiency and reduce development costs by offering a complete in-house consultancy, and project management service to deliver concepts through the whole project life-cycle from initial conception to operation making renewable energy development more accessible to a wider range of individuals, businesses and developers. Our experience profile includes 600MW+ of wind, 200MW+ of solar and 25MW+ of hydro projects.

Green Marine(UK) ORK69

Station House, North End Road, Stromness, Orkney Islands, KW16 3AG

For further information on our products and services please visit our stand.

Greenbackers Investment Capital M60

4 Royal Crescent, Glasgow, G37SL
T: +44 (0) 7957 201 203
E: robert.hokin@greenbackers.com
W: greenbackers.com

Greenbackers convenes and catalyses climate investment via: a) Greenbackers Investment Showcase, a deal room connecting VC's, Corporate Venture Funds, Impact funds, Investment Banks, Angel Syndicates and more to pre-screened, curated, investment-ready ventures, and; b) Greenbackers Climate Tech Tour, hosting Superpitch events on the doorsteps of major investment hubs of the world, some of the best Pitch events you have ever attended!

GreenCom Networks C40

Rosenheimer Strasse 120, Munich, 81669
T: +49 89 5108 5601
E: John.Henderson@greencom-networks.com
W: www.greencom-networks.com/en

Headquartered in Europe, a World leading IoT company integrating distributed assets such as SolarPV, battery storage, EV's and heatpumps enabling white-label end customer services such as energy communities, peer-to-peer trading, optimisation and visualisation of energy flows for utilities and OEM's

Ground Source Heat Pump Association C54

39 Dryburgh Road, London, SW15 1BN

For further information on our products and services please visit our stand.

Headland Archaeology (UK) Ltd J61

13 Jane Street, Edinburgh, Midlothian, EH6 5HE
T: +44 (0) 131 467 7705
E: russel.coleman@headlandarchaeology.com
W: headlandarchaeology.com

For further information on our products and services please visit our stand.

HeatSource G57

3 Watt Place, Hamilton, G72 0AG

Construction Scotland Innovation Centre is the launchpad to a zero carbon built environment. We provide the connections, infrastructure and culture needed to solve the sector's most pressing challenges. We bring together world-class academia, government bodies and industry at all levels to future-proof the commercial and environmental road forward for our sector.

Highlands & Islands Enterprise HIE56

An Lochran, 10 Inverness Campus, Inverness, IV2 5NA
T: +44 (0) 1463 383322 E: info@hient.co.uk

Highlands and Islands Enterprise (HIE) is an ambitious organisation with a unique remit from the Scottish Government that integrates economic and community development. We work in a diverse region extending from Shetland to Argyll, and from the Outer Hebrides to Moray.

Highlands & Islands Enterprise Energy of Orkney ORK32

14 Queen Street, Kirkwall, Orkney, KW15 1JE
T: +44 (0) 1856 888710
E: energy@orkney.com

Energy of Orkney is the umbrella brand for Orkney's renewable energy sector. Pod exhibitors are ICIT and Orkney Islands Council. Individual stand holders are Leask Marine, Green Marine, EMEC, Orbital Marine, Wello, Aquatera and Northwards.

Historic Environment Scotland K04

Finance Purchase Ledger Team, Longmore House, Salisbury Place, Edinburgh, EH9 1SH
W: www.historicenvironment.scot

The Key Agencies play a pivotal role in advising decision-makers on the effects of energy projects on the environment. We advocate early engagement on emerging proposals to enable good development and to advise on protection of the historic and natural environment.

HMS Industrial Networks D53

HMS Industrial Networks Ltd, Sir William Lyons Road, Unit 2, Sovereign Court 1, Coventry, CV4 7EZ
T: +44 (0) 1926 405599
E: uk-sales@hms-networks.com
W: www.hms-networks.com

For further information on our products and services please visit our stand.

Hresys Energy Solutions Europe Ltd M61

20-22 Wenlock Road, London, UK, N1 7GU
T: +44 (0) 7584 131837 E: jacky@hresys.com
W: hresys.com

Hresys is one of the largest and most Tech advanced Li-ion battery manufacturers and BESS solution providers from China. we play a significant role in integrating the whole battery industrial chain vertically, we have provided numbers of BESS solutions to the domestic and oversea clients. we recently set up our UK company for better service the UK commercial and domestic market with our second germination of 48V Home Energy Storage System.

Hydrasun R31

Gateway Business Park, Moss Road, Aberdeen, United Kingdom, AB12 3GQ

Hydrasun is the recognised market leader in fluid transfer, power and control solutions to the global energy industries. A core product offering is complemented by services including asset integrity management, installation & integration, design, engineering and project management. Our model of fast & reliable supply of integrated product & service solutions aligned with our innovative engineering and technology development has enabled us to develop an extensive track record in the fast developing Hydrogen marketplace and to support the worldwide drive to decarbonise economies and industry.

Hydro Genie Systems C50

Orchard Mill, Back Loan, Thornhill, Stirling, Stirling, Scotland, FK8 3QB
T: +44 (0) 7977 012224
E: Jim@hydro-genie.co.uk
W: www.hydro-genie-co.uk

Most of us have a central heating boiler that burns fossil fuel to heat our homes & Commercial buildings. The Retrofit system is based partly on Henrys Law of Physics where it removes dissolved gases from the circulating heating fluid. Once the gasses are removed the fluid dynamics within the technology provides compression & a slight vacuum, which lifts the temperature by 2 – 3 degrees. This lift in temperature is then measured by the Energy Genie Electronic Controller, which uses that information, to put the boiler into economising mode.

Hydrowheel Ltd L71

Pine Lodge, Old Tollhouse Road, Aboyne, UK, AB34 5AF

For further information on our products and services please visit our stand.

Hysopt E41

Bredabaan 837, Antwerp, 2170
T: 07719 902067 E: sales@hysopt.com
W: www.hysopt.com

Hysopt provides science-based, HVAC simulation and digital twin software. We work with companies and public sector organisations (NHS Trusts, Universities, local authorities) to optimise the performance of their heating and cooling installations to help them lower energy costs and move towards a low/zero carbon heat future. We do this by calculating, simulating and optimising the performance of installations with a unique "HVAC digital twin", leading to installations that have: - lower energy costs - lower carbon emissions - optimised investment costs - "first time right" performance.

INCICO SPA N40, P30, N30

44121 Ferrara – Italy Via Terranuova, 28

For further information on our products and services please visit our stand.

Indian Chamber of Commerce A87

ICC Towers- 9th Floor., 4, India Exchange Place., Kolkata, Delhi, 700001
T: +91 33 22 53 42 04

For further information on our products and services please visit our stand.

INGETEAM UK Ltd F30

INGETEAM UK Ltd, Ground Floor (Part), Colonsay House, GSO Business Park East Kilbride, G74 5PG
T: +44 (0) 07394 571834
E: uksupport.service@ingeteam.com
W: www.ingeteam.com/gb/Home.aspx

INGETEAM is a global company specializing in electric power conversion. With a headcount of +4,000 employees and subsidiaries in 24 countries, Ingeteam is ideally positioned to meet the needs of its customers across the globe. Furthermore, Ingeteam has its own O&M Service division for RE plants.

Innovate UK K40

Polaris House, North Star Avenue, Swindon, SN2 1FL
T: 0300 321 4357
E: support@innovateuk.ukri.org
W: www.ukri.org/councils/innovate-uk

Innovate UK is the UK's national innovation agency. We support business-led innovation in all sectors, technologies and UK regions. We help businesses grow through the development and commercialisation of new products, processes, and services, supported by an outstanding innovation ecosystem that is agile, inclusive, and easy to navigate.

Innse Gall - Harnessing the Atlantic Potential HIE32

Highlands and Islands Enterprise, Sandwick Road, Stornoway, HS12AN
T: 01463 383267 E: enquiries@hient.co.uk
W: www.hie.co.uk

Our stall representatives are: Highlands and Islands Enterprise - an ambitious organisation with a unique remit which integrates both economic and community development. Comhairle nan Eilean Siar - Local Authority for the Outer Hebrides. Stornoway Port Authority - manages Stornoway port, the primary port for the Outer Hebrides and one of the largest and busiest ports on the west coast, north of the Clyde. UHI Outer Hebrides - offers learning from its campuses across the Outer Hebrides, access level through to PhD, to suit more people, at more levels, for more reasons.

Invest NI C20

Bedford Square, Bedford Street, Belfast, BT2 7ES
T: +44 (0) 2890 698851
E: sam.knox@investni.com
W: www.investni.com

We have engineering companies that lead in development, manufacture and use of low carbon technologies, systems and services; exported to every continent.

Invest North Tyneside H56

Quadrant East, Cobalt Park, North Tyneside, North East England, NE27 0BY
T: +44 (0) 191 643 6409
E: business@northtyneside.gov.uk
W: www.investnorthtyneside.co.uk

Invest North Tyneside provides business support including research and intelligence, recruitment guidance, tailored funding advice, relocation assistance and property solutions. Available sites include Swans Offshore Energy Park, located on the River Tyne and only 96 nautical miles from Dogger Bank.

Italian Trade Agency N40, P30, N30

Trade Promotion Section of the Italian Embassy, Sackville House, London, W1J 0DR
T: +44 (0) 20 7292 3910 E: londra@ice.it
W: www.ice.it/en

ITA - Italian Trade Agency is the Governmental agency that supports the business development of our companies abroad and promotes the attraction of foreign investment in Italy.
With a motivated and modern organization and a widespread network of overseas offices, ITA provides information, assistance, consulting, promotion and training to Italian small and medium-sized businesses. Using the most modern multi-channel promotion and communication tools, it acts to assert the excellence of Made in Italy in the world.

Italian Trade Agency N40, P30, N30

Sackville House, 40 Piccadilly, London, W1J 0DR
T: 020 7292 3910 E: londra@ice.it
W: www.ice.it/en/index.php/about-us

ITA - Italian Trade Agency is the Governmental agency that supports the business development of our companies abroad and promotes the attraction of foreign investment in Italy. With a motivated and modern organization and a widespread network of overseas offices, ITA provides information, assistance, consulting, promotion and training to Italian small and medium-sized businesses. Using the most modern multi-channel promotion and communication tools, it acts to assert the excellence of Made in Italy in the world.

ITH Bolting Technology UK Ltd. F40

Unit 604 Merlin Park, Ringtail Road, Burscough, Lancashire, L40 8JY
T: +44 (0) 333 222 4012 E: sales.uk@ith.com
W: www.ith.com

ITH Bolting Technology are a world leader in the design & manufacturing of Bolt Tensioning Cylinders. Also, in our range of equipment are, Hydraulic Torque Wrenches, Nut Runners & a complete range of High Pressure Pump Units.

Katrick Technologies Limited H21

10 Montrose Street, Suite 8, Glasgow, G11RE
E: info@katricktechnologies.com
W: www.katricktechnologies.com

We are an IP-based business developing zero-carbon technologies. Our patented technologies capture & convert energy from heat and wind via oscillations. Our passive cooling technology revolutionises the cooling of data centres. Designed to passively remove heat to supply the required cool temperatures and reduce power use & emissions by over 50%. Our scalable & flexible wind panels provide zero-carbon electricity for every environment. Aerofoils capture & convert wind energy into oscillations, delivering carbon-free electricity. Providing a wind energy solution where turbines are impossible.

Kishorn Port Ltd HIE34

Integrated Freight Facility, Annat, Corpach, PH33 7NN

For further information on our products and services please visit our stand.

Knights Brown Construction Ltd H31

3 Charnwood Park, Waterton, Bridgend, CF313PL

With a tradition of successful civil engineering, in 2008 we established a divisional office in Bridgend specialising in energy projects. We quickly built a reputation as 'contractor of choice' for the construction of energy projects across the UK and Ireland. Our extensive, in-house project and site management expertise allows us to provide high quality, competitive packages for energy sector customers that effectively meets all construction requirements. Our customers take confidence in our portfolio of successful energy projects with over 900MW of installed capacity to date.

Kooi Camera Surveillance D39

Kooi Security Manchester, Grove House, 774-780 Wilmslow Road, Manchester, M20 2DR
T: +44 (0) 1204 819349
E: sales@247kooi.com
W: 247kooi.com

Kooi Security is the European market leader in temporary mobile camera surveillance. Our Alarm Center is available 24/7 and 365 days a year. Our security experts provide free advice (on site if required). Our professional service guarantees speedy and adequate delivery and placement. At Kooi you are assured of > More than 10 years of experience in effective and reliable camera surveillance > Fast delivery and installation at any desired location > 24/7 monitoring and action from the Kooi Alarm Center > A sustainable security solution through fuel savings and CO2 reduction.

Kyte Powertech H11

Dublin Road, Cavan, Co. CAVAN, H12 KV20
T: +353 494 331588
E: martin.reilly@kytepowertech.com
W: www.kytepowertech.com

Kyte Powertech is one of the leading manufacturers of distribution transformers. First established in 1977 the operations based in Cavan Ireland, has evolved into a global supplier of high-quality distribution transformer solutions.

La Tene Maps K02

Station House, Shankill,
T: +353 1284 7914
E: enquiries@latenemaps.com
W: www.latenemaps.com

The companies main products are printed and digital maps and their corresponding databases on most renewable energy technologies: including: bioenergy, hydro, solarPV, wind wave and tidal. We also cover electricity & storage. Copies of some of our maps are available for free pickup from our stand.

LDA Design Consulting Limited D49

17 Minster Precincts, Peterborough, Cambridgeshire, PE1 1XX
T: 01865 887050 E: info@lda-design.co.uk
W: www.lda-design.co.uk

LDA Design is an employee-owned creative consultancy of planners, environmental planners, EIA coordinators and designers. Our mission is to make great places and shape the world around us for the better. The climate crisis is the challenge of our generation. Our long-standing commitment to renewable energy places us at the fore to help clients respond. We work with developers, landowners, local authorities and communities to plan and deliver successful renewable energy projects, providing robust advice combining creativity with practical appreciation of the issues, and of risk and opportunity.

LDĀDESIGN

Logan Energy Limited R21

Logan Energy Ltd, 7 Wallyford Industrial Estate, Musselburgh, East Lothian, EH21 8QJ

For further information on our products and services please visit our stand.

Mabbett G38

Mabbett House, 11 Sandyford Place, Glasgow, G3 7NB
T: +44 (0) 141 227 2300
E: lindsay@mabbett.eu
W: www.mabbett.eu

Mabbett offers integrated planning, environmental and engineering capability to support renewable and low carbon energy developments. Our team of specialists include: EIA, Planning, Landscape & Visual, Glint & Glare, Ecology, Ornithology, Noise, Contaminated Land, Air Quality, ECoW, Energy Management, Grid connection support, and M&E Engineering Design. We work with developers, industrial clients, landowners and local authorities to assist their transition to net zero.

Mammoet UK J30

Beatrix House, Tyne View Terrace, Wallsend, Tyne and Wear, NE28 6SG
T: +44 (0) 1642 366150
E: sales.uk@mammoet.com
W: www.mammoet.com

Mammoet is the world's leading tailor-made heavy lifting and multi modal transportation specialists. Our core business is the transport, shipping, installation (including horizontal and vertical positioning) and removal of heavy or large objects to and from any location, onshore and offshore.

Manutech Europe Ltd M05

Glyn Wylfa-G3, Castle Road, Chirk, Ll14 5bs
T: +44 (0) 1691 770484
E: sales@manutecheurope.com
W: www.manutecheurope.com

Welcome to Manutech Europe Ltd. Leading providers of current measurement and energy monitoring products. Offering top of the range current transformers and transducers capable of measuring current ratings of up to 20,000 amps from microamperes and Rogowski coil flexible-core Rope CT's with multiple amperage ratingc varied in lengths of 12 to 48 inches – Manutech Europe Ltd are sure to offer products that guarantee to meet your requirements at competitive prices. Our product portfolio increased with our group companies products allowing us to have a wide range of electronic passive components.

Marsh Commercial A10

Apex House, Apex Business Park, Wainwright Road, Worcester, UK, WR4 9FN
T: 01905 892156 E: Carl.Gurney@marshcommercial.co.uk
W: www.marshcommercial.co.uk

We're a specialist renewable energy insurance broker. We understand this complex industry and the various associated risks: environmental, contractual, supply chain, delivery, construction and operational, so we're able to offer expert advice and arrange the right renewable energy insurance to protect your business. From concept to operation, from solar power to anaerobic digestion, we're here to provide the right expertise when you need it most.

Mersen C38

Orchard Park, 11 Woodside, Motherwell, Lanarkshire, ML1 4XL

For further information on our products and services please visit our stand.

METEODYN F36

33 Boulevard Salvador Allende, 44800 Saint-Herblain, Saint-Herblain, 44800
T: +33 (0) 240 710 505
E: info@meteodyn.com
W: meteodyn.com

Meteodyn provides Meteodyn Universe, a wind power software suite dedicated to: Mesoscale data extraction (GCS); Wind data analysis and completion (WDA); Wind resource assessment and wind farm AEP estimation (WT – the industry's leading CFD software); Wind farm optimisation (WFO); Wind farm performance analysis (WPA). Additionnaly, within our consulting services we may: Provide wind energy production forecasts; Propose mesoscale-microscale coupling for Wind Resource Assessment; Correct lidar data on complex terrain; Manage Climate Change Risk.

NanoSUN Q31

Ground Floor Office, Building 5, Lancaster Business Park, 14 Mannin Way, Caton Road, Lancaster, Lancashire, LA1 3SW
T: 01524 63517 E: info@nanosun.co.uk
W: www.nanosun.co.uk

NanoSUN is a world leading, award-winning engineering company focused on the development, manufacture and commercialisation of its hydrogen refuelling products, for customers in the Oil & Gas, Industrial Gasses and Transport sectors. Our novel cascade solutions are used in multiple applications, where high pressure, mobile and cost-effective hydrogen storage, distribution & dispensing is required. Bridging the gap between Hydrogen Suppliers and Fuel Users, our mission is to accelerate hydrogen use with innovative technologies and provide low cost, simple-to-use and safe fuelling systems.

Nanotech Energy Inc G53

323 Sunny Isles Blvd, 7th Floor, Sunny Isles Beach, Florida, FL33160,
E: pmaske@nanotechenergy.com
W: nanotechenergy.com

Nanotech Energy is a cutting-edge Graphene manufacturer that holds the world's first graphene patent. As Industry leaders in true mono-layer graphene production, we excel in several areas of nanoparticle production and have produced the world's first graphene-powered, non-flammable lithium-ion battery that is economical, mass producible, and delivers superior performance.

Natural Power M59

The Green House, Castle Douglas, Kirkcudbrightshire, DG7 3XS
T: +44 (0) 1786 542300
E: sayhello@naturalpower.com
W: www.naturalpower.com

Natural Power is an independent consultancy and service provider that supports a global client base in the delivery of onshore wind, solar, renewable heat, energy storage and offshore projects, from initial feasibility, through construction to operations and throughout all stages of due diligence.

Neo Environmental Ltd R22

1 Lonmay Road, Glasgow, G33 4EL

Our team consists of experienced multi-disciplinary consultants, including EIA Project managers, landscape architects, ecologists, heritage and archaeological consultants, environmental engineers, acousticians, hydrologists, geophysical surveyors, graphic designers and specialist technicians. The company was formally established in 2012 with our head office based in Glasgow. Three further offices have since been added in England, Ireland and Northern Ireland providing an extensive geographical coverage across the whole of the UK and Ireland.

Net Zero Technology Centre K69

Net Zero Technology Centre, 20 Queens Road, Aberdeen, AB15 4ZT
T: 01224 063200 E: info@netzerotc.com
W: www.netzerotc.com

Our purpose is to develop and deploy technology for an affordable net zero energy industry. We aim to accelerate the energy transition by closing the gap in net zero technologies. Our world is facing two great challenges: reducing our carbon emissions to net zero and continuing to meet our energy needs. As industries transition, we must ensure resilient and affordable energy supplies. For the oil and gas sector and other hard to decarbonise industries to support the UK's net zero target, innovation is key.

Norco Group Ltd G51

5&6 Airways Industrial Estate, Pitmedden Road, Aberdeen, Aberdeenshire, AB21 0DT
T: +44 (0) 1224 729221
E: nsutherland@norcoenergy.com
W: www.norcoenergy.com

Norco Group Ltd is an independent specialist in stored electrical energy systems, with unrivalled experience and expertise in the delivery of innovative solutions to support the demand for battery backed systems, UPS and charger systems across a wide range of applications. Representatives from our partner Riello UPS will on the stand to answer your questions of critical, backup and emergency power supplies.

Nordex Group D28

Towers Business Park, Wilmslow Road, Didsbury, Manchester, M20 2DX
T: +44 (0) 161 445 9900
E: SalesUK@nordex-online.com
W: www.nordex-online.com

The development, manufacture, project management and servicing of wind turbines in the onshore segment has been the core competence and passion of the Nordex Group and its more than 8,500 employees worldwide for more than 35 years. The focus is on turbines in the 3 to 6MW+ class.

Nord-Lock Ltd J49

Kingsgate House, Newbury Road, Andover, Hampshire, SP10 4DU
T: +44 (0) 1264 355557
E: enquiries@nord-lock.com
W: www.nord-lock.com

Nord-Lock Group is a global leader in bolted solutions. Our innovative technologies combined with our industry-leading expertise secures millions of critical applications across the globe. The product portfolio includes Nord-Lock® wedge-locking washers, Superbolt™ mechanical tensioners, Boltight™ hydraulic tensioners and Expander® System pivot pins. Our solutions are developed and manufactured in-house.

Northern Valve & Fitting Company Limited D38

Unit D13 Rivington Court, Moss Industrial Estate, Aberdeen, WN7 3NF
T: 01942 601209 E: sales@nvfcl.com
W: www.nvfcl.com

FITOK are generally recognised as the leading (price competitive & service orientated) alternative to all established manufacturers of Fluid system Components. FITOK (founded in 1998) manufacture and distribute its range of products in 6 continents. With a product portfolio covering Instrumentation (6,000psi, TWIN FERRULE), Medium & High Pressure (20K & 60K, CONE & THREAD), Ultra High Purity (VCR, VCO), Rigid Tubing & Sample Systems they have established themselves as a global brand associated with quality & value! FITOK also have a full range of EC-79 & ECE-R110 certified products.

Northwards Ltd ORK65

Anderson Base, Gremista Industrial Estate, Shetland, ZE1 0PX
T: 01595 694452 E: info@northwardsltd.co.uk
W: www.northwardsltd.co.uk

From Northwards' bases in Shetland, Orkney, Aberdeen, Inverness, Scrabster, and Central Scotland, work with the energy sector ranges from transporting materials to Shetland for the development of the UK's largest onshore wind farm to moving hydrogen in Orkney. Beyond its Scottish depots, the company has access to the vessels and terminals of parent company, SeaCargo AS, so transportation across the north of Europe and Scotland is simple and straightforward, while a partnership with UPN facilitates pallet distribution services across the UK, Ireland and Europe.

Offshore Renewable Energy Catapult M66

Inovo, 121 George St, Glasgow, G1 1RD
T: 03330 041400 E: info@ore.catapult.org.uk
W: ore.catapult.org.uk

ORE Catapult was established in 2013 by the UK Government and is part of a network of Catapults set up by Innovate UK in high growth industries. It is the UK's leading innovation centre for offshore renewable energy. Independent and trusted, with a unique combination of world-leading test and demonstration facilities and engineering and research expertise, ORE Catapult convenes the sector and delivers applied research, accelerating technology development, reducing risk and cost and enhancing UK-wide economic growth.

OICE N40, P30, N30

Via Flaminia 388 00196 – Roma (RM)

For further information on our products and services please visit our stand.

OMICRON electronics UK Ltd J18

Staples Close, Stafford, Staffordshire, ST16 1WQ
T: +44 (0) 1785 848100
E: info.uk@omicronenergy.com
W: www.omicronenergy.com

OMICRON is an international company serving the electrical power industry with innovative testing and diagnostic solutions. Offering a wide array of services in the fields of commissioning, consulting and training.

OMICRON

OPERA Engineering SRL N40, P30, N30

Via Benedetto Croce, 6 54100 Massa (MS),

For further information on our products and services please visit our stand.

Orbital Marine Power ORK30

Innovation Centre – Orkney, Hatston Pier Road, Kirkwall, Orkney, KW15 1ZL
T: +44 (0) 7985 542501
E: s.watt@orbitalmarine.com
W: www.orbitalmarine.com

Orbital Marine Power is an innovative Scottish engineering company focused on the development of revolutionary tidal energy turbine technology to produce a step-change reduction in the cost of clean energy from flowing water.

ORION Clean Energy Project HIE09

Shetland Islands Council, Port Administration Building, Sella Ness, Shetland Islands, ZE2 9QR
E: futureenergyhmpo@shetland.gov.uk
W: www.orioncleanenergy.com

ORION is a strategic framework connecting organisations with a common ambition: to transform the Shetland region into a centre for secure and affordable clean energy.

Orkney Islands Council - Marine Services ORK60

Harbour Authority Building, Scapa, Orkney, KW15 1SD
T: 01856 873636 E: harbours@orkney.gov.uk
W: www.orkneyharbours.com

Orkney Harbour Authority is part of Orkney Islands Council with responsibility for the largest natural harbour in the Northern Hemisphere at Scapa Flow but also 29 piers and harbours that support a diverse range of sectors and activities. Home to the Flotta Oil Terminal and the premier safe location for ship to ship transfers in Northern Europe we are also the cruise capital of the UK with nearly 200 callers this season. We have a developed Masterplan that provides a roadmap for supporting offshore wind and targeting the decarbonisation of the shipping sector as a priority.

PARAT Halvorsen AS — M51

Postboks 173, Flekkefjord, 4402
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Powersystems UK Ltd — G10

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W: www.redrockpower.co.uk

Red Rock Power is an Edinburgh-based owner, operator and developer of renewable energy projects in the UK and Europe including the Beatrice (25%) and Inch Cape (50%) offshore wind farm projects. We are passionate about delivering clean, affordable energy and supporting the net zero transition. While our strength lies in the wind sector and we are continuing to grow our UK wind portfolio, we are also pursuing acquisition and development opportunities to expand into other European markets and sustainable energy technologies. Visit www.redrockpower.co.uk to learn more.

REHAU Ltd A7

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Renewable Energy Association P48

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Renewable Parts Ltd G30

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W: www.renewable-parts.com

About Renewable Parts. Renewable Parts specialises in supply chain management for the wind energy industry, sourcing, storing, and delivering parts and consumables for turbine owners, operators, and maintenance providers across the UK and Europe. The company is a sustainability leader in the industry, actively working with partners including suppliers and academia, like the University of Strathclyde, to create a greener supply chain and introducing circular economy practices into the wind energy industry.

reNEWS G05

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reNEWS provides news-focused business intelligence on the renewable energy sector with market-leading coverage of offshore and onshore wind. The reNEWS Premium newsletter is regarded as a leading source of information on the sector, providing the exclusive and unmissable stories that matter to the industry. Breaking news is available through our dynamic website www.reNEWS.BIZ and across a range of digital platforms including a customised daily newsletter service.

RES K30

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RES is the world's largest independent renewable company with over 38 years' experience of developing, building and operating utility-scale solar, storage and wind assets. The company has delivered over 17 GW of renewable generation worldwide and supports an operational asset portfolio of 5.5 GW.

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RSK Group Ltd D60B

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E: communications@rsk.co.uk
W: www.rskgroup.com

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Scottish & Southern Electricity Networks G50

Inveralmond House, 200 Dunkeld Road, Perth, PH1 3AQ
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Scottish and Southern Electricity Networks is a British company. We aim to deliver a safe and reliable supply of electricity to the people who live and work in the North of Scotland and Central Southern England.

Scottish Enterprise K10

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W: www.scottish-enterprise.com

Scottish Enterprise is Scotland's main economic development agency and a non-departmental public body of the Scottish Government. We work effectively with partners in the public and private sectors. SE supports business and industry to help create jobs, business growth and international success.

Scottish Government A21

Local Energy Systems, 4th Floor, 5 Atlantic Quay, 150 Broomielaw, Glasgow, G2 8LU
W: www.gov.scot/energy

The Scottish Government is committed to achieve net zero by 2045. Energy system change is critical to the delivery of Scotland's ambitious net zero targets. It is vital we take a whole systems approach to this transition to net zero, where decisions taken in one sector of the energy system will interact with other sectors. It is crucial we look at the big picture, ensuring all sectors of our energy system work together. This will allow us to find joint opportunities so that our energy system as a whole, support Scotland and bring together our plans for each sector of Scotland's energy system.

Scottish Hydrogen & Fuel Cell Association R23

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W: www.siemensgamesa.com/en-int

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W: www.smithbrothersltd.co.uk

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Society for Underwater Technology -SUT- Q03

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Solar Energy Scotland D51

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Solar Energy Scotland operates in coordination with Solar Energy UK. Since 1978, Solar Energy UK has worked to promote the benefits of solar energy and to make its adoption easy and beneficial for domestic and commercial users. A not-for-profit association, we are funded entirely by our membership, which includes installers, manufacturers, distributors, developers, investors, and legal and environmental consultants.

SOLIDpower GmbH C30

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W: www.sse.com

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The Bryden Centre L64

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The Bryden Centre for Advanced Marine and Bio-energy Research is a consortium of five research institutions and two local authorities that have come together, within the INTERREG VA programme, to undertake a Renewable Energy project aimed at delivering industry informed research.

Thrive Renewables Plc F55

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Thrive Renewables is a renewable energy investment company. We believe in a clean, smart energy system powered by the investment of many and currently own and operate 22 projects including solar, storage, wind and hydro. Our investment strategy is focussed on making renewables work commercially and socially using flexible funding models. In addition to acquiring projects, we plug funding gaps and provide collaborative capital through joint ventures or funding bridges with developers, businesses and communities.

TLT LLP H39

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Our team of lawyers has the specialist expertise to advise on all clean energy schemes, including new technologies such as electric vehicles and energy storage, an outstanding reputation for innovation and a track record of working with some of the most entrepreneurial companies in the sector.

TMC Transformers S.p.A. L48

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TÜV SÜD K19

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UAB iPS Baltics H68

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University of Sheffield E39

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The Energy Institute highlights important research and partnership working from the University on low-carbon energy, electrical energy, nuclear, wind, conventional power and the circular economy. Visit us to hear about our new £21 million research facility, the Translational Energy Research Centre.

University of Strathclyde J60

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Via Federico Rosazza 38 - 00153 Roma,

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Vensys Energy E50

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Visualwind H08

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BB1 2LD
T: +44 (0) 1254 296000
E: rebecca.worgan@vitalenergi.co.uk
W: www.vitalenergi.co.uk

Vital Energi are one of the UK's longest established providers of district energy solutions, with over 30 years' experience. We incorporate the design, build, installation and operation & maintenance of heat networks helping clients to reduce their carbon emissions and increase financial savings.

Wave Energy Scotland HIE30

An Lochran, 10 Inverness Campus, Inverness,
IV2 5NA
T: +44 (0) 1463 245245 E: wes@hient.co.uk
W: www.waveenergyscotland.co.uk

Wave Energy Scotland (WES) is funding the development of innovative technologies to produce low cost, efficient and reliable components and subsystems which will form the basis of the cost effective generation of wave energy in Scotland.

Wilson Power Solutions G27

Westland Square, Leeds, West Yorkshire,
LS11 5SS
T: +44 (0) 113 271 7588
E: info@wilsonpowersolutions.co.uk
W: www.wilsonpowersolutions.co.uk

Wilson Power Solutions is a pioneer in manufacturing power and distribution transformers. Its flagship product, Wilson e3 Ultra Low Loss transformer helps organisations reduce carbon emissions and energy waste. WPS has over 1000 installations across the UK of the award-winning amorphous transformers

WINERGY G21

Unit 5, Navigation Park, Leeds, LS10 1EP
T: +44 (0) 7921 246116
E: gary.husband@flender.com
W: www.winergy-group.com

Winergy is the brand for wind gearboxes and generators of Flender GmbH and headquartered in Voerde, Germany. Over 200 GW of gearbox capacity and more than 50,000 generators have been successfully delivered. This is complemented by comprehensive service offerings. Production and service sites are in Europe, UK , China, India, and the U.S., while the strong base of service locations is continuously being expanded.

XOCEAN K41

XOCEAN, XOCEAN, Greenore, Louth, A91 E765
E: info@xocean.com
W: xocean.com

Using Uncrewed Surface Vessels (USVs), XOCEAN provides turnkey data collection services to surveyors, companies and agencies. From mapping the seabed to environmental monitoring, our platform offers a safe, economic and carbon neutral solution to collecting ocean data.

Xodus J10

Xodus House, 50 Huntly Street, Aberdeen,
AB10 1RS

For further information on our products and services please visit our stand.

PRODUCT INDEX

Air Mobility
University of Strathclyde E39

Anaerobic Digestion
Clarke Energy Limited E28
Marsh Commercial A10
University of Strathclyde E39

Biogas
Clarke Energy Limited E28

Biomass
Marsh Commercial A10

Carbon capture & storage (CCS)
Clarke Energy Limited E28
Mammoet UK J30
University of Strathclyde E39

Chemical
University of Strathclyde E39

Community energy
Clarke Energy Limited E28
Emergya Wind Technologies (EWT) DirectWind UK Ltd G45
Hysopt E41
Marsh Commercial A10
Shell U.K Limited K31

Data connectivity - sensors, controls and networks
Abloy UK Q41

Distribution
Abloy UK Q41
Wilson Power Solutions HIE30

Electric vehicles (EVs)
Marsh Commercial A10
Smarter Utility P01

Electrical
University of Strathclyde E39

Electrochemical
University of Strathclyde E39

Energy Efficiency
University of Strathclyde E39

Energy from waste
Clarke Energy Limited E28
Katrick Technologies Limited H21
Mammoet UK J30
Marsh Commercial A10
Uniconfort H68
University of Strathclyde E39

Energy Management/Procurement
University of Strathclyde E39

Energy systems
Atlas Copco Rental UK G19
Kyte Powertech H11
Clarke Energy Limited E28
Coast Renewable Services ltd H05
Emergya Wind Technologies (EWT) DirectWind UK Ltd G45
Hresys Energy Solutions Europe Ltd M61
INGETEAM UK Ltd F30
Katrick Technologies Limited H21
Mammoet UK J30
MANUTECH EUROPE LTD M05
European Energy Heating UK Ltd D30
REHAU Ltd A7
Shell U.K Limited K31
TMC Transformers S.p.A. H39
Uniconfort H68
University of Strathclyde E39

Energy Trading
Clarke Energy Limited E28
Pexapark Ltd G55

Environmental services
Clarke Energy Limited E28
Coast Renewable Services ltd H05
University of Strathclyde E39
XOCEAN LTD G21

EV charging infrastructure
Smarter Utility P01

Floating offshore
Delta-Xero N07
Orkney Islands Council - Marine Services ORK60
UAB iPS Baltics K19
University of Strathclyde E39
XOCEAN LTD G21

Geothermal
Clarke Energy Limited E28
University of Strathclyde E39

Green hydrogen
Orkney Islands Council - Marine Services ORK60

Incident response applications
University of Strathclyde E39

Local energy economies
Clarke Energy Limited E28
Hysopt E41
Katrick Technologies Limited H21
Shell U.K Limited K31
Uniconfort H68
University of Strathclyde E39

Low carbon buildings
University of Strathclyde E39

Mechanical
University of Strathclyde E39

Nuclear
Delta-Xero N07
Mammoet UK J30
University of Strathclyde E39

Offshore
Delta-Xero N07
Geo Structural Ltd H02
Orkney Islands Council - Marine Services ORK60
UAB iPS Baltics K19
University of Strathclyde E39
WINERGY G27
XOCEAN LTD G21

Offshore Wind
Delta-Xero N07
Geo Structural Ltd H02
Orkney Islands Council - Marine Services ORK60
Stanley Black & Decker J38
UAB iPS Baltics K19
University of Strathclyde E39
WINERGY G27
XOCEAN LTD G21

Onshore - Large
Clarke Energy Limited E28
Coast Renewable Services ltd H05
Delta-Xero N07
Emergya Wind Technologies (EWT) DirectWind UK Ltd G45
Pexapark Ltd G55
RINA CONSULTING SPA N40, P30, N30
University of Strathclyde E39
WINERGY G27

Onshore - Small & Medium, up to 500kW
Abloy UK Q41
Delta-Xero N07
Emergya Wind Technologies (EWT) DirectWind UK Ltd G45
University of Strathclyde E39
WINERGY G27

Onshore Wind
Delta-Xero N07
Emergya Wind Technologies (EWT) DirectWind UK Ltd G45
Geo Structural Ltd H02
Marsh Commercial A10
Stanley Black & Decker J38
UAB iPS Baltics K19
University of Strathclyde E39
WINERGY G27

Other
Abloy UK Q41
Atlas Copco Rental UK G19
Clarus Networks Ltd J69
Katrick Technologies Limited H21
Kooi Camera Surveillance D39
Marsh Commercial A10
OMICRON electronics UK Ltd J18
TMC Transformers S.p.A. H39
University of Strathclyde E39

Other Renewables
Abloy UK Q41
Stanley Black & Decker J38
University of Strathclyde E39

Smart & Sustainable Cities
Clarke Energy Limited E28
Kooi Camera Surveillance D39
RINA CONSULTING SPA N40, P30, N30
Shell U.K Limited K31
Smarter Utility P01
Uniconfort H68
University of Strathclyde E39

Smart / ICT
Abloy UK Q41

Smart buildings
Abloy UK Q41

Smart Cities
Abloy UK Q41
Kooi Camera Surveillance D39
Shell U.K Limited K31
Uniconfort H68

Smart Grids
Wilson Power Solutions HIE30

Solar PV / panels
Clarke Energy Limited E28
INGETEAM UK Ltd F30
Kooi Camera Surveillance D39
MANUTECH EUROPE LTD M05
Marsh Commercial A10
Pexapark Ltd G55

Storage - gas
University of Strathclyde E39

Storage – liquid
University of Strathclyde E39

Sustainability
Clarke Energy Limited E28
Coast Renewable Services ltd H05
Katrick Technologies Limited H21
Kooi Camera Surveillance D39
Orkney Islands Council - Marine Services ORK60
RINA CONSULTING SPA N40, P30, N30
Shell U.K Limited K31
Uniconfort H68
University of Strathclyde E39

Thermal
University of Strathclyde E39

Transmission
Wilson Power Solutions HIE30

Transport / Distribution – pipelines
University of Strathclyde E39

Transport / Distribution – ships / tankers / trucks
University of Strathclyde E39

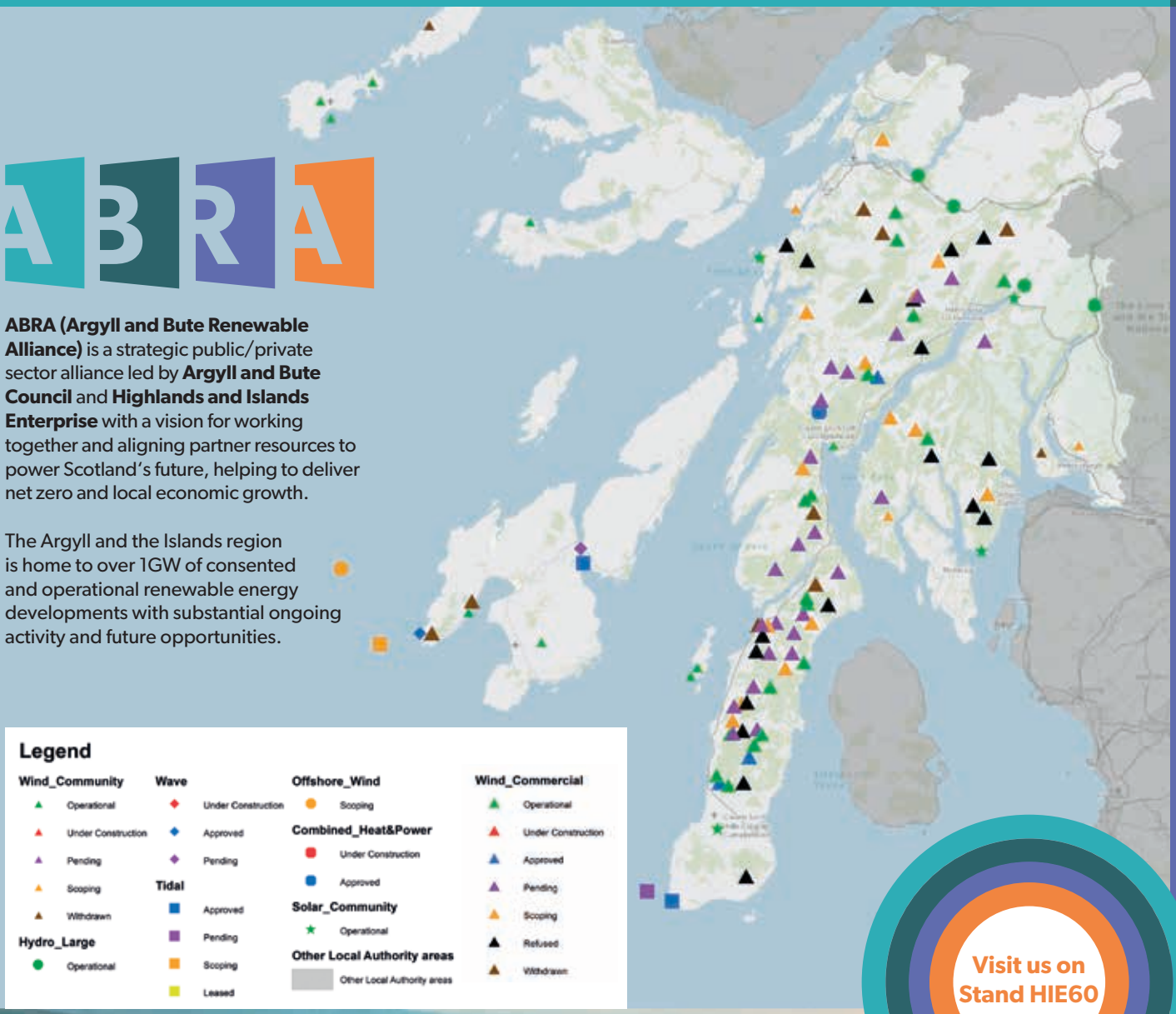
Waste water
Clarke Energy Limited E28
University of Strathclyde E39

Wave & Tidal
Mammoet UK J30
Marsh Commercial A10
Orkney Islands Council - Marine Services ORK60

ABRA

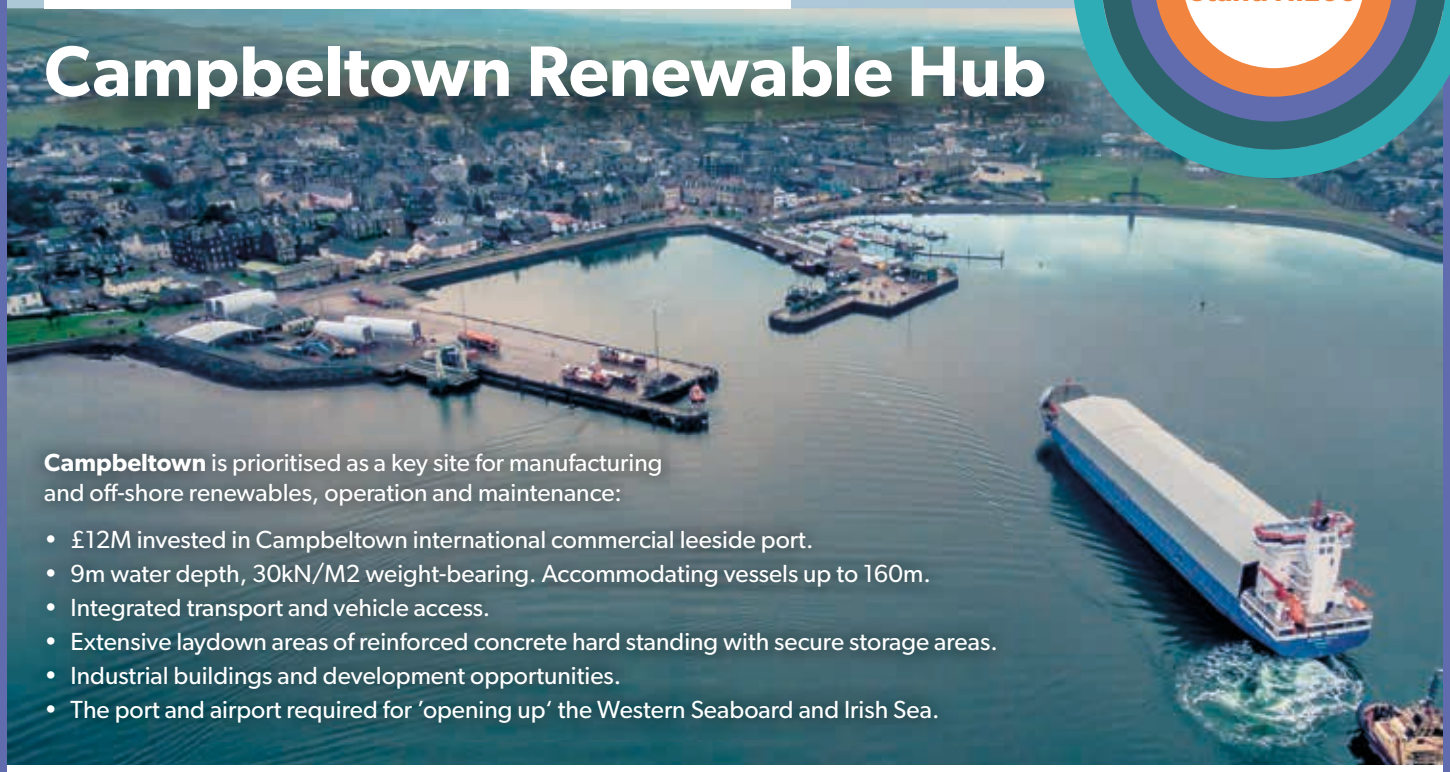
ABRA (Argyll and Bute Renewable Alliance) is a strategic public/private sector alliance led by **Argyll and Bute Council** and **Highlands and Islands Enterprise** with a vision for working together and aligning partner resources to power Scotland's future, helping to deliver net zero and local economic growth.

The Argyll and the Islands region is home to over 1GW of consented and operational renewable energy developments with substantial ongoing activity and future opportunities.



Visit us on Stand HIE60

Campbeltown Renewable Hub



Campbeltown is prioritised as a key site for manufacturing and off-shore renewables, operation and maintenance:

- £12M invested in Campbeltown international commercial leeside port.
- 9m water depth, 30kN/M2 weight-bearing. Accommodating vessels up to 160m.
- Integrated transport and vehicle access.
- Extensive laydown areas of reinforced concrete hard standing with secure storage areas.
- Industrial buildings and development opportunities.
- The port and airport required for 'opening up' the Western Seaboard and Irish Sea.

Argyll and Bute Council
www.investinargyllandbute.co.uk
Tel: +44 (0)1546 604180
Email: renewable.energy@argyll-bute.gov.uk

Highland and Islands Enterprise
www.hie.co.uk
Tel: +44 (0)1546 605408
Email: lochgilphead@hient.co.uk

VENSYS

ESPECIALLY FOR THE UK

1.5 – 2.1 PLATFORM

VENSYS 62
1.5 MW

ROTOR DIAMETER	62
HUB HEIGHT (m)	49

VENSYS 70
2.1 MW

ROTOR DIAMETER	71
HUB HEIGHT (m)	57.4 | 64.4 | 84.4

VENSYS 82
1.5 MW

ROTOR DIAMETER	82.3
HUB HEIGHT (m)	58 | 85 | 100

3.5 – 4.1 PLATFORM

VENSYS 115
4.1 MW

ROTOR DIAMETER	115
HUB HEIGHT (m)	72.5 | 92.5

VENSYS 126
3.8 MW

ROTOR DIAMETER	126.2
HUB HEIGHT (m)	86.9 | 96.9 | 136.9

VENSYS 136
3.5 MW

ROTOR DIAMETER	136.6
HUB HEIGHT (m)	81.7 | 97.2 | 100 131.7 | 161.2

www.vensys.de