# Energy Storage 100

Brought to you by

Energy Storage NEWS and Solar Business focus United Kingdom

hyperion executive search

talent acquisition in clean energy

# EnergyStorage

- 19 years global executive search experience
- All assignments managed by experienced clean energy sector experts
- Extensive market knowledge and network
- 100% confidentiality confirmed
- Commercial and technical roles handled globally

## What our clients say:

"We retained the services of Hyperion Executive Search to help recruit a Country Director for the UK. Their reputation and industry connections in the clean energy sector are very strong. Hyperion took the time to take a detailed job description, and then kept me informed in every step of the process, from their research through to the shortlist and then to contract negotiation. It was a smooth and enjoyable process. We now have an excellent new member to the team. I strongly recommend working with David Hunt and the Hyperion Team."

**Benjamin Schott, Director,**
**sonnen**

"Hyperion were quickly able to supply us with a range of strong candidates. What impressed me most was how they went beyond the job description and looked at our company culture, to ensure they found the right cultural fit and not just the right skills and experience."

**Graeme Ludlow, Commercial Director,**
**redT**

"My team and I always enjoyed very good and strong cooperation with Hyperion during the recruitment process. The candidates which have been selected and presented by you have always been of a high quality level, and they have fitted exactly to the profiles we have been searching for. This fact underlines a strong understanding of our requirements as well as you having a very good network in the industry in order to find the right candidates.

We also appreciated the fast, proactive and strongly aligned communication to exchange information and feedback. This was also very valuable for our process.

Over all I can strongly recommend the cooperation with you and in case we will have future request we will involve you accordingly."

**Thomas Herrmann, VP Sales,**
**Bosch**


### David Hunt

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**david.hunt@hyperionsearch.com**


Hyperion Executive Search was founded by Managing Partner David Hunt with the objective of offering specialist talent acquisition and retention services in the clean energy sector.

Before setting up Hyperion Executive Search, David was a director of a multiple award-winning renewable energy installer. His responsibilities in the company involved relationships, sales and marketing, business strategy and political lobbying. The skills and knowledge developed in this capacity have proven to be invaluable for Hyperion Executive Search.

In addition to leading Hyperion, David is Chair of Onsite Renewables and decentralised energy for the Renewable Energy Association (REA) and sits on the REA Policy Board. He is also a director of Liverpool Community Energy, a co-operative seeking to install over 1MW of solar projects in the Liverpool City Region and sits on the Low Carbon Economy Board for the Liverpool City Region LEP. Previously, David was a member of PRASEG (Parliamentary Renewable and Sustainable Energy Group).

David has worked extensively in the recruitment industry sourcing key talent for clients nationally and internationally.


### Ross Hoare

**+44 (0)7875 957944**
**ross.hoare@hyperionsearch.com**


Ross has over five years of experience in the renewable energy sector. He has worked extensively in project management, procurement, system design and resource planning. Ross has managed award-winning multi-technology projects, from the initial design stage right up to completion. He has a thorough understanding of the technologies, processes and skills required to deliver renewable energy projects.

As associate partner at Hyperion Executive Search, Ross draws upon this wealth of experience and insight, helping our clients to recruit the very best talent in technical and operational disciplines. Ross also manages Hyperion's research and delivery teams.

To arrange to meet or speak with either David or Ross to discuss either your personal or company requirements call +44 (0)845 303 9688 or contact directly on the above numbers.

**www.hyperionsearch.com**
**London • Liverpool**

Energy Storage Partner

REA Member

# The Energy Storage 100

Welcome to the Energy Storage 100. From Solar Impulse's daring round-the-world flight, to Tesla's attention-grabbing – and some would say brilliant – marketing, to the phenomenal 243% annual growth in the US market in 2015 alone, the energy storage industry is capturing more than just electrons.

Solar self-consumption and load shifting, providing grid services, synergies in cost reduction with the electric vehicle industry – the uses for storage and the incredible ideas and technologies advancing it are also capturing public and industry imagination alike.

This year and 2017 will be particularly important for the UK, as the government, regulators and National Grid are expected to make their definitive decisions on storage, after a period of getting to grips with the technology. We've already seen some innovative and exciting trial deployments in the past couple of years and hopefully that work will be built on in a positive way.

Ultimately, where energy storage can ensure reliable and cost-effective electricity supply, it should get the chance to play its part, and the industry bears some responsibility to put its case forward.

We think it's important not to get carried away – energy storage covers a range of different technologies which will have each other and in some cases other resources to compete with or to complement. There isn't enough economic recognition of the environmental benefits of low carbon energy as there should be, either. No one wants subsidies, but everyone deserves a level playing field. So it is a more complex business proposition than many imagine, but the rewards for getting it right could be immense.

As editor of Solar Media's Energy Storage News, I feel enormously privileged to have covered such an amazing set of technologies. Trains that store regenerative braking power which is then used to balance the grid, off-grid communities that have been able to gain energy independence and using home solar systems to create virtual power plants are just three examples of amazing tech that is becoming viable before our very eyes.

We have brought many of the exciting companies leading the way in this comparatively new sector in the UK and beyond into the Energy Storage 100. Through this supplement and our elite ES100 networking and celebration event in London on 28 April, we hope you will see more evidence of why energy storage is technology with the capacity to change the world.

**Andy Colthorpe**
Storage editor, Solar Media

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# News from the world of energy storage

## Powered by energy-storage.news

### Market Watch

**2015 the year 'energy storage took off in US' - GTM**

The US energy storage market grew 243% last year, making 2015 the biggest year of any on record for storage, according to GTM Research.

GTM is also forecasting positive growth out to 2020, with the annual market set to reach 1.7GW by that time and be worth some US$2.5 billion.

According to GTM'S 'US Energy Storage Monitor 2015 Year in Review' report, deployment in 2015 reached 221M, with 112MW of that being installed in the fourth quarter.

That quarterly total represented more than the total of all storage installed in the US in 2013 and 2014 combined. In 2014 total deployment reached just 65MW.

GTM predicts that the annual deployment of storage in the US will cross the 1GW threshold in 2019, before climbing to the 1.7GW it predicts annually by 2020.

Credit: RES

Storage deployment in the US grew by 243% in 2015, according to GTM Research.

**Common EU definition of storage could unlock potential: Solar Power Europe**

The EU's lack of regulatory definition for energy storage is among the major factors holding back the potential of the technology in the continent, particularly for integrating renewables, Solar Power Europe has argued in a report.

The trade group authored the "Solar and Storage Policy Paper – April 2016" along with the Association of European Automotive and Industrial Battery Manufacturers (EUROBAT) and the European Heat Pump Association (EHPA).

The trio's joint proposals outlined in the paper push for the greater recognition of storage as a way to increase the value of solar by enabling greater on-site consumption of PV power, as well as valuing the potential network-side benefits of storage. The latter includes easing pressure on grids by using solar-plus-storage to meet peak demand, which in Europe occurs in the evenings.

In order to get the best use of "zero marginal cost" solar electricity and to get to higher ratios of self-consumption, the report's authors recommend the provision of "a common EU legal definition of storage".

As has been seen in Europe and markets elsewhere, electricity markets and grids have been historically designed to accommodate centralised, usually fossil fuel-based generation, transmission and distribution of energy.

In the case of storage, one of the biggest issues raised by this is that networks are not configured to cope with a device that, like a battery, can be any number of things simultaneously including generator, load or transmission asset, depending on where it is placed on the grid and what it is used for.

### Business

**Long-duration solar load shifting trialled at Puerto Rico project**

The output of a 16MW solar farm in Puerto Rico will be tied to an Aquion 'saltwater' battery, in one of the few current trials of moving solar power produced in the daytime to be used at night.

The overnight energy requirements of the large-scale PV plant Horizon Energy in Salinas, Puerto Rico, will be provided by a 1.25MWh Aquion Aqueous Hybrid Ion battery, a device which has been deployed in various on- and off-grid projects since 2014. In a project executed by Sonnedix, the battery will be powered by its own mini solar array, of 250kWp output. Independent power producer Sonnedix said the battery system will make the 16MW facility "almost grid-independent".

**Post-Foxconn Sharp affirms commitment to Japan's residential solar-plus-storage future**

Sharp has launched its latest home energy storage systems in Japan, with features geared towards meeting changes in the electricity market that are underway in the country.

The "cloud battery storage systems" align control of a lithium-ion battery with weather forecasting and rooftop PV production using the internet, to allow for optimum use of resources. System users will be able to use their own PV power on sunny days and limit the amount of more costly daytime energy they buy on cloudy or rainy days. At present there is some difference between daytime and cheaper night-time prices of electricity in Japan but not a great deal, however changes are expected over the next few years.

The launch happened shortly after Taiwanese equipment assembly giant Foxconn completed its acquisition of more than 60% of Sharp, in what both parties called a "strategic alliance".

**Batteries deployed in 'world's largest' frequency regulation project in South Korea**

Korean firm Kokam has supplied two lithium nickel manganese cobalt (NMC) oxide batteries to utility Korea Electric Power Corporation (KEPCO) for frequency regulation on the South Korean grid.

The two systems, one 24MW (9MWh) the other 16MW (6MWh), add to a 16MW lithium titanate oxide (LTO) battery already installed by Kokam for KEPCO last year.

Kokam claims the 24MW battery is the largest lithium NMC battery in the world deployed for frequency regulation purposes.

Together the three systems form part of a bigger battery project under which 500MW of battery storage will be installed by 2017.

The storage units are expected to help KEPCO reduce its need for spinning power reserve to ensure grid stability. This will save an estimated US$13 million in fuel costs every year, amounting to three times the cost of the storage systems' purchase price their lifetime, according to a Kokam statement.

Credit: Kokam

Kokam has now supplied 56MW of battery systems to KEPCO in South Korea.

## Policy

### UK authorities prime storage push after Budget backing

The UK remains on track for a big push on energy storage with the latest budget backing changes proposed in a key report and an imminent consultation looking to shake up the role of network operators.

In March, chancellor of the exchequer George Osborne's budget confirmed backing for energy storage with a £50 million (US$71 million) allocation for R&D and a pledge to back the findings of the National Infrastructure Commission's (NIC's) Smart Power report. The NIC is a new cross-party agency set up with a reported budget of £100 billion across all sectors and its Smart Power study suggested incentivising Distribution Network Operators (DNOs) to deploy energy storage. At present, DNOs are not allowed to invest in or own generation assets.

Any changes in the treatment of DNOs or Distribution Service Operators (DSOs) would be regulated by Ofgem, the UK energy regulator. Ofgem said the imminent consultation on energy storage would look to address several barriers in the UK together.

### Japan hopes 'world's biggest' battery test facility will play crucial role in standardisation

The Japanese city in which lithium-ion battery makers including Panasonic, Hitachi Maxcell and GS Yuasa are located will play host to the world's biggest energy storage battery and system testing facility to date.

The National Institute of Technology and Evaluation (Nite), launched by the national Ministry of Economy, Trade and Industry (METI), is preparing to begin testing large-scale batteries this summer at its recently completed NLAB facility. Located in the city of Osaka, it is hoped that the centre will become integral to ongoing efforts to develop standards for the international energy storage industry.

Koichi Yamamoto, a director at Nite and the Global Center for Evaluation Technology (GCET), said NLAB aims to assist the competitiveness of domestic industry, while helping to develop safety standards that could be adopted universally.

"In many ways safety standards – at this point in time – are the most important aspect of developing an energy storage industry as a whole," Yamamoto said.

### NY BEST: New York needs 4GW of multi-hour storage by 2030

Efforts to modernise New York's grid would be best served by adding 2GW of multi-hour energy storage by 2025 and 4GW by 2030, and enable the achievement of renewable energy targets, according to advocacy body NY BEST.

NY BEST, the New York Battery and Energy Storage Technology Consortium, has just launched its second roadmap for energy storage in the East Coast US state, the first having been published in 2012. The state has in place goals to reduce emissions by 40% by 2030 and 80% by 2050, as well as generating 50% of its electricity from renewables by the earlier of those years.

To support this aim, the state launched New York REV (Reforming the Energy Vision) in mid-2014.

NY BEST, described as part development advisory, part trade advocacy group, with 150 member companies, was among the stakeholders invited to provide input into the design of the REV programme. With its latest roadmap, the group has reiterated the ability of energy storage to help integrate renewables, to give the grid better resilience in an urban environment frequently hit by extreme weather conditions, while also improving the efficiency and capacity factor or utilisation of the grid.

## Technology

### Sungrow, Samsung SDI collaborate on large-scale energy storage demonstration projects in China

PV inverter manufacturer Sungrow is partnering with lithium-ion battery provider and renewable energy storage system maker Samsung SDI to perform demonstrative energy storage projects in China.

Sungrow filed a statement with the Shenzhen Stock Exchange on which the company is listed, saying the two companies had signed an agreement with Shanxi Guoke Energy Saving Company, a state-owned company.

Under the agreement, the two manufacturing giants will be joining forces on these projects to demonstrate the effect of storage on the grid when solar is added into the mix.

The plan is to develop storage strategies based on grid-balancing frequency regulation and include both micro-grid and off-grid demonstration projects. The micro-grid projects will be of no less than 100MW capacity, with 20MW/40MWh storage.

### Canada gets its first 'virtual power plant'

What is thought to be Canada's first virtual power plant, aggregating the capabilities of a small fleet of solar PV-plus-storage systems with energy management software, has been deployed in Ontario.

Powerstream, a "community-owned" energy service provider with close to 400,000 customers, has installed the systems at 20 households in what has been described as a showcase of what the technology can do.

For the homeowners, the behind-the-meter lithium battery systems will allow them to time-shift their stored solar power. The systems will also provide some backup power capabilities, in the event of outages.


Key Strategic Partner


**Twickenham Stadium, London | 28 April 2016**

# What role will your business play in the increasingly important emerging storage market?

There seems little doubt now that energy storage will have a critical part to play in the energy system of tomorrow. A defined global industry is beginning to emerge as the opportunities offered by cutting-edge storage technologies come into ever clearer focus.

But in the UK as in other markets where the potential of energy storage is well recognised, two key factors are now coming into play that need to be addressed. One is that while energy professionals understand that storage could indeed be the 'game changer' it has been heralded as, they now need to know exactly how that will be so. Second, and intrinsically linked to that, it is clear that end users or potential clients are now critical to the conversation about the role energy storage will play.

For both these reasons we are bringing together all the major stakeholders relevant to the industry for our inaugural Energy Storage UK Summit. The key aim of the event will be to identify the addressable markets for storage and strategies for selling to them, as well as to explore how to unlock the much greater potential of energy storage.

Brought to you by Energy Storage News and in consultation with the Energy Storage Alliance, the Energy Storage Summit is the culmination of many months of research. The event will have three streams – residential, commercial and utility scale – addressing the key issues for all the different market segments:

- Policy and regulations updates to clarify the playing field
- How to translate different applications and business models of energy storage into income streams
- Steps to increase storage bankability and attract investment
- Numerous case studies from both front-of-the-meter and behind-the-meter systems explaining how their revenue streams stack up

The event will take place at Twickenham Stadium on the 28 of April and it is followed by our Energy Storage 100 elite networking event hosted by ex-international rugby player, Martin Bayfield.

## COMPANIES ATTENDING INCLUDE:

## SPEAKERS:

**John West,** Electricity Compliance Policy Manager, **National Grid**

**Allan Baker,** Global head of Power, **Societe Generale**

**Ben Hill,** Vice President, Energy Sales Europe & Africa, **Tesla**

**Martin Wilcox,** Head of Future Networks, **UK Power Networks**

**Roger Hey,** Future Networks Manager, **Western Power**

**Mark Dale,** Innovation and Low Carbon Networks, **WPD**
**Dan Taylor,** Managing Director, **Camborne Capital**
**Chris Miles,** Director, **Distributed Energy, RES Group**
**Alan Collinson,** Engineering Specialist, **SP Energy**
**Adriana Laguna-Estopier,** Low Carbon Technologies Manager, **UK Power Networks**
**Colin Campbell,** Partner, **Zouk Capital**
**Gerard Reid,** CEO, **Alexa Capital**
**Dan Kirk,** Partner, **Magnetar Solar**
**Ilesh Patel,** Partner, **Baringa**
**Giovanni Terranova,** Founding Partner, **Bluefield**
**Emma Bridge,** CEO, **Community Energy England**
**Jonathan Scurlock,** CEO, **National Farmers Union**
**Olivier Fricot,** Head of Infrastructure Finance, **Investec**
**Goran Strbac,** Professor of Energy Systems, **Imperial College London**
**Chris Roberts,** CEO, **Poweri Systems**
**Robert Flynn,** CEO, **Solar Barn**
**Logan Goldie-Scott,** Energy Storage, **BNEF**
**Ricardo Pineiro,** Head of UK Solar, **Foresight**
**Ian Chilvers,** CEO, **Smart Power Systems**
**Chris Morrison,** Head of Power Development, **British Gas**
**Martin Cotterell,** UK Manager, **Tesla**
**Graham Kenyon,** Principal, G Kenyon and Lead Author, **IET**
**Faithful Chanda,** Primary System Design Engineer, **WP**
**Ray Noble,** Co-Chair, Solar Strategy, **DECC, REA**
**Dr. Anthony Price,** Director, **Swanbarton**
**Nicola Waters,** COO, **Primrose Solar**

## SUMMIT AGENDA

**28 April 2016**

**AM**

- UK policy & regulations: Proposals regarding the definitions
- Global trends: cost reductions, impact of energy prices, lessons from other countries
- Utilities long term plan: Big 6 vs ESCOs
- Finance & Investment

Networking Lunch

| RESIDENTIAL STREAM | COMMERCIAL STREAM | UTILITY-SCALE STREAM |
|---|---|---|
| • Business models & revenue streams<br>• Keeping out cowboy installers<br>• Case Studies: Aggregated residential<br>• Installer perspectives | • Business models & revenue streams<br>• Designing a commercial systems<br>• Demand response<br>• Offering and Technology | • Business models & revenue streams<br>• Front of the meter opportunity<br>• National Grid tender<br>• DNOs Case Studies |
| **SOCIAL HOUSING ROUNDTABLE** | **ENERGY SECURITY ROUNDTABLE** | **STORAGE PLUS RENEWABLES ROUNTABLE** |

**ELITE NETWORKING EVENT: Energy Storage 100**

# Sunamp

## Heat Batteries™

# Affordable Heat Energy Storage

Sunamp Heat Batteries are innovative, high-efficiency heat energy storage systems. Each heat battery is a packaged store of heat energy that internally uses Phase Change Material (PCM), a chemical similar to the one inside a handwarmer, to store about four times more heat than an equal sized hot water tank. Sunamp develops its PCMs in intensive collaboration with Edinburgh University.

Renewable energy has huge potential to become the dominant source of energy in the economy, however the inherent intermittency of most renewable sources represents a huge weakness. It is universally accepted that energy storage is the key to overcoming this, but is costly and inefficient at the moment. Sunamp heat batteries go a long way to solving this problem by allowing energy to be stored, as heat, when it's available and released when needed, with much lower cost and higher efficiency than competing technologies (electrical batteries, hydrogen electrolysis/fuel cell, etc.)

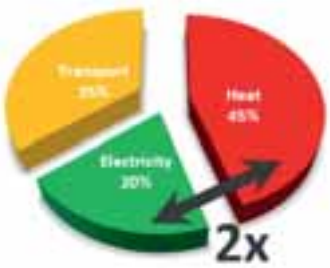
Sunamp Limited products can deliver dramatic efficiency gains and cost savings, which have been demonstrated in the lab and in field trials. DECC sponsored trials have shown heating bill savings of 45 to 60%.

**SunampPV**

**SunampStack**

**SunampCube**

**"The demand for heat is over two times higher than that of electricity"**




*Global Energy Consumption Figures*

*"Sunamp has developed heat batteries, an idea which arose from an understanding that storage is at the heart of making renewables and energy efficiency work. There is twice as much heat consumed in the UK economy as electricity, so why isn't heat storage a major topic? We decided that it was and that's where we focus."*

*Andrew Bissell, CEO (left)*

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# The Energy Storage 100

***The companies shaping the global energy storage sector***

## ads-tec

ads-tec is a manufacturer and supplier of top-quality industrial IT systems with long-term availability, as well as high-performance battery systems and complete storage solutions. Over 35 years of experience and professional expertise in systems development characterise the 100% in-house developments of ads-tec. ads-tec's energy storage business unit develops and delivers high-performance lithium-ion battery & storage systems. ads-tec know-how in the area of lithium-ion batteries ranges from complete storage systems for home and small business applications to scalable storage systems and complete container solutions. With the Big-LinX cloud solution, extensive options are available in the area of energy management, including, among others, simulation, monitoring and reporting as well as local applications.

adstec Energy Storage

www.ads-tec.de/en

## AES UK & Ireland

AES UK & Ireland is part of The AES Corporation, a Fortune 200 global power company. We are committed to operational excellence and meeting the power needs of the people of the United Kingdom and Ireland by using our unique electricity platforms and the knowledge of our people to provide the energy solutions our customers truly need. We are Northern Ireland's largest electricity generator, owning and operating Ballylumford and Kilroot Power Stations, and the Kilroot Advancion Energy Storage Array, a 10MW fully commercial battery energy storage facility providing system services for the All Island Electricity System.

AES UK & Ireland

www.aesukireland.com

## Alexa Capital

Alexa Capital delivers corporate advisory, financing and asset management solutions across the energy, energy infrastructure and technology sectors. We support our clients with corporate finance expertise and capital. With experience and insights developed over three decades of working across Europe, North America and Asia in energy, technology and communications investment banking and fund management, we can leverage global relationships across the corporate landscape, the investment community and government policymakers. Our mission is to apply our thought leadership and experience to serve our clients with insights, superior corporate finance execution and capital solutions. Alexa Capital LLP is authorised and regulated by the Financial Conduct Authority.

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www.alexa-capital.com

## Alpha Energy Storage Solutions

Alpha-ESS specialises in providing advanced energy storage products and intelligent energy management. With business bases in Europe, Australia and Asia, Alpha has a global reach that is ever expanding. STORION is Alpha's flagship product – an all-in-one system integrating modular battery design, inverter, controllers and LCD screen with web monitoring. Designed for residential users Alpha's 'plug-and-play' design allows for easy installation and no draping wires. Alpha empowers users to use their PV power when they choose, through an intuitive cloud-enabled energy management system and the highest safety lithium-ion phosphate batteries. Safety and empowerment is the cornerstone of our business.

Alpha·ESS

www.alpha-ess.com

## Anesco

Anesco is the UK's leading energy efficiency solutions provider. It is recognised as one of the top 100 clean-tech companies in the world, has been named the UK's fastest growing private company for two years running; and is ranked among the top 250 companies in the country. Anesco works with clients ranging from major corporations to small businesses and individuals, helping to drive carbon reduction and transform energy use. To date, Anesco has helped to raise over 275,000 people out of fuel poverty and the technologies it has deployed are generating over 500MW of renewable energy.

Anesco

www.anesco.co.uk

## Aquion Energy

Aquion Energy is changing the way the world uses energy through the development and deployment of flexible, scalable energy storage systems that are high performance, safe and cost effective. The company's batteries feature unique Aqueous Hybrid Ion (AHI) chemistry, resulting in a non-toxic, non-combustible battery so safe that it's the first in the world to receive Cradle-to-Cradle certification. This sustainable alternative to lead-acid and lithium-ion batteries is optimal for stationary, long-duration daily cycling applications including off-grid and micro-grid, energy management and grid-scale energy storage applications. Over 15MWh of Aquion's AHI batteries have been shipped as of 2015.

AQUION ENERGY

www.aquionenergy.com

## BAE Batterien

BAE Batterien has stood for quality and reliability in industrial lead-acid batteries since 1899. Nowadays we are an independent medium-sized company with a well-established position in the international battery market. BAE excels in its customer orientation and quality is our hallmark. A highly flexible and process-orientated structure enables us to provide our customers with tailor-made solutions. As a medium-sized and innovative company BAE is able to tread new paths and strongly focuses on co-operation with university-level institutions. Our aim is simple: "the chemistry must be right".

BAE Energy from Batteries

www.bae-berlin.de/en

## BayWa

With more than 20 years of experience, BayWa r.e. is a global distributor of PV and energy storage products with global contracts in place with major brands in the sector such as LG Chem, SolarEdge, Tesla, SMA and Fronius. BayWa r.e. Solar Systems is the UK arm of the organisation, based in mid Wales with warehousing in Welshpool and Belfast, and our experts will supply carefully selected systems for your energy supply, based on your individual needs. We place special emphasis on high-quality products which generate optimum yields, and with our Novotegra mounting

CCL

Industry leading technical distributor of products for the renewable energy, off-grid, energy storage and portable power industries

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EnerSys Power/Full Solutions

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in Q3 of 2016, to be kept up to date please drop us an email to **info@cclpowerplus.com**

Powerplus Hybrid Power System

*DUE Q3:2016*

solutions developed in-house we ensure our solutions are extremely robust.

www.baywa-re-solarsystems.co.uk

## BELECTRIC UK

BELECTRIC UK offers a cost-effective, modular, scalable battery energy storage system, known as the Energy Buffer Unit (EBU), with response time within 25 milliseconds. The EBU is already providing primary frequency response services across the German grid, and represents the UK solar industry in the Ofgem-approved National Grid EFCC (Enhanced Frequency Control Capability) project to demonstrate grid frequency and voltage stabilisation by renewable energy operators. BELECTRIC UK is prequalified for the National Grid 200MW Enhanced Frequency Response tender. We offer behind-the-meter energy storage services for energy intensive organisations and sites, and peak shaving services for energy generators.

www.belectric.co.uk

## BMW i

BMW i is an all-encompassing, groundbreaking concept for sustainable mobility. It represents visionary electric vehicles and mobility services, inspiring design and a new understanding of premium that is defined by sustainability. And it thrills with its innovative cars: the fully electric BMW i3 – an emission-free (excluding the use of energy to charge the vehicle) car for urban motoring that is sustainably designed throughout – and the BMW i8 Concept – the future of the sports car. With BMW i everyday journeys can be 100% electric and a pleasure from start to finish. BMW i also thinks beyond the car with its innovative mobility services.

www.bmw.com

## BMZ

BMZ GmbH is a system provider and specialist for intelligent battery solutions. Within only a few years, BMZ has established a leading position in the fast growing lithium-ion accumulator (rechargeable battery) market. Founded in 1994, the company is today one of the leading European manufacturers of customised battery solutions. BMZ has manufacturing facilities in Germany, Poland, China and the USA. The high-tech products developed and manufactured by BMZ, located in Karlstein, Germany, are used worldwide in many different products from renowned suppliers including electric garden tools, drilling machines, battery-powered screwdrivers, electric vehicles, electric bicycles, portable medical devices and accumulators for renewable energies.

www.bmz-gmbh.de

## Bonfiglioli

At Bonfiglioli, we operate through four different business areas: Industrial (incorporating our mechatronics and power transmission divisions), Photovoltaic (which also develops regenerative solutions), Wind and Mobile (focusing on applications for construction, agricultural and earth moving machinery, etc.). These four distinct sectors develop specific solutions and applications in response to the varying needs of our increasingly complex and technologically advanced markets. Bonfiglioli offers inverters for battery storage systems – high-performance power conditioners for large grid-connected energy storage systems employing all common battery technologies.

www.bonfiglioli.com

## British Solar Renewables

British Solar Renewables generates, stores, moves and supplies clean energy. As the UK's leading integrated solar developer and operator we have constructed over 340MWp since our launch in 2010. In parallel we are investing in energy storage technologies, power electronics and control software to create systems that respond to the energy management requirements of power networks. This has seen BSR recently join forces with BRE National Solar Centre and WPD in their National Innovation Allowance-funded 'Solar Storage Project'. We are rapidly moving to position ourselves as global clean-tech company, continually investing in the innovation that's transforming the energy sector and speeding the transition to a low carbon economy.

www.BritishRenewables.com

## BYD

BYD stands for Build Your Dreams. BYD Company Limited, backed by Warren Buffett, is the world leader in energy storage systems, having had an LFP battery manufacturing capability of more than 10GWh per annum since 2015, and growing. It has already completed more than 350MW of ESS projects around the world, more than what many competitors are aiming to do in the next few years. BYD has also been the world No. 1 brand for electric vehicles by sales ever since May 2015. And it's also the world's largest rechargeable battery manufacturer and ODM, supplying many of the world's top-brand products such as phones, tablets and computers.

www.byd.com

## CCL Components

CCL is a long-established technical distributor of high-quality components and provider of great service coupled with sound technical advice. Through years of experience in the renewables industry we have recognised the necessity for energy storage and fuel saver products across many markets. The CCL team is comprised of well qualified and experienced DC & AC electrical engineers, held together by a first class operations and sales team. The ethos of everyone at CCL is to always strive to deliver the best possible solution to any application or challenge we face. From the needs of small portable power through to permanent off-grid power, CCL will always provide an answer.

www.cclcomponents.com

## ChargeSync

CargeSync creates value by optimising embedded domestic battery storage systems, including its own StorQube device. As well as a deep understanding of the power market and how battery storage creates value, the ChargeSync team also has extensive experience of software development for trading applications. ChargeSync is currently running a proof-of-concept trial of its devices before an anticipated roll out later in the year. ChargeSync's product and optimisation is compatible with solar, but solar is not required for the use of a ChargeSync optimised system.

www.chargesync.com

## Circuitree

Circuitree is a clean energy capture and storage specialist. Our intelligent controls manage and automate energy flows, always prioritising the cheapest, cleanest source of power. We offer grid-tied, off-grid and biodiesel hybrid formats, fully web enabled and suitable for a multitude of applications. We are unique in our use of Aqueous Hybrid Ion and Si02 storage chemistries. Unlike conventional batteries, these breakthrough technologies deliver improved performance and high product longevity – without costing the earth. Temperature resilient, non flammable and non explosive, our

modular, plug-and-play approach allows for rapid deployment in almost any environment.

www.circuitree.co.uk

## Connected Energy

Connected Energy is a supplier and operator of industrial and commercial-scale E-STOR energy storage systems. Designed for behind-the-meter applications, E-STOR units scale up from 50kW/50kWh with an operating system that enables peak shaving, tariff management, renewables optimisation and demand response provision. A version developed to manage the grid load of EV chargers also includes direct OCPP communication. The operating system enables units to be managed autonomously or aggregated to capitalise on the benefits of scale and/or location. Developed in collaboration with Renault and Nissan, E-STOR units utilise second-life lithium-ion electric vehicle batteries as their storage medium.

www.c-e-int.com

## Convergent Energy + Power

Convergent Energy + Power is a technology-neutral energy storage asset developer with experience across a wide range of projects, from megawatt-scale commercial and industrial applications to grid-connected systems. The company manages all aspects of the energy storage asset development cycle, including project-specific opportunity identification and economic evaluation, contract and financial structuring, and engineering, procurement and construction, as well as operations and maintenance.

www.convergentep.com

## Cumulus Energy Storage

Cumulus Energy Storage Ltd (CES) aims to be the leading manufacturer and developer of grid-connected electricity energy storage systems with the lowest levelised cost of energy (LCOE). CES is developing a copper/zinc battery for grid-level electricity storage. This will enable 'firming' and 'time-shifting' (arbitrage) of renewable-energy sources and offer a variety of other valuable energy storage services to grid operators, commercial renewables generation (solar PV and wind farms), plus electricity intensive industries. We believe that the CES battery will have the scale, capacity and cost benefits to offer superior performance compared with other storage processes that are being developed, which include other batteries, CAES and pumped hydro.

www.cumulusenergystorage.com

## Current powered by GE:

Current, powered by GE, is a digital power service built to transform the way we use energy. Imagine using the most advanced technologies to make real-time decisions about your energy use. Imagine intelligent environments where buildings can generate power on site, or on the grid through networked lighting. Imagine smart cities configured with eco-friendly LED lighting systems networked with sensors. We can meet the unique needs of a wide range of utility, commercial and industrial and municipal customers, and provide them with the hardware and software they need to be more reliable, efficient and profitable. Current will deliver a combination of financing with GE's physical and digital capabilities across energy efficiency, solar, storage and on-site power.

www.currentbyge.com

## Deutsche ACCUMOTIVE GmbH & Co. KG

The key to the success of electric vehicles is developing the technology for a high-performance, reliable and long-life battery. In April 2009, Deutsche ACCUMOTIVE was founded to give Daimler a pioneering role in this area. The company is 100% affiliated to the Daimler AG. With the founding of Deutsche ACCUMOTIVE, Daimler has become one of the few car makers in the world to also develop vehicle batteries, and since 2012 the company has been producing them in Germany at its Kamenz site near Dresden. Based on the automotive platform the company forces the development of industrial battery applications as well as home storage solutions.

www.accumotive.com

## DNV GL

Driven by our purpose of safeguarding life, property and the environment, DNV GL is dedicated to helping our customers in the maritime, oil & gas, energy and other industries to make the world safer, smarter and greener. Within the energy arena DNV GL is the global leader in energy storage advisory services and also globally renowned when it comes to the testing and demonstration of storage technologies. DNV GL has worked on a range of energy storage consultancy projects in the UK with a variety of key stakeholders.

www.dnvgl.com

## E3/DC

E3/DC house power plants enable you to operate your private electricity and heat production with high independence from the fuel. You can also drive your electric car with Type 2 charging technology by E3/DC and with its own power. The house power plant generates and stores via the connected solar electricity or stores power from external generation sources (solar, combined heat and power, wind). The device is connected between power supply and home network, and your home remains electrically unchanged. At an optimum design, independence from the power supply is 73%, meaning only 27% of power purchased from utilities. The savings are considerable and exceed the acquisition costs.

www.e3dc.com

## EA Technology

Founded in 1966, EA Technology is a leading authority on the design and assessment of energy storage solutions. We provide comprehensive technical and commercial advice, together with ongoing support, to enable you to choose and implement the most cost-effective and appropriate energy storage technologies available. The integration of new and emerging energy technologies is a key enabler of the smart grid and a means to deliver the transition to a low carbon energy system.

www.eatechnology.com

## Eaton

Eaton is a global power management company with 2015 sales of US$20.9 billion to customers in more than 175 countries. We provide energy-efficient solutions that help our customers effectively manage electrical, hydraulic and mechanical power more efficiently, safely and sustainably. For energy storage, Eaton's capabilities are enabling successful storage implementation for applications ranging from simple backup power to large-scale micro-grids. Leveraging key partnerships with companies such as Nissan and AES, Eaton storage solutions help residential, commercial, large industrial and utility customers to reduce

costs, defer investments, ensure reliable power and generate new streams of revenue.

www.eaton.com

## Ecotricity

We're an energy company unlike any other. We take the money our customers spend on their gas and electricity bills and use it to build new sources of renewable energy - what we call 'bills into mills'. We have the greenest energy in Britain, the best customer service and an ethical pricing policy that means every customer gets our latest best price. We do much more than just provide energy to homes and businesses, too – from building Britain's biggest network of electric vehicle charging points to showcasing our vision at our Green Britain Centre in Norfolk, we're very much a 21st century energy company.

www.ecotricity.co.uk

## Electrovaya

Electrovaya is a vertically integrated battery producer based in Canada with a long track record in the lithium-ion sector. In 2015, Electrovaya made the strategic acquisition of Litarion GmbH and its 500MWh of production capacity, allowing Electrovaya to address the rapidly growing energy storage market. Additionally, the joint company now boasts over 500 patents in lithium-ion technologies and processing, including the complete patent portfolio for SEPARION, a unique ceramic separator that gives our batteries a long cycle life and unparalleled safety.

www.electrovaya.com

## Enphase Energy

Enphase Energy delivers solar, storage and energy management technologies that not only optimise, but also provide insight. The Enphase Home Energy Solution is a flexible platform for the future of energy. It's an integrated, intelligent and reliable solution that integrates Enphase Microinverters, the Envoy Communications Gateway, the Enlighten Software Platform and the Enphase Storage System, which is coming to market in 2016. Enphase accessories and mobile apps for installers work together seamlessly for faster, simpler installations. Greater than the sum of its parts, the Enphase Home Energy Solution features Enphase products that work together to help every stage of your business.

www.enphase.com

## EnStorage

EnStorage has developed a cost-effective, grid-scale energy storage system based on a proprietary flow battery. Our technology is optimal for long-duration, large-scale applications i.e. MW-scale daily dispatch of four to 12 hours for over 20 years. Target customers include grid operators, renewable developers and large industrial users. EnStorage's hydrogen bromide system has demonstrated stable operation for over 10K cycles and enjoys the advantage of employing low cost chemicals, simple operations and a strong IP portfolio including a proprietary membrane and catalyst. EnStorage has partnered with AREVA to scale up and deliver its technology for the European market.

www.enstorageinc.com

## Exide Technologies

Exide Technologies has a rich history spanning more than 120 years in the battery business. Our strengths demonstrate our position as a forerunner of industrial advancement around the world. With countless contributions to the growth of technology, our story reflects the spirit of innovation and resilience at its best. Today, Exide serves the complex stored energy needs of customers around the world. We provide services and systems that enhance vehicle performance and fleet utilisation as well as those that reduce risk of temporary interruptions of power supplies. Exide is working to change the way the world uses and stores electrical energy.

www.exide.com/gb/en

## Fronius

Synonymous with quality, Austrian manufacturer Fronius develops high-performance inverters for grid-connected PV systems that are efficient, reliable and powerful. Its long-term goal is to achieve energy self-sufficiency for the planet. Fronius offers string inverters from 1.5-27kW, central inverters up 100kW and a three-phase storage solution with hybrid inverter and modular lithiu- ion battery up to 12kWh. Working with inverter technology has never been as easy as it is with the Fronius SnapINverter generation. Installation of this compact and lightweight range is quick and simple with its intelligent snap-in design. The future-proof inverters come with an all-in-one communications package including integrated wireless for system monitoring.

SHIFTING THE LIMITS

www.fronius.co.uk

## Geli

Geli provides software and business solutions to design, connect and operate energy storage systems. Geli's suite of products creates an ecosystem where project developers, OEMs, financiers and project operators can deploy advanced energy projects using a seamless hardware-agnostic software platform. Geli ESyst is an online design tool for the analysis and design of energy storage and micro-grids. Geli EOS (Energy Operating System) is a software platform that allows for advanced functionality of any OEM equipment via Geli Energy Apps & Geli Energy Drivers. Geli GENI (Global Energy Network Interface) is the portal through which systems are monitored for performance and can be aggregated for virtual power-plant services.

geli.net

## Generate Capital

Launched by renewable energy industry veterans in late 2014, Generate Capital is changing the way the world invests in energy storage assets. Generate's no-money-down, Infrastructure-as-a-Service solutions are accelerating the energy storage industry by financing projects that traditional capital sources consider too small or early-stage. As a speciality finance company with permanent, flexible capital, Generate offers multiple types of financing programmes to a range of storage segments including grid services, behind-the-meter services, and solar-plus-storage. In 2015, Generate established over US$150 million of innovative, sustainable infrastructure programmes. We look forward to continuing to catalyse the energy storage industry in 2016 and beyond.

www.generatecapital.com

## GILDEMEISTER energy solutions

GILDEMEISTER energy solutions offers industrial customers and municipalities integrated solutions for energy management. This includes efficiency analyses to conserve energy as well as systems for generating, storing and using energy from renewable sources. The combination of wind and solar energy generation systems and large-scale energy storage systems based on vanadium redox flow technology gives energy-intensive consumers the opportunity to take control of their energy supply. GILDEMEISTER energy solutions is one of the most innovative companies in the energy sector and can draw on over 140 years of experience in the engineering industry.

energy.gildemeister.com/en

## Glen Dimplex

Glen Dimplex is the world's largest manufacturer of electrical heating technologies and holds significant global market positions in renewable energy technologies, domestic appliances, cooling, ventilation and heat recovery systems. We are at the vanguard of a low carbon revolution, with an unrivalled range of solutions in renewable space and water heating, cooling and ventilation for domestic, commercial and industrial applications. Across the world these innovative low carbon systems are enabling our customers to realise the dual goals of reducing CO2 emissions and eliminating cost. Glen Dimplex is coordinating the RealValue project, a European Commission energy storage project funded by Horizon 2020.

www.glendimplex.com

## Good Energy

Good Energy is a 100% renewable electricity company which was set up to give consumers and businesses a choice in where their energy comes from, providing the blueprint for how energy companies can and should look in the 21st century. Good Energy's vision is a decentralised energy system in the UK – away from the old-fashioned utilities – where consumers, businesses and communities play a far more active role in the market. With a 15% share in the feed-in tariff market, Good Energy is exploring ways it can offer a battery storage solution as part of its customer proposition.

www.goodenergy.co.uk

## Green Acorn Energy Solutions

Green Acorn Energy Solutions is a UK-based energy storage system company. We cover the domestic storage segment with the Sonnenbatterie battery range, offered in capacity sizes of between 2kWh and 16kWh. For the agricultural and light commercial segments, Green Acorn offers lead-acid systems as well as redox flow batteries. For the large commercial to utility-scale segments we offer a zinc/copper system, and the larger systems work within the current trading revenue streams. Green Acorn provides a full feasibility and design service and we have our own power trading division to service the storage market.

www.greenacornenergy.co.uk

## Green Charge

Green Charge is the largest provider of commercial energy storage in the US with systems installed coast to coast. Green Charge's mission is to use energy storage to power the world efficiently and sustainably. Our team is comprised of the top energy storage industry experts who provide performance-based solutions to optimise the value of energy for our customers. Our industry partners include SunEdison (solar), Duke Energy/REC (solar), ChargePoint (EV charging) and Nissan (second-life batteries), allowing our customers to easily combine energy storage and renewables. Green Charge offers customers the Power Efficiency Agreement, a shared savings model, providing the most advanced energy storage capabilities with no capital output or cost.

www.greencharge.net

## Greensmith Energy

As one of the largest providers of energy storage software and integration services, Greensmith Energy's mission is to make energy storage a fundamental part of a cleaner, more intelligent and more distributed energy infrastructure. Now in its fifth generation, Greensmith's GEMS software platform optimises the performance of energy storage by lowering costs and maximising the system's return on investment throughout its life. Over one-third of all energy storage capacity installed in the United States is running on the GEMS platform, which is currently used by more than 30 major customers globally.

www.greensmithenergy.com

## Edmundson Electrical Greentech

Edmundson Electrical Greentech is a leading distributor of energy storage products, operating from 23 locations around the UK. Each location holds energy storage products in stock along with a range of solar PV and other renewable energy products – and each location can provide advice and technical backup. Leading energy storage brands such as Tesla, Samsung, Growatt, Goodwe are stocked, and Edmundson Electrical Greentech will continue to develop its range as the market demands.

www.edmundson-electrical.co.uk/renewables

## Hanwha Q CELLS

The 2015 merger of Hanwha SolarOne and Hanwha Q CELLS created one of the world's largest solar manufacturing companies, which offers the full range of PV products, applications and solutions, from modules to kits to systems to large-scale solar power plants. The Korea-based company is also diversifying into energy storage via a partnership with Samsung SDI. Under this arrangement, Hanwha Q CELLS offers its Q.HOME rooftop solar PV system with a Samsung SDI storage system. The combination of technologies is aimed at the growing number of homeowners seeking energy independence.

www.hanwha.com

## Highview Power Storage

Highview Power Storage has developed and owns the intellectual property to its proprietary, large-scale long duration Liquid Air Energy Storage (LAES) system. The system can simultaneously convert low-grade waste heat into power during the discharge cycle, further increasing the overall efficiency by producing additional power. Highview has a global licence agreement with GE Oil & Gas to develop the integration of LAES technology into its peaker plant offering. In 2014 Highview and project partners, Viridor, were awarded more than £8million from the UK Department of Energy and Climate Change for the build, design and testing of a 5MW pre-commercial demonstrator. The plant will be online this year.

www.highview-power.com

## Hoppecke Industrial Batteries

Hoppecke Industrial Batteries has been at the forefront of energy storage for many years. As the leading specialist for industrial battery systems and at the same time the largest battery manufacturer in European ownership, the company has developed the technology to make cost-effective and efficient energy storage possible for businesses and homes. In the UK, Hoppecke has been working closely with local and central government to take energy storage into the 21st century in order to meet the growing demand for power based on renewable energy that can be stored by consumers and available to them when it is needed.

www.hoppecke.co.uk

## Hyperion Executive Search

Hyperion Executive Search Ltd is a specialist recruiter within the energy storage and cleantech markets. We help our clients achieve their strategic goals by helping them to attract, attain and retain the key talent they need. In a young market where talent and experience is scarce it takes knowledge, skill and integrity to uncover the hidden talent. Managing partner David Hunt has a unique background having previously been the director of a leading multi-technology renewable energy installer. Before that he worked in senior roles in the international recruitment industry. High-profile

Hyperion clients in the UK and internationally include Sonnen, LG Chem, redT, Bosch and SMA.

www.hyperionsearch.com

## Imergy

The desire for clean energy solutions has never been greater. Whether it's simply to cut costs and provide energy reliability, or to shift to more sustainable, renewable resources, corporations and communities everywhere seek viable new energy storage technologies. Imergy's ground-breaking Energy Storage Platform (ESP) provides an affordable energy storage solution that dramatically reduces the physical dangers and environmental toxicity inherent in traditional batteries. The ESP is constructed with non-flammable, non-explosive materials, and a ground-breaking electrolyte made from recycled vanadium which has no cycling limitations and does not degrade over time.

www.imergy.com

## JuiceBox Energy

Founded in 2013, JuiceBox Energy is committed to providing safe, reliable, intelligent and connected solar energy storage for renewable energy. JuiceBox Energy storage solutions are designed to support consumer self-consumption and enable a resilient renewable energy grid. The JuiceBox Energy storage system is an intelligent, 8.6kWh, 5.5kW lithium-ion battery system. It is designed, engineered and manufactured by JuiceBox Energy based on the company's years of automotive lithium-ion control systems engineering. The systems can be aggregated to support utility demand response programmes, where available. The systems are designed to support grid-tied, grid-isolated (in the event of grid failure) and off-grid configurations.

www.juiceboxsolar.com

## Kaco New Energy

Kaco is proud to be able to present to the market its Gridsave Eco 5.0kW bi-directional battery inverter system. Among its features, the system offers easy and flexible integration into existing plants due to AC-coupling – any sized system can be catered for. It has a high peak power because of 50Hz toroidal transformers (5kW can sustain 12kW peak load for around one minute). The system is flexible thanks to variable battery capacity and is compatible with lead-acid, lithium-ion and aquion saltwater batteries. It is single- and three-phase switchable, allowing optimsation of own consumption. Other advantages are easy handling and easy monitoring.

www.kaco-newenergy.com

## KiWi Power

KiWi Power is the UK's leading demand response aggregator, delivering significant revenues to large users of electricity since 2009. Demand response is a powerful application using technology to reduce consumption at peak times across industrial and commercial sites. This creates a greener, more cost-effective grid, reduces the need for inefficient backup power stations, further integrates renewables and provides security of supply to system operators and commercial sites. KiWi Power's enviable portfolio of clients across 800-plus sites includes some of the UK's most well-known brands including Marks & Spencer, the NHS, Marriott, Trinity Mirror Group, Ocado and United Utilities.

kiwipower.co.uk

## Krannich Solar

With over 20 years of specialist solar PV experience, Krannich Solar provides market-leading, high quality PV equipment and battery storage solutions, plus incomparable technical, training and customer support services. Expertly balancing international experience and global purchasing power with localised, personal service, Krannich Solar works in true partnership with solar professionals in an evolving industry. With storage firmly at the forefront of industry agenda, Krannich Solar is proud to offer products which offer installers and consumers the opportunity to unlock the full potential of solar power: increased self-consumption of clean electricity and maximised energy independence.

uk.krannich-solar.com

## Kyocera

Kyocera Corporation and Energetik Solartechnologie-Vertriebs GmbH have teamed up to offer an energy storage solution for residential use in Germany. The new solution, which includes Kyocera's battery storage system and Solare Datensysteme's energy monitoring software and hardware, can be combined with solar power generating systems to realise power generation and power storage at home, thus contributing to energy independence and reduced utility costs. The storage system features a multi inverter, which achieves a high charging efficiency of 97% while realising a cost advantage for customers. Because the inverter and battery box are separated into two compact units, they can be installed easily and flexibly in homes.

global.kyocera.com

## Leclanché

Leclanché designs, develops and manufactures customised energy storage solutions for electricity generation and transmission, mass transportation, heavy industrial machines and specialty battery systems. Through recent acquisitions we have positioned ourselves as a fully vertically integrated battery energy storage solution provider. We offer our customers multi-technology lithium-ion battery systems dimensioned to meet their specific application needs within a given operating environment, depending on whether they require high energy density or high cycle stability and fast charging, or a combination of both.

www.leclanche.com

## LG Chem

LG Chem, Ltd. is Korea's largest diversified chemical company which operates three main business units: Petrochemicals, IT & Electronic Materials and Energy Solution. Based on many years of experience in the development and production of batteries, LG Chem is one of the world's leaders in energy storage systems and is a primary supplier for the mobile and automotive industry around the world. Entering the business of ESS in 2010, LG Chem has constantly developed and supplied innovative solutions for the ESS market segments such as grid, residential and UPS. Throughout multiple production facilities and an extensive distribution network globally, LG Chem strives to become a global leading company.

www.lgchem.com

## Lightsource Renewable Energy

Lightsource Renewable Energy was founded in 2010 and has achieved an unrivalled track record in the installation of both ground-mount and rooftop solar projects – deploying more than £2billion of solar assets across the UK. Currently the leading solar PV energy generator in Europe, Lightsource firmly believes that combining storage systems alongside solar PV generation will revolutionise the energy sector. Lightsource is exploring all options for solar energy storage – from domestic through to

utility scale. By finding new ways to utilise the most cutting-edge technologies, we hope to pave the way for renewable energy to fulfil its true potential.

www.lightsource-re.co.uk

## Moixa Technology

Moixa Technology is a leading UK residential energy storage company, with 1MWh of MASLOW energy storage systems installed across the UK, managed as an aggregate virtual power plant for a range of emerging grid services via GridShare, which pays owners £75 a year on top of solar savings. MASLOW is a compact 2-3kWh all-in-one smart battery system, which is AC-coupled to access solar, smart tariff and winter grid services. MOIXA has also delivered major UK energy storage pilots for DECC, InnovateUK, LNCF and UK Utilities, producing deep experience and evidence to support financing storage as a service.

www.moixa.com

## NEC Energy Solutions

NEC Energy Solutions is a recognised and proven leader in advanced energy storage. We develop and manufacture energy storage solutions for electric grid, renewable energy, commercial and industrial applications. NEC Energy Solutions' products range from compact advanced industrial batteries to very large grid-scale energy storage systems with a focus on high performance, efficiency, safety and availability. Using energy storage combined with intelligent controls, we can provide turnkey solutions that ensure electric power grid reliability whilst enabling ever-greater amounts of renewable energy to power our lives.

www.neces.com

## Nidec ASI

Nidec ASI was founded in 2012 when Nidec, a Japanese multinational corporation listed on both the US and Japanese stock exchanges, acquired Ansaldo Sistemi Industriali (ASI). The company established itself as a provider of customised solutions for a range of industrial applications worldwide. Operating from offices in North America, France, Germany, Romania, the United Arab Emirates, Southeast Asia, Russia, China and Japan, its markets include petrochemical, energy, steel, marine and industrial automation. Nidec ASI specialises in heavy-duty applications requiring high power and performance, including inverter and converter, power electronics, industrial process software and automation, central electrical retrofits and hydroelectric generators.

www.nidec-asi.com

## Nissan

Nissan Motor Company and Green Charge Networks, the largest provider of commercial energy storage, have joined forces to deploy second-life lithium-ion vehicle batteries for stationary commercial energy storage in the US and international markets. With more than 178,000 sales since its launch in late 2010, Nissan LEAF is the world's top-selling electric vehicle. As part of the company's commitment to sustainability and reducing greenhouse gas emissions, Nissan has conducted multiple research projects in Japan, the US and Europe to use LEAF batteries outside the vehicle through 4R Energy, a joint-venture with Sumitomo Corp. formed in 2010.

www.nissan-global.com

## Off Grid Energy

For over 10 years, Off Grid Energy Ltd has been pioneering energy storage technology for permanent and temporary off-grid power applications. GridtoGo POWERCUBE is a factory-built, adaptable solution for applications as diverse as hybrid power generation, solar energy storage, grid resilience and demand-side response. Our utility-approved solutions provide power for remote dwellings and commercial installations as well as for DNO fault response from the Scottish highlands to the Australian outback. For the developing world, Off Grid Energy provides nano and micro de-centralised grid systems, providing electrification in Asia, and Africa.

www.offgrid-energy.co.uk

## Open Energi

Open Energi is a clean technology company harnessing flexibility in our demand for energy to build a new energy economy which is cleaner, cheaper, more secure and more efficient. Open Energi's Dynamic Demand platform aggregates flexible capacity from equipment and battery systems to deliver real-time frequency response, creating a distributed storage network which helps National Grid manage electricity supply and demand UK-wide.

www.openenergi.com

## Origami Energy

Origami Energy is an ambitious new technology company providing the required technology and financial mechanisms to connect, control and optimise a large network of existing energy generating/energy using/energy storing assets. Origami's new storage division is developing and growing a portfolio of energy storage assets that provide fast and reliable flexibility into this marketplace. With a core team, experienced in storage and renewables, Origami aims to become a leading developer and provider of energy storage solutions, intelligently managing and optimising a large interconnected virtual network, to maximise value for utilities, renewable operators and large energy users.

www.origamienergy.com

## OST Energy

OST Energy is engaged in assisting companies accepted into National Grid's Enhanced Frequency Response Tendering process towards successfully winning service contracts. We have advised on many thousands of renewable energy projects across their full lifecycle and acted as technical advisor on numerous energy storage projects in multiple continents including America, Europe, and Africa, ranging from hydrogen battery technology to flagship lithium-ion plants. Our extensive renewable energy experience covers: feasibility studies, economic and functional modelling, development and planning, design, engineering, execution – including tendering capabilities complemented by an in-depth knowledge of lender requirements and EPC and equipment providers – and operational management.

www.ostenergy.com

## OutBack Power Technologies

With an emphasis on product performance OutBack has established itself as the product of choice in harsh environmental conditions and applications where product reliability is paramount. Whether the application is village micro-grids in Africa, rural electrification projects in Latin America, remote off-grid cabins in Alaska or a suburban home in Southern California, OutBack has set the bar for delivering high quality, cutting-edge power conversion electronics. OutBack's customer service and technical support have received industry-wide acclaim for offering a "no hassle" approach to problem solving. OutBack has pioneered many of the technologies that have become industry

standards for power conversion technology, and there's more to come.

www.outbackpower.com

## Panasonic

Panasonic Corp. is a worldwide leader in the development of diverse electronics technologies and solutions for customers in the consumer electronics, housing, automotive, enterprise solutions and device industries. Since its founding in 1918, the company has expanded globally and now operates 468 subsidiaries and 94 associated companies worldwide. Panasonic is striving to become the world's number-one sustainable electronics company by 2018, the year of its 100-year anniversary, and is committed to pursuing new value through innovation across divisional lines, using its technologies to create a better life and a better world for its customers and the world.

www.panasonic.com

## PE Systems

PE Systems is a market leader in the provision of energy storage and power protection solutions. Set up in 1987 to be a consultation and design house for DC systems we have since become the manufacturer of choice for DNOs in the UK where a system critical back-up supply is needed. Our expertise is now turning to both large- and small-scale smart grid and renewable energy storage products which are suitable for real world applications. Recent projects have seen development and manufacture of domestic and commercial energy storage systems and the new generation of fast frequency response units.

www.pe-systems.co.uk

## Powervault

Powervault has developed the UK's first simple and affordable home energy storage system. The award-winning device enables homeowners to store free electricity they generate from solar panels for use at night when energy demand peaks. It is also equipped for the smart power revolution and allows homeowners to benefit from new time-of-use tariffs, buying electricity from the grid when it is cheap for use at peak times. Its products offer an emergency power socket and come in a range of sizes and battery technologies. Powervault has raised investment through crowd-funding in record time and used it to expand its team, deliver early sales, and improve its product.

www.powervault.co.uk

## Primus Power

Primus Power is a provider of low-cost, long-life and long-duration energy storage systems. The company's flow batteries are shipping to US and international micro-grid, utility, military, commercial and industrial customers. With 25 patented innovations in chemistry, cell design and system engineering, the company's EnergyPod systems offer exceptional power and energy density, reliability and portability at industry-low total cost of ownership. Follow Primus Power on Facebook, LinkedIn and Twitter, or visit us at the website below.

www.primuspower.com

## Redflow

Redflow Limited is an energy storage specialist that has developed the world's smallest flow batteries. Redflow's unique flow batteries are designed for stationary energy storage applications ranging from its ZCell home battery to its ZBM battery range for commercial, telecommunications and grid-scale deployment. Redflow is a publicly-listed company (ASX: RFX) that operates R&D facilities in Australia, as well as offices in the US and Europe. Produced in North America by Flex, one of the world's largest supply chain solution companies, Redflow's high energy density batteries are sold, installed and maintained by a global network of system integrators.

www.redflow.com

## redT energy

redT develops and supplies durable and robust energy storage systems based on proprietary vanadium redox flow technology for on- and off-grid applications. The liquid storage medium affords an exceptionally long life of over 10,000 full charge/discharge cycles and a 100% usable depth of discharge. Combined with low maintenance requirements, this delivers industry-leading levelised cost of storage (LCOS) and total cost of ownership (TCO) results. The modular approach allows the power and energy components of systems to be independently sized to meet customer requirements.

www.redtenergy.com

## RES

RES has been active in energy storage for over six years and was recently named as one of the world's top three energy storage integrators by Navigant Research. RES has investigated multiple energy storage technologies and offers utility-scale development and fully-wrapped EPC services for energy storage, including our energy management control system: RESolve. At the forefront of renewable energy development for over three decades, with expertise in onshore and offshore wind, solar and energy management technologies, RES has developed and/or built more than 10,000MW of renewable energy capacity worldwide and currently manages operations for over 2,000MW.

www.res-group.com

## Rexel Energy Solutions

Rexel Energy Solutions is a trading division of Rexel UK Ltd, part of the Rexel Global Group, which has a presence in 37 countries. It offers a broad range of energy-efficient products of quality manufacture including solar, renewable heating, electric vehicle charging, energy monitoring and associated innovative solutions. Specialist teams provide technical support, and can help manage projects from inception to completion. Training courses are available for those wishing to open up new opportunities and diversify in the renewables market.

www.RexelEnergySolutions.co.uk

## S&C Electric

Headquartered in Chicago, S&C Electric Company is a provider of equipment and services for electric power transmission and distribution systems. We specialise in switching and protection systems, smart grid applications, energy storage and renewable integration. In addition, S&C offers a wide range of engineering, laboratory and testing services. As a thought leader and innovator in the industry, S&C is always interested in pursuing opportunities to explore new technology and applications. Therefore we welcome any interest in innovation projects, joining strategy groups and taking part in pilot research, especially those relating to energy storage, micro-grids and self-healing grids.

www.sandc.com

## Saft Batteries

Saft (Euronext: Saft) is a world leading designer and manufacturer of advanced technology batteries for industry. The group is the world's leading manufacturer of nickel batteries and primary lithium batteries for the industrial infra-

structure and processes, transportation, civil and military electronics markets. Saft is the world leader in space and defence batteries with its Li-ion technologies, which are also deployed in the energy storage, transportation and telecommunication network markets. More than 4,100 employees in 19 countries, 14 manufacturing sites and an extensive sales network all contribute to accelerating the group's growth for the future. Saft batteries. Designed for industry.

www.saftbatteries.com

## Samsung SDI

The Samsung SDI large-sized battery system inherits the full stability of our world's-best rechargeable batteries, which have been used for the latest mobile devices and electric cars. Our ESS technology is able to meet the various needs of users and provides customised solutions for the various purposes of the electric power market. Our ESS provides not only economy but also strong reliability through its long-lasting life, safety and excellent performance. Spanning from the size of kWh to MWh, Samsung SDI supplies ESS solutions for various applications – residential, utility, commercial, UPS and base transceiver stations – applicable to your everyday life, leading the green energy industry.

www.samsungsdi.com

## SCHMID Energy Systems GmbH

SCHMID Energy Systems develops and distributes stationary energy storage solutions based on the powerful vanadium redox flow technology. The product range includes compact storage solutions for use in private homes, battery containers for trade and industry, off-grid solutions for telecommunication and undeveloped areas as well as large storage parks. SCHMID benefits from more than 40 years of experience in the development and production of complex wet process systems. This ensures highly reliable and safe systems with low maintenance and a long lifetime.

www.schmid-energy-systems.com

## Schneider Electric

We strongly believe that renewable energies will radically change the future of our children and our planet, and we are very committed to accelerating their development. In order to increase significantly the penetration level of renewable energies on large interconnected grids, such as small island systems, energy storage systems are becoming a vital part of the equation. This is why we developed a new range of energy storage solutions, banking on the synergies with competitive PV technologies and leveraging our expertise in energy management and control systems. Whatever the application, wherever in the globe, we will be here to support you with your energy storage needs.

www.schneider-electric.com

## Sharp Electronics

Sharp's SmartStorage system is an energy storage solution designed to reduce expensive peak demand charges for commercial and industrial buildings. The SmartStorage energy storage system combines Sharp's intelligent energy management system with cutting-edge hardware, operating seamlessly as a standalone solution or when deployed along with a solar electric system. SmartStorage energy storage systems are available with an optional 10-year Asset Management Service Agreement and innovative demand reduction performance guarantee. If guaranteed performance is not met, Sharp will compensate for the deficit in promised peak demand reductions.

www.sharpsmartstorage.com

## Siemens

Siemens' SIESTORAGE is a modular electrical energy storage system. SIESTORAGE can act as an energy consumer as well as producer. This combination helps to improve grid stability and enable greater integration of renewable energy sources. Thus the grid can utilise more of the available energy. Also industry and infrastructure customers can benefit from this solution to better manage variable loads or as an alternative to back-up power generation in case of a breakdown. SIESTORAGE provides a stable and reliable power supply. It helps to integrate renewable energy sources and can help to reduce the use of fossil fuel generation moving towards a more modern eco-friendly grid.

www.siemens.com

## SimpliPhi Power

SimpliPhi Power designs and manufactures clean energy storage and management systems for commercial, residential, and military applications. Founded in 2002, California-based SimpliPhi is one of the oldest companies to utilise non-toxic lithium ferrous phosphate chemistry with proprietary cell and battery architecture to create the safest, most reliable, durable and scalable on-demand power. SimpliPhi Power storage creates energy security with a 98% efficiency charge/discharge rate, 5000+ cycles and 10-year warranty. SimpliPhi storage system components are UL certified, and have been rigorously tested and deployed by the US Army and Marine Corps.

www.simpliphipower.com

## Skeleton Technologies

Skeleton Technologies is Europe's leading manufacturer of ultracapacitors and has achieved global breakthroughs in product performance through the use of patented graphene-based materials. We deliver high power and high energy storage solutions across industries including the automotive, aerospace, industrial and renewables sectors. Our current customer base includes global engineering companies, the European Space Agency and several Tier 1 automotive manufacturers.

www.skeletontech.com

## SMA Solar

As a market leader with more than 30 years of experience, SMA has unparalleled expertise in the field of storage system integration. Increase your independence with SMA storage solutions. For PV applications of all types and sizes.

www.sma.de/en

## Smart Power Systems

As a business we are passionate about the development and use of innovative electrical technology to improve the environment we live in and reduce the operating costs of our clients' businesses. We offer three specialist areas centred on electricity network innovation: power system analysis, design and commissioning; micro-grid and smart grid products and services; and energy storage system products and services. We have worked for global, high-profile clients in the renewable energy, oil/gas and electricity grid sectors. This has involved the analysis and design of up to 500MW power stations right down to domestic PV solar. We are currently offering our energy storage systems to the residential, commercial and grid sectors.

www.smartpowersystems.co.uk

## Socomec

The market leader in energy performance and integrated power systems – Socomec – has developed a range of intelligent systems that convert and store solar energy. The latest power conversion system – SUNSYS PCS2

– is available from 33 to 100kW per cabinet, ideal for deployment within smart buildings and improving mangement and stability when connected to grids as well as off-grid applications. With over 45 years of experience in energy conversion and UPS, Socomec has most recently demonstrated its unrivalled expertise as part of the pilot site for an innovative smart grid operation – Nice Grid – the first "islanded", or disconnected, neighbourhood in Europe.

www.socomec.com

## SolarEdge

SolarEdge provides an intelligent inverter solution that has changed the way PV systems harvest and manage power. The SolarEdge DC-optimised inverter system maximises power generation at the module level while lowering the cost of energy production. Addressing a range of solar segments, the SolarEdge system consists of power optimisers, inverters, storage solutions and a cloud-based monitoring platform. Compatible with Tesla's home battery, the Powerwall, StorEdge is a DC-coupled storage solution that allows homeowners to reduce electric bills and gain energy independence. With StorEdge, unused solar energy is stored and used when needed to maximise self-consumption and for power backup.

www.solaredge.com

## Solutronic Energy GmbH

Solutronic Energy develops and manufactures PV products for residential and commercial applications, from grid tied, off-grid and hybrid inverters through to complete storage systems and energy production solutions including CHPs and generators. The 30-strong, Swabian solar company develops sophisticated systems for renewable energies with a view to economic and sustainable use, perfect self-sufficiency and quality, availability and security. In the words of CEO Reinhard Lenz: "Generate and consume green electricity locally – up to 100% self-sufficiency – that is our challenge."

www.solutronic-energy.de

## Sonnen

Clean and affordable energy for everyone is the biggest challenge of our time. The sonnenBatterie eco is an energy storage solution that utilises intelligent energy management software. It is easily adaptable to your individual needs. The system is available in a variety of storage capacities and configurations, allowing for extensibility and expansion. sonnenBatterie eco allows you to save money every day by harvesting energy from your solar PV system or the grid when it is cheapest, and using the stored energy from the battery to power your home when rates are more expensive.

www.sonnen-batterie.com

## Steca Elektronik

Steca Elektronik in Germany has been synonymous with creativity and innovation as a provider of electronic services and battery charging systems since 1976. Steca is also known for the development and production of its own solar electronics products. In the three market segments of grid-connected and off-grid PV systems and solar thermal applications, the Steca brand is internationally recognised for innovation and vision. Steca is now a leading electronics service provider and supplier of a wide range of solar electronic products and delivers to over 80 countries worldwide. The production facilities occupy over 29,000 square metres with over 700 employees.

www.steca.com

## Stem

Stem, a leading provider of intelligent energy storage, automates electricity savings for businesses and provides fast-acting dispatchable resources for the grid. The Stem solution combines energy storage and a predictive software platform to maximise value by delivering a variety of services including peak demand mitigation, participation in wholesale electricity markets and visibility into real-time energy data. With over 200 systems installed, Stem has more commercial energy storage systems than any other provider. Founded in 2009, Stem is funded by global energy companies such as Constellation New Energy, GE Ventures, Iberdrola, Mitsui & Co., Ltd. and RWE Supply & Trading.

www.stem.com

## Studer

Since its founding in 1987, Studer Innotec has built up unmatched expertise and experience in developing products especially suited to all types of battery-based solar energy systems. It also boasts extraordinary reliability, which is required given the use of its products in remote, hard-to-reach locations. In Studer Innotec's R&D department, the guiding principle is flexibility in the mode of operation and versatility in applications. It is therefore natural that Studer Innotec has entered at a very early stage the battery-based on-site consumption market with its flagship product: the Xtender. The Xtender is a multi-directional energy conversion platform that offers seamless interaction with the grid. The Xtender works with both lead-acid and lithium battery technologies.

www.studer-innotec.com

## Sunamp

Sunamp Ltd is a world leader in thermal energy storage, having developed a highly efficient, non-toxic, low-cost heat battery system using PCM, allowing energy to be stored, as heat, when it's available and released when needed. Sunamp Heat Batteries are scalable and can be tailored to specific applications. SunampPV and SunampStack make sense for all domestic customers who want to make their energy systems work better and deliver higher yield. Sunamp Heat Batteries can deliver heat and hot water on demand, saving domestic customers £200 per year. SunampCube, for large-scale industrial use, deals with grid constraint and curtailment ensuring continuous generation.

www.sunamp.co.uk

## Tesla Energy

Tesla is not just an automotive company; it's an energy innovation company. Tesla Energy is a critical step in the mission to enable zero-emission power generation. With Tesla Energy, Tesla is amplifying its efforts to accelerate the move away from fossil fuels to a sustainable energy future with Tesla batteries, enabling homes, business and utilities to store sustainable and renewable energy to manage power demand, provide backup power and increase grid resilience. Tesla is already working with utilities and other renewable power partners around the world to deploy storage on the grid to improve resiliency and cleanliness of the grid as a whole.

www.teslamotors.com/powerwall

## TLT Solicitors

When it comes to renewable energy, we know what we're talking about. We've been involved in the sector for nearly 20 years, advising on a wide range of projects for a variety of different organisations. Our team has specialist experience of advising on a range of projects incorporating battery storage solutions, both retro-fit and as part of more strategic grid-orien-

tated solutions, and can provide you with advice across the project life-cycle. Our experienced legal team is one of the few that can provide UK-wide legal advice, supporting projects in England, Wales, Scotland and Northern Ireland.

www.tltsolicitors.com/sectors/energy-and-renewables/energy-storage/

## Trojan

Trojan Battery Company is the world's leading manufacturer of deep-cycle batteries, offering a complete portfolio of technologically advanced deep-cycle flooded, AGM and gel batteries that provide maximum long-lasting performance to meet the requirements of today's advancing renewable energy systems. Founded in 1925, the company is ISO 9001:2008 certified with operations in California and Georgia. Trojan also maintains two of the largest and most extensive research and development centres in North America, and opened a third R&D facility in Sligo, Ireland at IT Sligo. These R&D centres are dedicated to engineering new and advanced battery technology.

www.trojanbattery.com

## VARTA Storage

VARTA Storage GmbH is a leading company for battery energy storage systems. The company is specialised in large-format lithium-ion battery storage systems for the use in private households as well as for commercial mass storage applications. Based in Nördlingen, Bavari, the company is part of the VARTA Microbattery/ VARTA Storage group. Its goal is to perform research and development for an effective contribution to the energy revolution and hence the environment.

www.varta-storage.com

## Victron Energy

Victron Energy was founded in 1975 by Reinout Vader. Victron Energy has grown from a small, one-office technology company to become an international enterprise with nearly 1,000 different products sold in more than 60 countries worldwide. Our extensive product range includes sine wave inverter/chargers, battery chargers, battery monitors, batteries, solar panels, solar charge regulators and many more. Victron Energy's innovative products play key roles in the energy storage and self-consumption market as well as our traditional areas of marine, automotive, off-grid energy systems and industrial locations. Our inverter chargers range from 800VA up to 10,000VA and can easily be connected in series and parallel configurations.

www.victronenergy.com

## ViZn Energy Systems

ViZn Energy Systems is comprised of a dedicated and passionate team of scientists, engineers and business leaders who have commercialised a revolutionary energy storage solution for use wherever economical and safe energy storage adds value. We are proud to offer a solution, which is safe, reliable, cost effective and versatile enough to meet the needs of today's ever-changing energy landscape. ViZn Energy storage systems are the safest battery under all operating conditions in all regions from the UK to Antarctica. Our systems can tolerate extreme high-temperature environments and deliver under intense duty cycling across the full state of charge.

www.viznenergy.com

## Wattstor

Wattstor designs and supplies high quality and sustainable renewable energy storage and management systems to domestic, commercial and agricultural properties throughout the UK via an accredited installer network. Our systems are constantly evolving using emerging technology and battery chemistries, and offer both energy storage and management capability by banking surplus renewable energy in a battery store or redistributing it to other loads such as heating or refrigeration. In addition to our single and three-phase scalable battery storage systems we have designed and launched our own export limitation and smart switch, the Wattstor Imp.

www.wattstor.com

## Win Inertia

Win Inertia is a technological solution provider and pioneer in creating hybrid energy storage solutions, optimised in economic terms thanks to the integration of several energy storage technologies, enhanced power electronics and patented energy management algorithms in an exclusive, flexible hardware and software platform. Win Inertia offers solutions to the new challenges faced by the power grid through the integration of innovative grid-scale energy storage solutions at different levels of the electrical grid, continuously and cost-effectively providing multiple grid services, and opening up new revenue streams.

www.wininertia.es

## WINNER BATTERY

WINNER BATTERY is the world's leading battery brand with more than 1,500 product codes in 38 product series serving any need for renewable energy storage, stationary, starting and motive power applications, from energy storage design, to supply of speciality batteries. The WINNER BATTERY product range consists of a wide selection of battery technologies such as advanced lead acid, GEL, AGM and FLA and advanced turnkey solutions for large-scale energy storage systems. WINNER BATTERY has substantial presence in 36 countries in five continents through an expanding network of local partners and its subsidy companies WINNER BATTERY (UK) based in the UK and WINNER BATTERIEN GmbH based in Germany.

www.winnerbattery.com

## Younicos

Younicos is a global leader for intelligent energy storage and grid solutions. Clients benefit from the technical expertise, commercial know-how and in-depth experience we've built based on nearly 100MW installed across more than 20 energy storage projects worldwide. The company was founded in 2005 in Berlin, Germany, and currently employs more than 150 storage enthusiasts there and in Austin, Texas (USA).

www.younicos.com

## ENERGY STORAGE 100 - The Curation Process

The Energy Storage 100 was carefully curated by the editor of Energy Storage News, Andy Colthorpe, and the chair of the Energy Storage Alliance, Dan Caesar. Drawing on their extensive experience of the energy industry Andy and Dan drafted a long-list of hundreds of potential companies for inclusion in the Energy Storage 100. To ensure that no organisations were overlooked businesses were invited to nominate themselves and this method meant that many more businesses emerged. The long-list was then reduced to the final 100 through the use of a scoring system, which took into account an array of criteria including investment relative to turnover, potential geographical reach, brand impact and technological innovation.

# Energy storage events around the world

**Clean Energy Summit,** 26th-27th April | UK, London

**Energy Storage Summit,** 28th April | UK, London

**Energy Storage 100,** 28th April | UK, London

**Energy Storage China,** 10th-12th May | China, Beijing

**SNEC,** 24th-26th May | China, Shanghai

**International Flow Battery Forum,** 7th-9th June | Germany, Karlsruhe

**EES Europe,** 22nd-24th June | Germany, Munich

**Intersolar Europe,** 22nd-24th June | Germany, Munich

**Energy Storage World Forum,** 12th-16th September | Australia, Melbourne

**Clean Energy Live,** 4th-6th October | UK, Birmingham

**Solar Energy UK,** 4th-6th October | UK, Birmingham

**Clean Energy Awards,** 5th October | UK, Birmingham

**Solar Power Portal Awards,** 5th October | UK, Birmingham

**Energy Storage North America,** 4th-6th October | USA, San Diego

**US Energy Storage Summit,** 7th-8th December | USA, San Francisco

**Energy Storage Europe,** 14th-16th March | Germany, Dusseldorf




# Clean Energy LIVE

# SOLAR ENERGY UK

## Where solar, storage, energy management and renewable heat connect

THE NEC, BIRMINGHAM, UK | **4 – 6 October 2016**

INCORPORATING:

INSTALLER CENTRAL · Solar Business Theatre · Energy Storage THEATRE · Energy Management THEATRE · Renewable Heat THEATRE · Clean Energy SHOWCASE · Clean Energy AWARDS · SOLAR POWER PORTAL AWARDS

"Good change of direction - energy needs to be looked at as a whole system in a building, organisation, city, country. smart solutions are needed to move away from fossil fuels and reduce greatly our energy consumption even while moving ahead with technological advances."
**Jody Lockyer, Bristol City Council**

BRISTOL CITY COUNCIL

**cleanenergylive.co.uk**

Over 200+ exhibitors confirmed, including:

BayWa r.e. renewable energy · British Solar Renewables · enphase ENERGY · JinKO Solar · Hanwha Solar · HUAWEI · LarkEnergy · LIGHTSOURCE · push energy · REXEL ENERGY SOLUTIONS · solaredge · sonnen · SUNGROW Green and Effective