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# THE FUTURE OF ENERGY, POWER AND EMISSIONS?

The world is currently in a state of flux over power/energy and emissions. In an attempt to reduce harmful emissions, diesel has become something of a leper with virtually every government in the developed world, looking to replace it with 'clean and emission free' electric power. However, opponents of going all-electric argue that while EVs have significantly lower lifetime emissions the production and disposal of some batteries carries an even higher carbon footprint.

**They also point out that the particulate matter emitted by modern Euro VI diesels is 96 to 99 percent lower than that of a Euro III/IV engine of 20 years ago. At the same time, NOx emissions are 85 to 95 percent lower, with a significantly cleaner sulphur burn, which also achieves significantly more power per litre of fuel.**

Governments, however, are in the process of banning petrol/diesel engines, although there has been a rowing back on implementation dates in several countries, with most of Europe now looking at 2035. By then, all new vehicles will need to have zero emissions, in other words, powered by electric or hydrogen. For larger mobile construction equipment, electricity is generally considered a non-starter primarily due to the size and weight of the batteries.

On the other had big mining equipment such as walking draglines and mining trucks have had electric power options since the 1930s but using mains power and overhead lines. The first big battery electric mining vehicles are now at work.

Getting back to cranes and aerial lifts, there are also a few exceptions. For example, the Dutch mobile self-erecting tower company Spierings started work on its City Boy tower crane about 15 years ago, although shipments did not start until 2020. The company's entire product line is now electric powered. Putting the technical issues of making a large battery powered machine to one side, the cost of a big electric machine can cost twice or three times the price of a regular diesel

unit, a major deterring factor for most customers.

The crane, aerial lift and telehandler manufacturers have been developing emission free equipment for the best part of 20 years with some notable success. Small aerial lifts have, of course, always been battery powered, but the arrival of smaller, more efficient, lighter and more powerful batteries has made it possible to use battery power for even the largest of lifts. Other developments, such as the various forms of hydrogen power, are also playing a role.

China, although still the world's largest overall polluter - but not on a per capita basis - is making massive strides in converting to solar and wind power and appears to have reached 'peak emissions' in 2025. As a result, it leads the world in battery development and production.

The USA, on the other hand, has done a major environmental U-turn, repealing a scientific finding that greenhouse gas emissions endanger human health, and has eliminated federal tailpipe emission standards for cars and trucks in the most sweeping climate change policy rollback by the Trump administration to date.

*Chinese manufacturers such as Dingli are now producing hybrid/electric 40 metre plus boom lifts*



*Tadano launched the first all electric Rough Terrain crane in 2023*

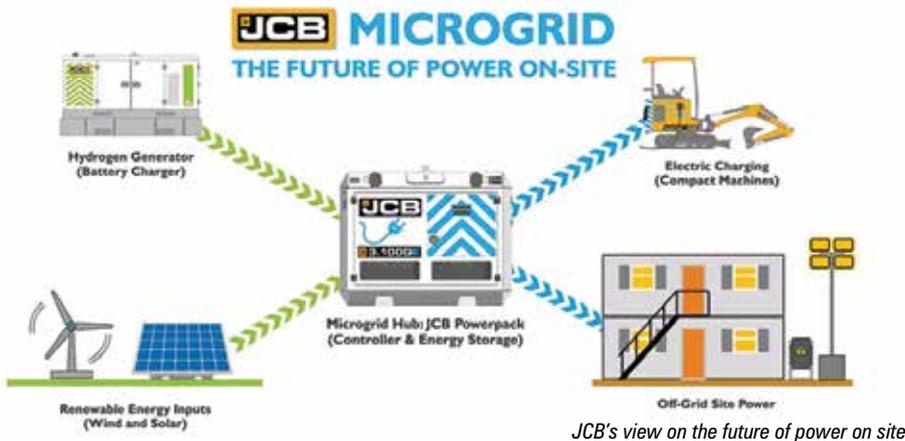
## BUT WHERE DOES ALL THIS LEAVE THE EQUIPMENT MANUFACTURERS?

Electric/battery power is by far the most developed currently, but some major equipment manufacturers, such as JCB, are investing in internal combustion hydrogen power for their larger equipment.

As touched on already, battery power on smaller equipment is now the norm, including small to medium scissor and boom lifts, pick & carry cranes, and compact telehandlers. This move is growing through the development, mostly by



*JCB's Hydrogen G60H generator*



Chinese companies, of larger boom lifts and a growing number of plug-in mobile and crawler cranes.

The diesel generator has also had its day, with the uptake of battery powered power packs, which are able to run not only tower cranes, mastclimbers and hoists but also the whole site infrastructure. Where adopted, this has led to massive cost savings both for fuel and a connection to the grid. The latter also eliminates having to wait months or even years for a high capacity connection for a job site. By using battery power packs a site can start work almost immediately and complete everything to the handover phase with minimal electrical requirement and cost.

**CRANE ELECTRIFICATION**

Several mobile crane manufacturers are now offering electric/hybrid All Terrain and crawler cranes, including Liebherr, Tadano, Manitowoc, Marchetti, PVE, XCMG and Sany to name just a few. One of the latest and largest capacity cranes to make it to market is the fully electric 200 tonne Sany SCC2000A-EV crawler crane, first seen at Bauma last year. One of the first units has just been delivered to Belgian international crane rental and heavy lift company Sarens.

The crane features an 86 metre main boom plus a 15 to 30 metre fixed jib, while an 18 to 63 metre luffing jib takes the maximum system length to 122 metres. Transport weight of the base machine is 47.1 tonnes. Power is supplied by a 422kWh battery pack, allowing the crane to operate for up to eight hours of standard/typical working cycles. It can also be connected to the grid via a cable during operation. Where this is not an option, Sany offers a 210kWh SPL210 mobile energy storage system with a 120kW DC output at 472/689 volts or an AC output from 6.6kW to 40kW from 230 to 400 volts. The lithium-ion phosphate battery from CATL features an aerosol fire suppression system and, with an overall weight of 2,750kg, can be towed behind a van or 4x4, for easy transportation and plug & play operation. It can be charged while in use and can power several devices at the same time. Real time data tracking is available via a mobile App.

Sarens said: "We are taking a decisive step into the future of heavy lifting with the introduction of the SCC2000A-EV, the first fully electric heavy crawler crane of its kind to join the fleet. Designed for demanding lifting operations, this crane combines the performance expected of a 200



tonne class crawler with the advantages of zero emission technology. By welcoming this crane into the fleet, we are reinforcing our commitment to innovation, performance and sustainability - proving that electric technology is not just the future of heavy lifting but is already a reality."

**CRANE TECHNOLOGY NOW A REALITY**

We mentioned Spierings Cranes earlier as an early adopter of electric power as a response to growing demand from companies working in urban environments. Power availability, stricter emission regulations and smart power management are all becoming decisive factors in how and where certain types of equipment can be used.

As we mentioned before, the development of Spierings' City Boy hybrid electric crane took 10 years to perfect, although this was also partly due to the economic crash of 2008/9. The company persevered and has sold a good number of units. The latest is to French rental and heavy haulage company

Cauvas Occilev, which took delivery of an SK487-AT3 City Boy, the first unit to arrive in France.

The City Boy can be operated as a full battery electric machine or used while plugged in or as a sort of hybrid model with a small, low emission diesel engine for topping up the battery. It has a maximum capacity of seven tonnes, which it can take to a radius of just under 12 metres, and handles 1,700kg at its maximum radius of 40 metres. Four tower heights of 21, 24, 27 and 30 metres are available, while the jib luffs to 15, 30 or 45 degrees for a maximum lift height of more than 55 metres. Total weight is 36 tonnes, and it has overall stowed dimensions of 13.1 metres long, 2.5 metres wide and four metres high.

Chief executive Benjamin Cauvas said: "What we value most is the City Boy's unique electric versatility. We believe that this new crane will help create a new market by offering our clients a lifting solution for sites with restricted access, especially in city centres. It also allows us to meet the growing demand for environmentally responsible lifting solutions."

For Spierings, it is hard to know if all that development has paid off in terms of profits from City Boy sales. However, all that work and knowledge gained has enabled it to introduce the technology across its full line. The company recently introduced two new innovations that demonstrate how technology, energy and ease of use come together: a completely redesigned crane cab and the new SK1265-AT5 eLift.

Demand for zero-emission operation is growing, but real-world site conditions are not always ideal. Grid power is not available everywhere, and lifting operations are often short term and variable. The latest generation of eLift has been



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SK1265-AT5 eLift

further developed with features such as the 'Stand Alone Battery Mode', which allows the crane to operate just on the battery for up to three hours, not only eliminating emissions, but also noise, ideal in noise sensitive city centres but also helping reduce overall site noise and allowing better communication between riggers and operators etc.

The new SK1265-AT5 eLift on a five axle carrier has a jib length of 60 metres. A key innovation is the newly developed Automatic Ballast Detection System, which automatically recognises and monitors the counterweight configuration, ensuring that the correct lifting capacity is always set and removes part of the routine and risk from daily operations.

**THREE TERMINAL SAFETY CONFIGURATION**

With all electric powered access equipment, battery performance isn't just measured in capacity and charging times, but how the system reacts in a critical moment, in other words, reliability. Imagine an operator working at a height of 15 metres when a minor electrical glitch occurs, perhaps a brief spike from a faulty charger is detected. In a conventional two terminal battery system, this single fault can trigger the main contactor, resulting in an immediate loss of power, leaving the operator stranded. However, there are ways to avoid such an occurrence from escalating into a high altitude emergency.

BSLBATT is a lithium battery manufacturer that specialises in Light Motive Power and industrial energy storage solutions. It designs and promotes the three terminal battery configurations - Charge Positive (+), Discharge Positive (+), and Common Negative (-), which are aimed at high safety industrial applications. The company says that the product is not just a wiring change, but a redesigned Battery Management System (BMS) logic, ensuring the operator always maintains control, even when a fault occurs on the charging side. The company says that the primary benefit of the three terminal setup is that it provides physical and logical independent control over the charging and discharging circuits.

The company adds that in aerial work platform operations, its three terminal configuration uses dedicated contactors for each path. If the BMS

detects an overvoltage or fault, it immediately opens the charge contactor while keeping the discharge contactor closed, ensuring the operator maintains control over all of the drive and lift controls.

"High capacitance loads, such as motor controllers, require pre-charging to prevent contactor welding. The three terminal architecture allows the BMS to run a precise pre-charge circuit exclusively on the discharge path, without affecting the charging side. By separating the paths, the wear from frequent switching is distributed across two independent components. Furthermore, it simplifies diagnostics, allowing fleet managers to instantly distinguish between a charger fault and an equipment load issue, significantly reducing troubleshooting downtime."

**WHY DOES IT MATTER?**

In the rental and construction sectors, where safety ratings and high utilisation are the lifeblood of the business, the three terminal architecture is said to offer two major benefits:

- Zero Unplanned 'Stranding': It guarantees that the operator can always navigate the machine to safety, regardless of charging-side anomalies.
- Component Protection: Precise control over inrush currents protects expensive motor controllers and inverters.

It also, according to the company, elevates the industrial battery from a simple energy container to an active safety management system to deliver the most reliable and safest motive power solutions.

**REAL WORLD BATTERY ADVICE**

Although lithium battery technology might be seen to be hogging the limelight, traditional



BSLBATT 80V 615Ah lithium Ground Support Equipment battery

lead acid batteries still have a place in the aerial work platform market. Veloris - Europe's largest battery distributor, which rebranded from Ecobat following its recent sale to private equity firm Endless - says that lithium batteries do have clear benefits, such as longevity, they can be more deeply discharged and generally recharge more quickly. However, it says that purchasers should not overlook the key requirements of the application and then choose the most suitable technology, rather than simply opting for the latest technology.

Things to bear in mind include the initial cost, which is significantly higher for a lithium battery - sometimes by a factor of four, and while the lithium battery's lower weight is beneficial, with some equipment, the batteries on an aerial lift usually play a critical role as counterweight, the lack of weight is a distinct disadvantage.

When it comes to charging, it is likely that existing infrastructure will need to be upgraded to cope with the different charging parameters required by lithium batteries, which can also be costly. If equipment is stored or used outside, standard lithium batteries will not accept a charge if their temperature falls below zero degrees.

Another consideration is the environment, as many companies nowadays have policies that dictate carbon footprint or the percentage of waste needing to be recycled. In contrast to lead acid batteries, 99 percent of which can be completely recycled, lithium battery recycling is currently costly and environmentally challenging, all of which can add an additional back end cost. Although they do last longer of course.

Despite these negatives, for businesses with multi shift operations and high equipment usage, lithium is often the ideal solution. However, if the business faces budget limitations, runs single shift operations or the equipment is only used occasionally, or if it's old, perhaps nearing the end of its service life, then lead acid batteries are likely to be a far more cost effective solution or consider AGM batteries.





60 tonne XCMG XCA60-EV hybrid All Terrain crane

### DISCOVER'S NEW LITHIUM MOBILE PLATFORM

Canadian battery manufacturer Discover Battery, which supplies several large aerial work platform manufacturers with its Dry Cell AGM batteries, will launch a new lithium mobile platform and an improved lithium professional battery at Conexpo.

The Lithium Mobile battery DLM-16000-48V is a North American focused solution designed for high power mobile and industrial applications. Delivering 16kWh of energy at 51.2 volts with 314Ah capacity and charge/discharge capability up to 200A, the platform is engineered to support equipment requiring extended runtime and significant auxiliary power demand.

The DLM-16000-48V combines high energy density with stable voltage delivery under heavy loads, with integrated system intelligence through Discover Electronics and the Forge Battery Management System. The system incorporates advanced safety architecture, integrated heating capability and certified protection standards, including UL 9540, UL 9540A and UL 1973, along with an IP-65/NEMA 3R outdoor-rated enclosure designed for operation in harsh environmental conditions.

The solution is particularly suited for applications such as lighting towers, mobile power units and remote job site systems, where operators require reliable, maintenance free power together with predictable performance and simplified



deployment. According to Discover's internal analysis, the Lithium Mobile platform can achieve cost parity with AGM batteries in solar trailer applications while delivering efficiency, energy density and operational advantages associated with lithium technology. ■



Discover Battery is to launch a new lithium mobile platform



Discovers improved lithium professional battery

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