



THINK SUSTAINABILITY

Sustainability is the practice of using resources in a way that can be maintained over time without depleting them. In action, sustainability might be Google Maps providing fuel efficient routes or alternative transportation options such as public transport, cycling or walking. Even simpler is avoiding the use of plastic bags to keep the oceans clean or installing solar panels.

In the lifting related market almost every company is working towards some form of sustainability, perhaps by reducing CO2 and diesel usage by using batteries, HVO or hydrogen powered machines or by specifying battery storage units to power tower cranes, mastclimbers and hoists.

While governments and the world's car manufacturers have dragged developed markets into Electric Vehicles, most consumers are still unsure of the long term benefits of battery power. Many question the true 'green' credentials of production and how the energy to charge them is produced. Most however agree that battery power is the best current solution for powering small to medium equipment - but the sheer physical size and the weight of the batteries rule them out as sole power sources for larger mobile machines. Because of this many 'experts' agree that diesel combustion engines will continue to be used on larger machines for well into the foreseeable future.

BATTERY SUCCESS

One of the big success stories over the past few years for tower cranes, mastclimbers and hoists has been the growth of flywheel technology and battery energy storage systems. UK construction group Bowmer + Kirkland was one of the first construction companies to recognise the potential for using the flywheel technology developed by Punch Flybrid - now renamed Dumarey Green Power. The technology significantly reduces the size of generator needed to power a tower crane or mastclimber by eliminating the need to allow for the high power spikes required for lift off or high speed heavy lifts, providing enormous fuel and emissions

savings. With diesel prices rising the company saved almost £130,000 in fuel and 106 tonnes of CO2 on just one site.

Since then, many other users of tower cranes have started adopting this technology, while other companies have launched huge battery energy storage systems which not only power the lifting equipment, but also the site offices and welfare units. As well as massively reducing CO2 emissions and fuel costs they can be independent of the national power grid, allowing for a quicker and more cost effective connection. This type of energy storage system only requires a trickle charge during use and can be supplemented with solar panels.

NO MORE DIESEL

One UK tower crane rental company - Falcon Cranes - is now offering an energy storage system to power its cranes and equipment. The Northvolt Voltpack system is made up of a modular battery providing between 281kWh and 1,405kWh of power, storing energy in its batteries from an AC mains outlet or renewable sources, such as solar panels or wind turbines. Recharging can be carried out overnight or the unit can be left plugged into an AC outlet to keep it topped up. Depending on the size of the pack, the batteries can be fully recharged from empty in around four hours on a 125 amp outlet.

Andy Brown of Falcon said: "The Northvolt Voltpack battery system is just one step on Falcon's path to using diesel free power. With the arrival of a number of Stage V diesel generators, new start/stop technology for use in tower cranes and the Punch Flybrid system, we are committed to reducing and eventually removing diesel altogether when renting tower cranes."



The Northvolt Voltpack



HYDROGEN

One growing possible alternative to batteries is hydrogen power with many companies currently developing power units. In 2021 JCB unveiled a hydrogen powered telehandler coupled with a £100 million investment in hydrogen.

A year later Haulotte and Bouygues Energies & Services announced a partnership to develop a practical hydrogen power source for aerial work platforms with Bouygues carrying out live real world tests on several of its construction sites using a Haulotte platform equipped with a hydrogen fuel cell system. It also studied the hydrogen supply system looking to confirm the technical feasibility of using hydrogen technology in the construction sector. Less than a year later Haulotte exhibited a prototype of the hydrogen



fuel cell system. The unit - an all-electric Pulseo HS 18 Pro Rough Terrain scissor lift - was equipped with a prototype of the removable and interchangeable Range Extender generator, operating with a Bouygues Hyvision hydrogen fuel cell system.

Last year Speedy Hire in the UK placed an order for around 100 Niftylift NR17 H2 hydrogen electric articulated boom lifts. The lifts are based on Nifty's standard all-electric, two wheel drive boom lifts with direct electric wheel motor drive and AGM maintenance free batteries - with a lithium-ion battery option. The H2 models are equipped with a compact hydrogen fuel cell, fed by a standard G20 hydrogen gas cylinder which produces electricity to top up the battery pack when necessary.

Hydrogen internal combustion engines are now being introduced by the major engine manufacturers. Deutz recently unveiled its latest sustainable drive technologies including its six cylinder 200kW TCG 7.8 H2 hydrogen combustion engine certified by the German Motor Transport Authority. The engine is already being used in hydrogen generators which Deutz is supplying to China.



The TCG 7.8 H2 is DEUTZ's first ready for the market hydrogen engine

HYDROGEN FUEL CELL TRIAL

In the UK, Sunbelt Rentals, Balfour Beatty and the Environment Agency joined forces to conduct a four week hydrogen fuel cell trial as part of the Canvey Island Southern Shoreline Revetment project - designed to renew and improve three kilometres of shoreline flood defences. The team chose eco-friendly technologies such as EcoSense welfare cabins, energy management systems, battery storage units, solar frames and rainwater harvesting systems along with fuel cell generators. The hydrogen generator - supplied by Sunbelt Rentals in partnership with EODev



A new crane filling up with HVO fuel at Liebherr's Echingen plant

and Hydrologiq - delivered 24/7 silent power throughout the duration of the test.

Aran Bates of Hydrologiq, said: "As consensus grows that hydrogen plays a key role in removing diesel from construction sites, the key to its acceptance lies in seamless integration. We need collaboration across the entire supply chain, ensuring that the physical, digital, process and regulatory pieces all come together to unlock the true potential of this fuel source."

Over the course of the four week trial, the site consumed 202.5kg of green hydrogen, which produced 3,310 kWh of energy with an average generator efficiency of 49 percent. This resulted in a reduction of 4.3 tonnes of CO2 emissions, eliminating the direct scope 1 emissions associated with powering the compound.

LIFTING WITH HVO

Liebherr was one of the first crane manufacturers to introduce and begin using pure Hydrogenated Vegetable Oils (HVO) fuels produced with renewable energy that complied with EN 15940. In 2021 all Liebherr engines up to the 560kW were approved for operation with modern HVO fuel which is manufactured from vegetable and animal oil and fat waste from the food industry, converted into hydrocarbons by adding hydrogen, resulting in engines that are essentially CO2 neutral. HVO fuel is now used during testing and for the initial fuelling of cranes prior to delivery.

A short while later UK rental company Cadman Cranes announced it had converted half its fleet to HVO fuels and was in the process of converting the whole fleet. As well as reducing its carbon footprint by 72 percent, Cadman said that it has managed the switch without changes to its infrastructure or any capital expenditure. Other benefits included being 100 percent



The Cadman Cranes fleet runs on HVO fuels

biodegradable, being able to mix with existing diesel and offering a storage life of up to 10 years.

More recently Sarens is just one of many crane companies looking to reduce emissions and noise pollution as it develops greener fleets. After building its first 'green' SGC-90 Mega crane and the heavy luffing tower cranes the company is also investing in hybrid cranes and most recently the E-Pack for telescopic cranes. The SGC-90 motor control system not only runs on electricity, but also puts electricity back into the grid during operation.

To protect marine ecosystems Sarens is switching to biodegradable hydraulic oil on its entire marine barge fleet, while ballasting systems are being converted to use Biohydran TMP hydraulic fluid, which contains none of the harmful zinc used in commercial hydraulic oils. At its headquarters in Belgium, it now boasts more than 3,000 solar panels.

TAKING AN ACTIVE PART

Another company based in Belgium, TVH, has a truly global presence and is actively advancing a sustainable environment in all of its facilities. At its headquarters for the Americas in Olathe, Kansas City it has been promoting sustainability both internally and externally.

The company says that switching to biodegradable cups and utensils is just a small step in its waste reduction programme for everyday items. LED lights have helped reduce energy consumption, while car charging points have been installed in the parking lot in a bid to promote the use of electric vehicles.

Another sustainability initiative is the company's remanufactured parts programme, which restores used parts to an 'as new' condition, reducing waste and providing customers with sustainable options. From engines to electronics, various parts can be remanufactured offering customers alternatives to new parts, at the same time encouraging customers to send in any replaced parts on a service exchange type basis.



AMPD storage system



Haulotte's new packaging for spare parts