

# Show Report

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## CONEXPO 2023



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As part of our ongoing effort to collect industry intelligence and information on new products, analysts from Power Systems Research regularly attend major trade shows around the world. We share our findings with you in these Show Reports.

## CONEXPO 2023 Features Hydrogen and Electric Equipment

*PSR Team Report*

Walking CONEXPO 2023, the giant international construction show in Las Vegas this month, it was obvious that OEMs are devoting huge resources to developing alternative power sources for their compact equipment.

Hydrogen powered units and battery packs were common and new products powered by alternative energy sources were popular with attendees. New technology was the name of the game at this year's show.

However, there were several prototypes that were built only for the show, according to some exhibitors, and were not likely to be put into mass production anytime soon. In fact, one manufacturer told us, "This was manufactured for the purpose of the exhibition and is not intended for mass production."



Major new technology-related exhibits that we saw include:

- **REMOTE CONTROLLED** systems. A driver's unit consisting of a seat, monitor, joystick, etc., and an Internet connection to operate a remote dozer or excavator.
- **BATTERY-POWERED** construction equipment (mostly mini-excavators).
- **FUEL CELL** powered trucks (Volvo Construction Equipment) and engines (HDI, Kubota, and others.)

CONEXPO 2023 sprawled across three million square feet—that's equivalent to about 50 football fields—making room for more than 2,400 exhibitors, according to show managers. Officials said more than 139,000 individuals visited the five day show, which ran March 14-18.

We focused our attention on the new products powered by hydrogen and batteries, and we came away impressed with several new items. Here are just three examples.

- **Bobcat T7X Electric Compact Loader.** This unit delivers all the functionality of its traditional diesel

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counterparts but offers the advantage of using 50% fewer components, which translates to fewer parts to replace over the lifetime of the machine.

Additionally, there are 96% less fluids used on the T7X relative to similar diesel compact loaders. Bobcat has achieved this fluid reduction by eliminating the need for a hydraulic reservoir and hydraulically actuated cylinders and attachments. Instead, the machine uses all electric driven means of actuation. The elimination of these types of fluids means less time maintaining and preventing leaks over the machine lifetime.

A typical battery charge cycle results in 4-5 hours of operating time for the T7X. The T7X was originally introduced at CONEXPO 2020 but that was merely an early prototype. The current version on display at the CONEXPO 2023 is the production version.

An exclusive rental agreement was reached in

September 2022 making Sunbelt Rentals the primary channel for rental users to take advantage of the innovative design features Bobcat has integrated into these compact loaders traditionally been dominated by diesel.

The T7X offers customers a chance to reduce their carbon footprint and is ideal for jobs in areas that require zero emissions as well as indoor and night operations where noise is a major consideration.

At this time, the Bobcat T7X appears to fill a niche role in the overall market of compact loaders. As more experience is gained with this technology it appears to be a good example of how end-users may adapt to innovation and build upon their experiences. End-users will likely continue to gain more confidence and “buy-in” of the advantages offered by an all-electric when evaluating machine lifetime and total costs of ownership for diesel vs. battery-electric.



- **JCB.** Perhaps one of the most advanced new products was that offered by JCB with the display of its hydrogen internal combustion engine (HICE).

At the show, JCB took the wraps off its new hydrogen combustion engine, the company's zero-carbon emissions solution for construction and agricultural equipment.

Initially, JCB had designed an excavator that used a hydrogen fuel cell. But after extensive testing, JCB decided fuel cell technology was not the best option for their customers at this time, and they decided to move toward a hydrogen internal combustion engine solution.

Now, JCB is investing \$US 120 million (£100 million) to produce super-efficient hydrogen engines and has showcased working prototypes of a backhoe loader and telescopic handler powered by hydrogen.

They also have announced another industry first – a mobile hydrogen refueller, providing a quick and easy way for customers to refuel machines on site. About 97% of construction machines have fuel delivered

to them on site, and customers are used to using transportable fuel, which allows refueling onsite in minutes.

JCB also has a range of compact electric-powered vehicles, including the 525-60E Loadall telehandler and the 19C-1E mini excavator. In July 2020, JCB released the construction industry's first hydrogen powered excavator, the 20 ton 220X.

JCB has developed a diversified approach to its product offerings, one that uses multiple forms of alternative fuel and one that helps achieve carbon-neutral goals. Currently, the most important and most mature alternative is hydrogen.

- **DEVELON**—formerly called **Hyundai Doosan Infracore (HDI) Construction Equipment** -- demonstrated two autonomous vehicles. The upgraded Concept-X2 fully automated remote controlled construction equipment uses state-of-the-art information and communications technology. The CX225 crawler excavator and CX100 dozer feature cableless designs, autonomous driving and blade control.



Develon claims the Concept-X2 could optimize future construction sites through increased productivity, and reduced costs and risks. Here are some details:

<https://bit.ly/3ylxeL1>.

**SUMMARY.** Many of the battery-powered construction equipment units on display at ConExpo were mini-excavator prototypes, and many companies said they did not have immediate plans for mass production, but several noted it was under consideration.

Specifications for many units did not seem to allow the machine to replace a conventional diesel engine. In particular, the short operating time for many units is a major disadvantage for users.

In some off-road locations where it is difficult to receive power from the grid, diesel engine-driven generators are brought in to operate electric construction equipment. This is a complete reversal from the perspective of reducing emissions, and simply adds to the hassle.

Although electrification as a major trend certainly seems to exist, the question of how it should be implemented

in the construction machinery segment is still at the trial and error stage for many OEMs, dealers, and users.

It seems unlikely that electrification of construction equipment will proceed as quickly as it has in the case of automobiles but new product introduction and prototypes, as displayed at CONEXPO 2023, are an important step in the process to familiarize and acclimate the industry to these new technologies. Europe is more likely to move in that direction in a straight line, but what will happen in North America, Asia, and other regions remains to be seen.

At this stage, it seems that digital technologies, such as such as automated driving and land scanning and analysis, are capable of having the greatest impact on improving efficiency in construction operations for the short term.

While these digital technologies continue to improve efficiencies, the uptake of alternative energy sources will progress at a slower pace in cadence with industry acceptance. **PSR**



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## About Power Systems Research

Power Systems Research (PSR), established in 1976, is the leading source of data, analysis and forecasting on the global production of engines and engine-powered equipment, including class 8 vehicles. One of its databases, EnginLink™ includes production figures down to the model level for OEMs in key market segments, such as commercial vehicles. PSR's global research network includes eight offices and stretches across 200 countries and four continents.



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