CASE Construction Equipment unveils the world's first methane-powered construction vehicle at bauma 2019

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CASE creates a breakthrough in sustainable construction as it reveals the world's first wheel loader which runs entirely on alternative and renewable fuel.

ProjectTETRA, CASE's methane-powered wheel loader concept, demonstrates a clear pathway to a renewable future for construction equipment, shifting away from a reliance on the traditional diesel engine and addressing one of the world's most pressing issues – environmental sustainability – with a pragmatic solution for the construction industry.

PRESS RELEASE

Achieving the virtuous cycle

ProjectTETRA reimagines wheel loader design, marking a clear departure from anything seen in construction equipment to date.

The concept includes a methane-powered engine, specially designed and developed by sister brand FPT Industrial for construction applications. With a maximum 230hp, it delivers the same power and torque as its equivalent diesel engine found in the CASE 821G wheel loader.

It's powered by biomethane which is produced in biodigesters from waste products such as waste food, wood chippings and animal waste. With carbon-neutral production, biomethane provides a closed-loop, virtuous energy cycle, converting waste into useful energy.

"We've been researching sustainable fuel sources for our construction machinery for many years," explains Carl Gustaf Goränsson, President of Construction. "Biomethane was the most logical choice for the wheel loader. We needed a fuel that could provide the drive and power that our customers demand. The fuel needed to be readily available, easy to refuel and power through a full day of work. We wouldn't comprise on performance, so we set our designers quite a challenge.

"We were fortunate to work very closely with sister brand FPT Industrial, pioneers in developing sustainably-fuelled powertrains, with over 40,000 gas-powered engines produced to date. This technology is already tried and tested in other CNH Industrial brands as there are some 28,000 methane-powered IVECO trucks and IVECO BUS vehicles on the roads today."

ProjectTETRA not only uses a sustainable energy source but also benefits the environment in other ways. The methane-powered wheel loader concept produces 95% less CO_2 when running on biomethane, 90% less nitrogen dioxides and 99% lower particulate matter than a diesel-powered equivalent. It delivers an 80% reduction in overall emissions and also achieves a 50% reduction in drive-by noise levels.

Powered on the job

"We don't believe in developing technology for technology's sake," continues Goränsson. "Our innovations must solve real-world challenges in a simple and straightforward way. ProjectTETRA is suited to do so in common job sites; agricultural environments, waste handling centres and recycling businesses are perfect locations for a biogas production plant, providing a free source of fuel for the machines working on site."

"But biomethane isn't the only option," explains Goränsson. "ProjectTETRA will run on network methane too, providing access to lower emissions than diesel, even if onsite biomethane production is not an option. This is important as we see changing regulations in some regions."

Innovative design with the operator at the centre

Although sustainability was a huge factor in ProjectTETRA's definition, the design team wanted to showcase the very best of CASE's practical innovation, with the focus firmly on the operator and productivity.

"Automation and digitisation were key drivers in our design process," reveals David Wilkie, Director of the CNH Industrial Design Centre. "We are a future-focused business, and these are two of our key strategic pillars. These elements are the drivers for safer and more productive machines. ProjectTETRA was a blank sheet so we could be as creative as possible in including the very latest technologies that matter."

A cab with a winning combination of safety and comfort

ProjectTETRA's cab features wraparound glazing and a high visibility roof panel, increasing the total glazed area by 16% when compared to a standard wheel loader.

All-around visibility is achieved with the use of viewing cameras instead of wing mirrors. These are automatically linked to the direction of the machine and viewed on the A-pillar mounted displays.

The uncluttered design means all controls are accessed through ergonomic joysticks and an integrated, armrest-mounted, colour touchscreen monitor, which adds to the feeling of space and a panoramic view.

The new cosseting seat automatically extends and pivots to facilitate entry upon door opening, returning to the operating position immediately after the operator is seated, which is an industry first.

With lumbar support, weight-compensated suspension and active heating and cooling systems it ensures operator comfort throughout the working shift, reducing operator fatigue.

A partnership in conceptual design

An exclusive partnership with Michelin led to the development of innovative airless concept tyres for ProjectTETRA. Constructed from pure rubber and a patented composite material in a honeycomb spoke design, the tyre/wheel fusion also features built-in suspension.

The lightweight and robust structure has been designed to withstand the extreme conditions present in construction environments. In addition, the airless tyres reduce overall machine weight and a large footprint delivers low contact pressure. Advanced connectivity is achieved with integrated sensors, providing a

stream of real-time data to both the operator and the control room. When active, the integrated sidewall lights are illuminated and also function as an additional safety feature.

Unrivalled control

ProjectTETRA can be controlled at the touch of a button through the armrest-mounted operating hub. Operators can access all key operating parameters and functionality including:

- Face scan to activate start-up sequence
- Bucket load-fill assist screen which displays target load, current bucket load and remaining load
- Jobsite map, which tracks incoming trucks, indicates the fastest route to the selected work area and displays general site information
- Weather screens showing real-time weather reports
- Lighting parameters, Bluetooth telephone, heating and ventilation and music controls
- Access to secondary machine parameters, machine settings and additional submenus

The operator can also swipe the operating screen to the A-pillar screens. The A-pillar screens contain further machine monitoring details and 'at a glance' performance indicators:

- Feeds from all viewing cameras
- Operating parameters including machine speed, engine speed, fuel level, engine and oil temperature, selected gear, engine hours and time

All machine data is automatically communicated to the control centre, allowing for on-the-job updates and optimisation to increase machine efficiency.

Safety first design

ProjectTETRA employs the latest biometric technology to ensure the safety and comfort of the operator. Before the operator reaches the machine, it is ready for operation. Remote retinal scanning, accessed through any mobile device, activates heating and cooling to adjust the cab to the optimal operating temperature.

Biometric facial recognition technology is integrated into the access and start-up sequences to ensure that only fully-qualified operators have access to the machine.

As a demonstration of CASE's development into autonomous technology, ProjectTETRA includes integrated obstacle detection technology, alerting the driver to any possible hazards on site.

Furthermore, this concept is compatible with the complete range of buckets and was fitted with high-tip and quarry versions from Leonardi Benne during the initial testing activities.

Combining CASE's heritage with its innovative future

"The most striking thing about ProjectTETRA is its design. It expands the pre-conceived conception of what a wheel loader should look like," explains Wilkie. "We took inspiration from our emblem, the American

Bald Eagle. You'll see bird-like features within the design, from the integrated cab wings and the commanding stance of the eagle's head and beak within the rear engine cover.

"As the name suggests," Wilkie continues, "ProjectTETRA contains elements relating to the structure of methane too. The tetrahedral structure of the methane molecule is expressed in the name but also in the design. And we have finished the machine in our custom-made metallic fleck CASE power-tan paint finish. A nod to the heritage of our brand but with a strong link to our innovative and sustainable future."

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