

"As this truck goes down the road the only thing coming out of it will be water droplets"

Trevor Milton

lectric revolution

Last year, *Transport Engineer* revealed ambitious plans for the futuristic, all-American, all-electric Nikola One tractor. The latest zero-emission prototype has now broken cover. Brian Weatherley reports

Trevor Milton, founder and CEO of US-based Nikola Motor Company, wants to transform trucking. And with the unveiling of his first prototype Nikola One all-electric long-haul tractor – which boasts an impressive 1,000bhp and 2,700Nm (even higher with gear reduction), plus a wind-cheating aerodynamic cab – NMC has taken the first step towards that goal.

The sleek Nikola One has already undergone major changes since the concept was first revealed last year (*TE* August 2016). Its 320kW/h lithium-ion battery pack was originally to have been charged by a generator driven by a 400kW gas turbine, fuelled by CNG (compressed natural gas) – making it effectively a range-extender hybrid.

However, for the North American market that drivetrain has now been replaced by a hydrogen-electric 800V fuel-cell that directly charges the tractor's batteries. These, in turn, provide the power for electric wheel motors. Regenerative braking is also employed.

HYDROGEN DRIVE

Storage tanks mounted behind the sleeper cab hold 100kg of compressed (5,000 psi) hydrogen – enough, says NMC, to deliver a range of 1,200 miles. Milton says the original CNG drivetrain will still be available for countries where hydrogen is not readily available.

Why the shift to H₂? NMC says it wanted its tractor to be both zero emission and ultra-quiet. "As this truck goes down the road the only thing coming out of it will be water droplets,"



insists Milton. "And everyone around the world will be cheering for that."

To support its Nikola One (sleeper) and Nikola Two (day cab) fuel-cell tractors, NMC plans to build 364 hydrogen filling stations across the US and Canada, with construction starting in 2019. The firm will also develop a chain of its own 100MW solar farms.

Incidentally, among the many innovations planned for this all-electric tractor is a system called Nikola Shipments, whereby freight brokers can upload information on available loads to the truck's large dashboard display. The driver is then given a choice of routes to the load – including the most cost-effective within a given timescale.

Making Nikola tractors in sufficient numbers will clearly take time. The first 5,000 will be assembled by the Fitzgerald

Corporation, based in Tennessee. Nikola has also entered into a service and maintenance agreement with Ryder Systems, which will provide back-up through 800 sites across the US.

To help persuade customers to embrace its revolutionary trucks, NMC is offering an attractive leasing package that includes unlimited hydrogen fuel, warranty cover and scheduled maintenance during a 72-month term. And according to Milton, NMC now has more than \$4bn in pre-orders.

Meanwhile, the first prototype – a 6x6 although most are expected to order 6x4s – was unveiled wearing the livery of US Xpress, the third largest privately-owned carrier in the US, with 8,000 trucks and 22,000 trailers. US Xpress CEO Max Fuller provided feedback on the first Nikola One design ahead of launch. 