

F1 Tech Is About to Make Buses Way More Efficient



Buses operated by The Go-Ahead Group are being fitted with a fuel-saving system developed for F1 cars.

The Go-Ahead Group

The same technology that helped Audi's amazing R18 e-tron Quattro race car win the grueling 24 Hours of Le Mans will make buses throughout England a lot more fuel efficient.

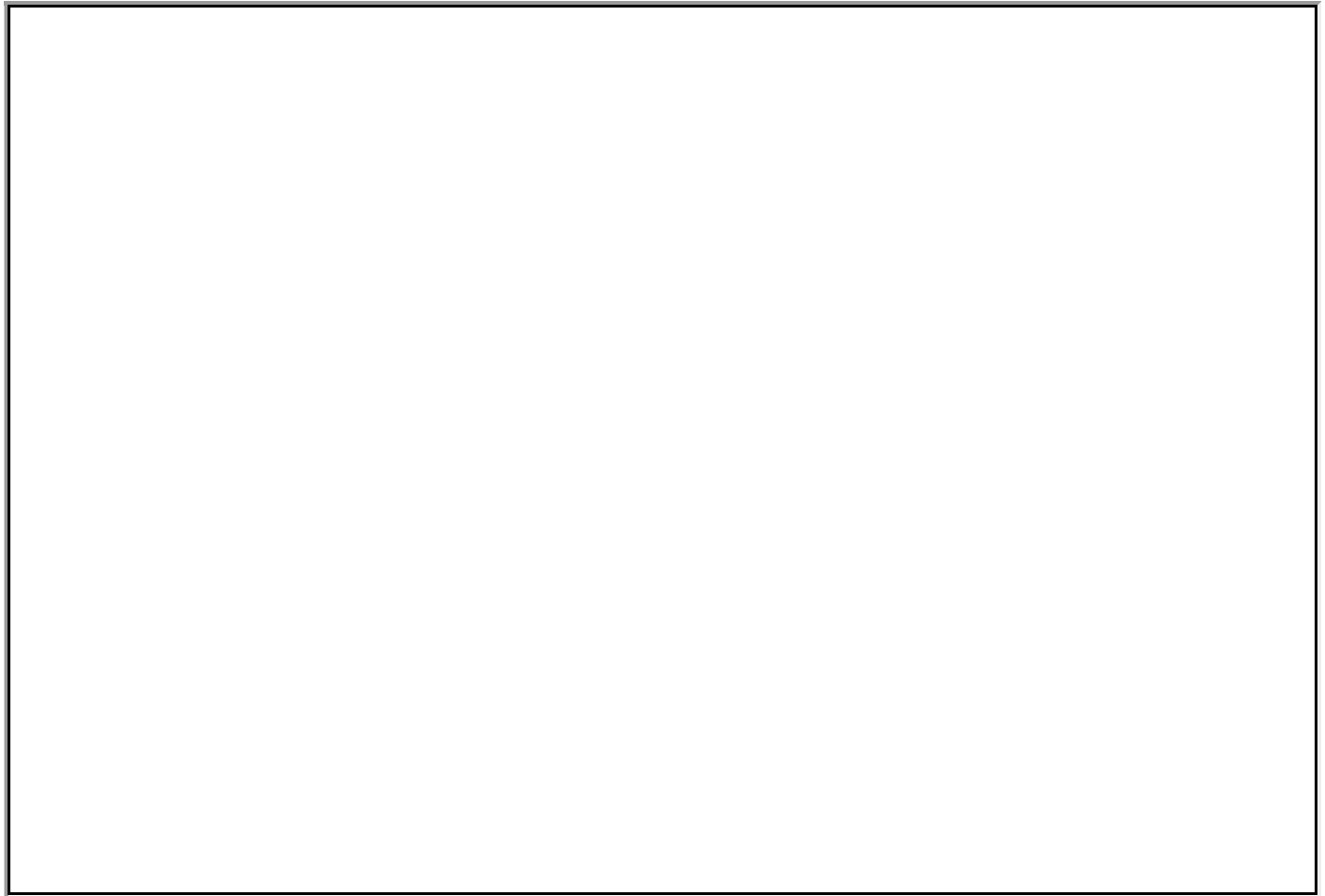
The GKN Hybrid Power Gyrodrive is an electric flywheel that captures energy as the car brakes, then uses it to drive an electric motor that boosts power and cuts fuel consumption. It was developed by Williams Hybrid Power, a division of the company that owns the Williams Formula 1 team. Williams first used it on its F1 cars and supplied it to other manufacturers. It has been used in the Audi R18 and [Porsche 911 GT3 R Hybrid](#), for example.

In April, Williams sold the technology (and the team that developed it) to British automotive and aerospace conglomerate GKN for about \$13.5 million

and a cut of sales. Now it's up to the 55-man team at GKN Hybrid Power to get the system onto the mass market and let English bus drivers enjoy the added performance racing drivers have been enjoying for years.

Gyrodrive, known officially by the thoroughly boring name Mk4 eFES, is a kinetic energy recovery system. Such systems capture energy usually lost as heat during braking and use it to power an electric motor.

In many cases, that energy is stored in a battery. GKN's approach is a bit different. When the driver hits the brakes, a traction motor on the axle generates electricity while slowing the vehicle, augmenting the brakes. That energy is stored in a carbon-fiber flywheel, a [spinning mechanical device that stores energy as momentum](#). The wheel operates in a vacuum to reduce friction, and can rotate up to 36,000 times a minute. When the driver gets on the gas, the system taps that spinning flywheel to send as much as 120 kilowatts back to the traction motor, helping acceleration.



As [well as it works on race cars](#), the Gyrodrive really gets useful when installed on city buses. The heavy vehicles that spend all their time in traffic, stopping and starting, making for lots of opportunities to gather and then deploy energy. That's why GKN is working with the Go-Ahead Group, a public transit provider in the U.K. The collaboration started with trials on several buses about a year ago.

Regenerative braking systems can make acceleration and braking jerkier. But Gordon Day, the general manager of GKN Hybrid, says drivers who tested Gyrodrive enjoyed the improved acceleration, though not all of them noticed much difference. It's worth noting GKN tuned the system to work with a bus, so it's not going to provide quite the same kick as the system Audi used at Le Mans.

The GKN Gyrodrive Flywheel is about the size of a passenger car wheel.

GKN Hybrid Power

If the drivers didn't always see an improvement, the beancounters surely will. Gyrodrive-equipped buses saw a whopping 20 percent bump in fuel efficiency, more than enough to convince GKN and Go-Ahead to install the system on 500 buses over the next two years, starting in London and Oxford. The system, which weighs 130 pounds and is roughly the size of a passenger car wheel, can be retrofitted onto a bus in a few days.

Day would not reveal how much GKN is charging for the system, but says the fuel savings will make up for the cost in three years. Given that buses tend to stay in service for at least a decade, the investment seems well worth it.

Buses are just the beginning. Gyrodrive can be installed on other big vehicles, such as garbage trucks, which are well-suited to the technology because they make frequent stops. Day says GKN is also looking at rail vehicles, possibly using bigger or multiple flywheels to account for the jump in size.

So the next time you get annoyed at your bus driver for acting like he's on a racetrack, you won't be too far off the mark.