



ON TRACK FOR  
A SUSTAINABLE FUTURE

## Freight Team Trial Sustainable Solid Oxide Fuel Cell Technology



**Colas Rail UK's Freight Business has collaborated with G-Volution Ltd to decarbonise locomotive operations by using solid oxide fuel cells (SOFC) running on near net zero carbon emission Bio Liquefied Petroleum Gas (Bio LPG) to generate power for auxiliary load.**

With the majority of locomotives heavily reliant on diesel and a major source of our carbon emissions, Colas Rail UK were approached by G-Volution to partner with them on a project to install a SOFC into a Class 37 locomotive to power the auxiliary systems.

This proof of concept was successfully showcased at our Rugby Depot on the 21<sup>st</sup> September where over 40 delegates witnessed a demonstration of the innovation of the SOFC providing power for the exterior and interior lighting of our 37254 locomotive.

Route simulations by the University of Birmingham using a 35kW SOFC show that for a typical Class 37 operation using two locomotives will save on average 50 tonnes (12%) of CO<sub>2</sub>e per annum and combined with an average 8% reduction in fuel costs.

Other benefits brought by this approach are improved air quality (zero particulate matter and nitrogen oxides are produced by the SOFC) and significant reduction in noise and engine idling.

Speaking about the success of the trial, Paul Conway, our Head of Engineering and Compliance said "Innovation with a focus on decarbonisation is essential given the challenge to reduce dependency on fossil fuel. This trial has proven that a lower carbon option is available for auxiliary power generation. It's still early days for this technology but it's an excellent start and something that Colas Rail Services have been proud to be a part of".

**Colas Rail Limited.**

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**What is SOFC?**

SOFC's are fuel flexible and process Bio-fuels such as Bio-LPG, Bio-LNG and hydrogen and generate electricity.

**Who is involved in this collaboration?**

The SOFC project funded by the Department for Transport's Innovate UK First of a Kind competition, the main project contributors were as follows:

- G-Volution – Project Lead and Engineering Lead
- Colas Rail UK – Class 37 Operator
- Aegis Engineering Systems – Standards and Approvals Consultant
- Adelan Ltd – SOFC Supplier
- DG8 (An Equans Company) – PoC Integration Design
- Pragmatex – Project Management
- SBL Rail – Systems Engineering
- Tully Engineering Limited – Emissions Measurement
- University of Birmingham – Engineering Support and Modelling