

CASE STUDY

THE ROAD TO ZERO FREIGHT EMISSIONS

DECARBONISING THE UK FREIGHT SECTOR WITH CLEAN HEAVY GOODS VEHICLES (HGV)

As part of the UK Government's efforts to reach net zero-carbon emissions by 2050, [the UK Energy Research Centre \(UKERC\)](#) identified [Energy Systems Catapult](#) (ESC) and [Advanced Propulsion Centre UK](#) (APC) as strong candidates for a collaborative project combining Whole System analysis and Transport expertise.

Following a workshop we identified the UK Road Freight sector as an under-researched topic that would later become the focal point of The Road to Zero Freight Emissions project. This explored different pathways for reducing freight emissions with a specific focus on Heavy Goods Vehicles (HGVs).

The Innovation

The crux of the project centred around a series of brainstorming workshops (overseen and delivered by APC) to collect insights from a range of stakeholders and operators in the UK freight sector.

As more and more operators appreciate the necessity to adopt alternative energy supplies across vehicle fleets, their engagement in the workshops revealed that existing modelling tools were not sufficient to address the specific requirements of the industry. The complexities and intricacies of the freight sector meant we needed a highly adaptable and flexible modelling tool to accurately represent operating profiles and the operators' willingness to adopt new powertrain technologies.

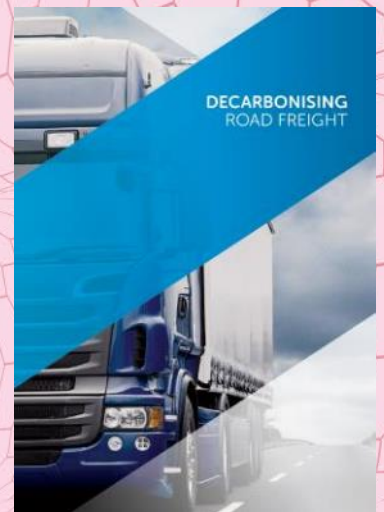


ABOUT US

Energy Systems Catapult was set up to accelerate the transformation of the UK's energy system and ensure UK businesses and consumers capture the opportunities of clean growth.

The catapult is an independent, not-for-profit centre of excellence that bridges the gap between industry, government, academia and research.

We take a whole system view of the energy sector, helping us to identify and address innovation priorities and market barriers to decarbonise the energy system at least cost.





The Challenge

The ultimate challenge was to develop an accurate and usable modelling tool that could provide evidence to encourage the UK transport sector to transition away from freight vehicles with high tailpipe emissions and embrace cleaner alternatives. Despite the pressing need to decarbonise road freight, there was very little momentum across the industry and a severe lack of workable prototypes or research to drive the technology forward at the time of starting the project.

ESC's collaboration with UKERC and APC challenged us to identify a clear and competitive pathway to success that would provide tangible advice and shine a light on unanswered questions to help policymakers implement appropriate legislation.

Impact

Following project completion, we've used the tool to engage with the UK Department of Transport and industry to explore how they could benefit from enhanced freight modelling to inform policy making.

Our key findings were as follows:

- Including operators' decision parameters and behaviours into modelling helped to better inform policy interventions and align operators' choice with the required deployment of technologies and infrastructure.
- There is still high uncertainty in the data as the majority of research is not demonstrated and commercial information is not publicly available.

Get in touch

To find out how we can help you, get in touch via email: info@es.catapult.org.uk.

For more information about this project, [click here](#).



The Solution

The workshops provided a qualitative view of the changes needed to decarbonise HGV fleets which we then converted into a number of modelling scenarios.

Adapting existing software from The Energy Technologies Institute (ETI) provided the foundations to develop a bespoke modelling tool that could compute a number of freight operation categories.

Instead of focusing solely on the weight of vehicles (like most existing models), we focused on the specific use cases of different HGVs (e.g. long-haul vs. local depot deliveries) to identify the technical specifications needed to achieve zero emissions and the infrastructure that will need to be in place to support the vehicle uptake. By linking the model to ESC's [Energy Systems Modelling Environment \(ESME\)](#) model, the impact from energy system decisions can also be assessed.

Next Steps

After completing the project, we were delighted by the usability of our model and decided to invest additional resources in the following year to make continuous improvements and develop additional functionality.

The project demonstrates the imminent need for stricter regulations on freight emissions to enable a fast and efficient transition to zero emissions by 2050. The coming years require transport authorities to assess how they can use policy decisions to support freight operators and ensure the necessary infrastructure is in place to facilitate carbon-free powertrains.

