

# C.A.G.E. CLEAN AIR GAS ENGINE

## Project summary Feb 2020



The Clean Air (W1) programme is led by NERC and the Met Office, with Innovate UK, EPSRC, ESRC, MRC, NPL & Defra as delivery partners.



# OAKTEC....WHO ARE WE?

Specialist in design and development of efficient, low emission gas engines. 7 years concentrated R&D into dedicated gas engine development.

Inventors of the Pulse-R engine technology ...now at late stage prototype

Focus on displacing diesel with equivalent small and medium ultra-clean gas engines

Currently developments;

- Bio-gas Pulse-R engines for sub Saharan Africa and Asia to power off grid communities
- Small gas generators for domestic construction sector to improve air quality
- Developing world class engines for LPG, CNG, biogas and hydrogen

# CAGE BROAD OBJECTIVES

To displace diesel engines with ultra low emission gas engines to power equipment in the construction and other sectors. Engines will target elimination of NOx emissions by using clever combustion strategies.

No customer penalty! To develop gas powered solutions that match the performance of incumbent technologies with lower or equivalent ownership costs and equivalent ease of use.

Focus on the range between 2kW and 56kW where there is a high demand and lack of competitive product. First CAGE engine will be a 25kW unit in a Sutton generator

To build a powerful consortium of stake holders to create a clear commercial path for our new gas engine technologies

Create world leading products that benefit customers, the environment and the UK businesses that produce and adopt the technologies.

# THE CAGE PROJECT

- Follows an invitation from Autocraft to develop the engine from one of their vehicle OEM customers engine range for non-automotive applications using gas fuels. The OEM was keen to support with free supply of engines
- The CAGE engine platform has state of the art automotive efficiency and emission reduction technologies.
- The project will focus on development of Stage V emission certified bio-LPG generators with class leading performance and air quality emission benefits
- Calor will support the project by deploying their latest fuel supply innovations to suit customer needs and supply bioLPG for demonstration in the project.
- Prototype systems will be trialled on HS2 rail construction sites managed by their Clean Air team.
- CAGE emission performance will be monitored in real time by Kings College London and compared to existing data for equivalent diesel engines. Predictions on air quality benefits will then be made assuming wide scale adoption.

# SUSTAINABILITY

- LPG and CNG the current solution. Equivalent performance to diesel and petrol but greatly reduced emissions from dedicated gas engine technology.
- Bio methane/BioLPG. Vast opportunities for growth from genuinely sustainable fuels
- Hydrogen. The zero carbon fuel for the long term future of the combustion engine.

**All engines being developed by OakTec and partners can use any of the above fuels with high efficiency and ultra low emissions without modification to engine hardware.**



LPG



Biogas



OakTec hydrogen engine

# *Pulse-R* Multi-Gas Engine

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