

Project title: PRISMA (Peak Reduction by Integrated Storage and Management of Air)

Main applicant: Innovatium

Technology developer: Innovatium

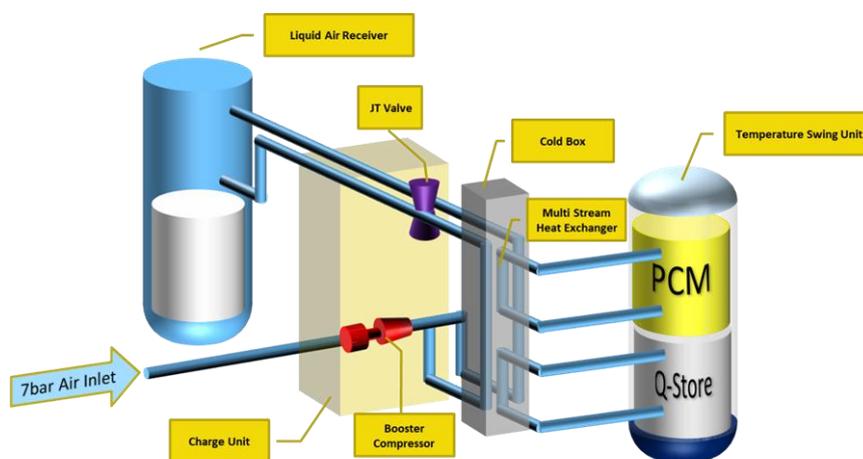
Industry partners: Aggregate Industries

Research partner: University of Birmingham

Demonstration capital cost: £632,971.43

Funding received: £387,566.58

Photo:



Project description:

The PRISMA (Peak Reduction by Integrated Storage and Management of Air) Technology uses a Liquid Air Energy Storage (LAES) plant that stores energy in the form of liquid air to provide on-site compressed air, allowing partially loaded variable-demand compressors to be turned-off rather than operate at a reduced efficiency. The technology allows for the use of a smaller, more efficient piston compressor. Additionally, there is the potential to make cost savings by transferring air production from higher to lower unit cost periods.

The system has been developed and patented by Innovatium with the University of Birmingham who are carrying out the development work in selecting, testing and optimising the phase change material (PCM) for the coolth stores, which forms a fundamental part of the cycle design and ensures the process' efficiency. The demonstration project will integrate a number of technologies along with the key development work on the coolth stores utilising the PCM. Deployment will be at Aggregate Industries' Bardon Hill quarry, where compressed air usage is varied and will allow the project to be demonstrated through a range of operational demands.

Barrier to market: The use of LAES within compressed air generation has not been developed and demonstrated. PRISMA combines a number of novel technologies into one process that requires a specialist knowledge of advanced machinery, thermal storage materials and heat exchange processes. This project is utilising a smaller but more efficient compressor with the innovative LAES

storage system, which is different to the current market approach of developing higher efficiency variable demand compressors.

Size of target market: The technology has wide applicability across all sectors utilising compressed air. Whilst the demonstrator is being applied to a system utilising on load - off load control, the technology could also be applied to sites utilising variable speed control, albeit with reduced savings.

Initial TRL: The project will cover multiple TRL's however the coolth store and associated PCM is at TRL 5.

Targeted final TRL: TRL 8

Estimated energy and carbon savings: The project provides efficiency savings through avoiding operating the compressors at partial load and reduced efficiency. The use of LAES also provides the ability to reduce operation of the compressors during higher tariff periods. Innovatium have estimated that electrical savings of around 47 per cent could be achieved utilising PRISMA, where a compressor has decreased efficiency operating part loaded at 50%. The decrease in efficiency comes from running off-design point and energy consumed during idling (usually around 35% of full load energy)

Why IEEA funding was important to this project:

Delivering a disruptive demonstrator product into an established market requires the concerted efforts of all collaborators. The funding has been instrumental in ensuring that the PRISMA energy efficient machinery is delivered to a major industrial site at Aggregate Industries as an improvement to their operational energy consumption that would normally have been viewed as non-essential.

Additionally, as part of the funding we have been provided business incubation support and have been able to provide market analysis, a go-to-market strategy that will underpin the scalability and roll-out of the PRISMA product that will realise the stated carbon reduction targets within the project.