



fcep

Future Combustion Engine Power Plant

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fcep sectors

Advanced combustion

Dynamic combustion phenomena measurements, theoretical analysis and modelling

Energy efficiency

Engine related technologies, heat recovery systems, power conversion

Emission control

Emission control technologies, main focus on NO_x, SO_x and particulate matter

Fuel flexibility

Bio fuels, alternative fuels

Intelligent automation and control

Optimized usage, operational cost reduction, energy efficiency, failure detection predictive maintenance

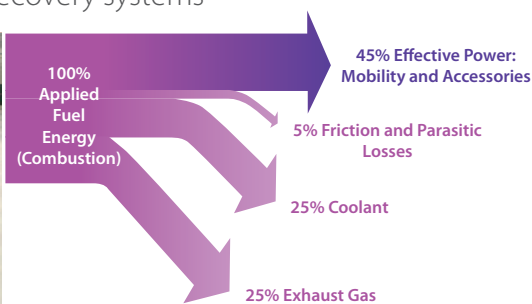
Strategic research environment

Research environment development to improve the efficiency, capabilities and standard of combustion engine research in Finland

Future Combustion Engine Power Plant: breakthrough emission reduction and better energy efficiency

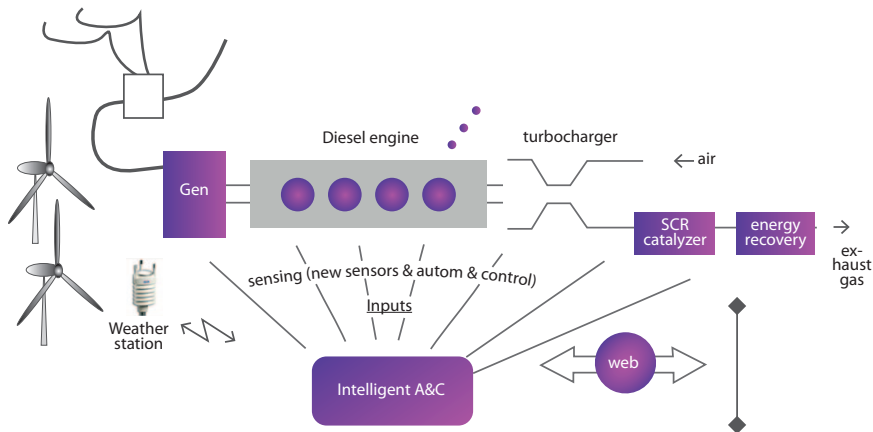
The Future Combustion Engine Power Plant (fcep) research program is focused on research topics and development efforts in reciprocating engine technologies and related power plant technologies. The key areas of research include improvements in the combustion process, energy efficiency, emissions reduction methods, heat recovery systems, and power conversion technologies. In addition, fuel flexibility and the use of renewable fuels are central research areas. The objective of the fcep research program is to ensure that the Finnish combustion engine industry can maintain its leading position in global markets.

Better efficiency from heat recovery systems



Energy efficiency target: Increased efficiency of combustion engine power plants by engine related methods, heat recovery systems and power conversion.

The future combustion engine power plant as part of a distributed energy system:
optimized usage by intelligent automation and control

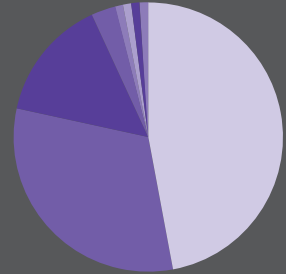


Future combustion engine power plant: A clean, energy efficient and flexible energy producer

The diesel engine is the leading power source for medium speed and heavy-duty high-speed applications, based on its high efficiency. Gas engines are becoming more popular in distributed energy generation, as they provide better performance compared to diesel engines, in many cases. Today, the global challenge over the whole energy field is to reduce greenhouse gas emissions to combat climate change. This can be achieved by increasing energy efficiency (energy savings), and by finding alternative and renewable options to replace conventional fossil energy sources. In this respect, the diesel engine provides a good starting point, with its potential to achieve significant improvements both in energy efficiency and emission reduction.

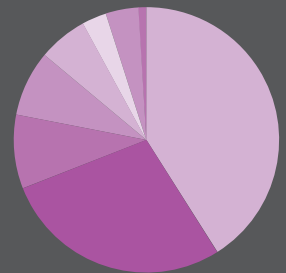
Volume on average 9 M€/a
for 2010-2013

fcep consortium members



Industrial partners 50%

Wärtsilä Finland Oy 48%,
AGCO SISU POWER Oy 32%, ABB Oy 15%,
Metso Power Oy 3%, Gasum Oy 1%,
Wapice Oy 1%, Ecocat Oy <1%,
Metso Automation Oy <1%



Research Partners 50%

VTT 41%, Aalto University 28%,
Tampere University of Technology 9%,
Lappeenranta University of Technology 8%,
University of Vaasa 6%,
Turku University of Applied Sciences 4%,
University of Oulu 3%, Mikes 1%.

About CLEEN

The fcep consortium is managed by CLEEN, the strategic research centre for the Energy and Environment Cluster. CLEEN Ltd was founded in 2008. The 44 shareholders are all major actors in the sector, with 28 corporate shareholders and 16 research institution or university shareholders.