Next-generation fuel cells are ready for low-emission electricity production

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VTT Technical Research Centre of Finland Ltd, under the INNO-SOFC project and in collaboration with Convion Ltd and Elcogen Ltd, is developing a new-generation, long-life fuel cell system offering efficiency higher than that of competing technologies. The project will result in new, energy-efficient and commercially viable applications.

Fuel cells are used to generate low-emission electricity and heat. Thus far, the adoption of such systems into widespread use has been hindered by their short service life and high price. These factors have been made the key development areas of the INNO-SOFC project, which was launched in September and is funded by the EU and managed by VTT. The target is set to double the service life and halve the cost of fuel cell systems. Such a competitive edge will enable the emergence of commercial applications.

VTT, in collaboration with Elcogen and other European partners and Convion, will develop a 50 kW fuel cell system that will have an efficiency of 60% for electricity production and a total efficiency of 85%. Elcogen will deliver the core of the system, the fuel cells. VTT will act as the project coordinator, supporting the R&D of the companies participating in the project and validating the service life of the system and the cells.

The new fuel cell system will generate normal alternating current and will be able to be used in several different applications. Fuel cells can be used to generate electricity and heat from methane produced by biomass

at wastewater treatment and biogas plants. In addition to biogas, the distribution of LNG (liquefied natural gas) will enable the use of fuel cell systems outside the current gas network.

Compared with competing systems, for example generators powered by a combustion engine, fuel cell systems exhibit a high efficiency level, low emissions, low noise and low vibration levels. Improved efficiency is especially pronounced in applications smaller than 1,000kW in power, in which fuel cells may exhibit an efficiency double that of competing technologies and produce CO2emissions that are correspondingly lower. Other emissions, such as particles, nitrogen oxides and noise, also remain at very low levels.

Other participants in this project, managed by VTT, include the Finnish corporate partners Convion Ltd and Elcogen Ltd, as well as Dutch Energy Matters, Italian ENEA, Dutch ElringKlinger AG and Forschungszentrum Jülich. Collaboration on such a large scale enables the value chain of the entire system to be optimised, serving the requirements set by the end-user.

"The companies participating in the project can expect to benefit from new competitive products and efficient value chains. Simultaneously, we are making a contribution to a growing European fuel cell industry. VTT coordinated the creation of the consortium. This project will also support R&D at Finnish companies and assist them in participating in the EU Horizon 2020 projects," says VTT Project Manager Olli Himanen.

Provided by VTT Technical Research Centre of Finland