Ongoing research on fuel cell powertrains

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Continuous depletion of the crude oil and gradual increase in the oil price have emphasized the need of a suitable alternative to our century-old oil-based economy. A clean and efficient power supply device based on a renewable energy source has to be available to face this issue. Among the different technological alternatives, fuel cell power generation becomes a more and more interesting and promising solution for both automotive industry and stationary power plants. However, many technological hurdles have still to be overcome before seeing the development of industrial and competitive products in these fields.

Among them and focusing on automotive applications, different issues must be solved regarding development of specific components (e.g. air compressors, high efficient power electronics, …), new on-line energy management strategies for fuel cell hybridized systems, efficient diagnostic and state-of-health estimation methodologies, able also to operate in real-time and with limited number of additional physical sensors. Moreover, regarding the increase of the durability and of the reliability of those powertrains, prognostic algorithms able to estimate the remaining useful lifetime of the fuel cell system under actual operating conditions are requested. The proposed presentation will provide a state-of-art on these different items.

Fig. 1: Mobypost vehicles – First fleet of FCV in France (FC powertrain integrated @ FCLAB / UTBM)

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