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Debate: Professor Hongming Xu

Do you agree that the future of fuel is in cleaner combustion?

Yes

Professor Hongming Xu

Research into the internal combustion (IC) engine must carry on as this will continue to be the main power unit in vehicles for several decades to come. Despite the development of electric cars, with the potential to offer alternatives for short distance transport, market forecasts indicate that worldwide IC engine powered vehicle sale shares will continue to flourish, still exceeding 70 per cent in 2050, despite they can decline from a projected 95 per cent in 2015.

This means that the most practical short term way to improve emissions and vehicle performance is to invest in the development of advanced engine technology.

Environmental concerns demand significant reduction of fossil fuel consumption and CO2 emissions, meaning automotive engines need to operate in a much improved way. Current automotive engines are not always operating in the most efficient way. It is hoped that technological developments will enable the next generation of engines to do many things that haven't been possible before. This will include future combustion engines sharing the advantages of both gasoline and diesel engines and using 'downsizing' techniques to increase energy efficiency by considerably reducing the physical sizes of engines.

Currently IC engines only reach 30-40 per cent efficiency and have a long way to go to reach their thermal engine efficiency limit, but this is possible. The combustion systems used today still follow the principles set when the engines were invented over a hundred years ago. There are many areas already identified that could offer potential improvements, making a clear case for continued investment in IC engine research. In principle, engine designers at present have many technical options to achieve higher energy efficiency while meeting the most stringent emission legislations.

The main challenge in engine research is to identify feasible technical solutions at an acceptable cost as most improvements simply carry too hefty a price tag for the average vehicle consumer to be able to afford, as evidenced with current hybrid vehicle technology. Development of electric cars and fuel cells will progress, gradually driving down their cost, and in the meantime the variety and applications of alternative fuels and the complexity of IC engines will increase.

IC engines are the most convenient way to use energy supplies and the challenge is to make the engine even more efficient and clean. Many of the available vehicle options may require sacrificing convenience for the protection of the environment. Conversely the internal combustion engine is a ubiquitous technology, which people trust and which will remain significant for several decades.

Therefore research into more efficient and greener IC engines must carry on for the benefit of the environment as this will remain the main source of power for vehicles, whilst alternative energy supplies are developed. "

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