

Extremely Downsized Gasoline Demonstrator Vehicle

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Abstract:

Gasoline engine downsizing is an established technology for reducing vehicle CO₂ emissions. Further benefits are possible through more aggressive downsizing, however, the trade-off between the CO₂ reduction achieved and vehicle drivability limits the level of engine downsizing currently adopted by vehicle manufacturers.

This paper details an extremely downsized engine, and resulting demonstrator vehicle, featuring eSupercharging in combination with a conventional turbocharger. The demonstrator vehicle that also features an advanced 48 V lead-carbon battery pack and a 48 V belt-driven starter generator (BSG). The battery and BSG have been selected to enable the continuous high-output (6 kW) operation of the eSupercharger to support prolonged operation of the engine at low speed and high-torque output.

The fuel consumption of the resulting demonstrator vehicle has been analysed over a number of drive-cycles and the benefits of the downsized engine in conjunction with the complete mild-hybrid system have been assessed.