

Normal air could halve fuel consumption

February 7 2011

Every time a car brakes, energy is generated. At present this energy is not used, but new research shows that it is perfectly possible to save it for later use in the form of compressed air. It can then provide extra power to the engine when the car is started and save fuel by avoiding idle operation when the car is at a standstill.

Air hybrids, or pneumatic hybrids as they are also known, are not yet in production. Nonetheless, [electric cars](#) and electric hybrid cars already make use of the brake energy, to power a generator that charges the batteries. However, according to Per Tunestal, a researcher in Combustion Engines at Lund University in Sweden, air hybrids would be much cheaper to manufacture. The step to commercialisation does not have to be a large one.

"The technology is fully realistic. I was recently contacted by a vehicle manufacturer in India which wanted to start making air hybrids", he says.

The technology is particularly attractive for jerky and slow driving, for example for buses in urban traffic.

"My simulations show that buses in cities could reduce their [fuel consumption](#) by 60 per cent", says Sasa Trajkovic, a doctoral student in Combustion Engines at Lund University who recently defended a thesis on the subject.

Sasa Trajkovic also calculated that 48 per cent of the brake energy,

which is compressed and saved in a small air tank connected to the [engine](#), could be reused later. This means that the degree of reuse for air hybrids could match that of today's electric hybrids. The engine does not require any expensive materials and is therefore cheap to manufacture. What is more, it takes up much less space than an electric hybrid engine. The method works with petrol, [natural gas](#) and diesel.

For this research the Lund researchers have worked with the Swedish company Cargine, which supplies valve control systems.

The idea of air hybrids was initially hit upon by Ford in the 1990s, but the American car company quickly shelved the plans because it lacked the necessary technology to move forward with the project. Today, research on air hybrids is conducted at ETH in Switzerland, Orléans in France and Lund University in Sweden. One company that intends to invest in engines with air hybrid technology is the American Scuderi. However, their only results so far have been from simulations, not from experiments.

"This is the first time anyone has done experiments in an actual engine. The research so far has only been theoretical. In addition, we have used data that means we get credible driving cycle results, for example data from the driving patterns of buses in New York", says Sasa Trajkovic.

The researchers in Lund hope that the next step will be to convert their research results from a single cylinder to a complete, multi-cylinder engine. They would thus be able to move the concept one step closer to a real vehicle.

Provided by Lund University

Citation: Normal air could halve fuel consumption (2011, February 7) retrieved 9 April 2024

from <https://phys.org/news/2011-02-air-halve-fuel-consumption.html>

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