



Newsletter IEA Bioenergy Task 37: 11/2019

Biomethane in mobility

Gas vehicles – a technology overview

Natural gas/biogas vehicles are generally considered as an alternative to "internal combustion engine drives" although their potential for reducing CO₂ emissions and integrating renewable energy is still underestimated. Apart from the use of biomethane from biogas there is a large potential of synthetic biomethane, which can be generated from temporarily surplus renewable power. The critical review of EMPA in the context of Swiss legislation is of general interest. The study shows that 1) Already today liquid biogas is a suitable alternative to petrol and diesel vehicles for everyday use even with low ranges of 350 to 500 km per day. As compared to petrol or diesel they have a far lower environmental impact. 2) When operating with renewable gases, the vehicles have the lowest CO₂ emissions of all renewable vehicle concepts even when compared to e-mobility. 3) Gas vehicles still have a higher purchase price of around 15% when compared to gasoline vehicles, but doubling of the current number of gas vehicles would allow economic operation when the whole value chain is considered. 4) Gas vehicles are as safe as petrol vehicles.

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SEAT participates in a new European biomethane project

SEAT will participate until 2023 in the Life Landfill Biofuel project, recently approved by the European Commission, which aims to obtain renewable gas from municipal landfills. The objective is to achieve more efficient management by obtaining biomethane from an indigenous and abundant energy source. The project will be developed together with other collaborating entities (FCC, IVECO, the University of Granada, the CARTIF Foundation, SYSADVANCE and Gasnam) over the next four years and has a global budget of 4.6 million euros, of which the European Commission finances 55%. SEAT is already participating in the Life Methamorphosis project to obtain biomethane from previously selected waste and slurry from a farm in Lleida. The new Life Landfill Biofuel project is another step since the raw material comes directly from the landfill, without prior separation.

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First LNG freight locomotive in the Baltics

Operail, an international logistics and transportation company, has entered into a cooperation agreement with the Latvian company DiGas to develop the first cargo-carrying liquefied natural gas (LNG) freight locomotive in the region. Adding the LNG system to freight locomotives is a landmark event in Baltic railway transportation and the railway sector in general. On average, an LNG locomotive uses 30% less fuel and emits 20% less carbon dioxide and 70% less sulphur dioxide. The reconstruction process of the American General Electric C36 locomotive involves dividing the 17,000-litre fuel tank in two – half for diesel fuel and half for LNG – and the addition of new systems. The information systems of an LNG locomotive store all information regarding fuel consumption and data analysis will allow

further savings. The first LNG locomotive should be completed next spring and tested in summer 2020.

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Record efficiency for a person car gas engine

In addition to electric and hydrogen powertrains, gas engines also play an important role in the Swiss Competence Centre for Energy Research in the Field of Mobility ("SCCER Mobility") headed by ETH Zurich. This is because vehicles powered by pre-processed biogas or synthetic methane ("e-gas"). As part of the Horizon 2020 "GasOn" project Volkswagen has developed a brand new 2 litre gas engine with a highly efficient combustion process. The behavior of the ignition was optimized in a pre-chamber and an overflow of the hot rays into the main combustion chamber. Compared to the state of the art, the consumption of the new gas engine with pre-chamber combustion process was reduced by 20% (converted into WLTP standard consumption for a mid-size passenger car). The peak efficiency in the best engine configuration was over 45%, with efficiencies of over 40% achieved over a wide operating range. Such values are currently only achieved by significantly larger engines, such as those used in commercial vehicles, stationary or marine applications. In comparison, petrol engines typically have efficiencies of 35 to 40%. The GasOn project has developed a series of other outstanding improvement which are all compiled on the project's website.

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Hurtigruten cooperates with Biokraft and in future runs on biogas from fish waste

The Norwegian shipping company Hurtigruten signs a multi-year contract with the Norwegian company Biokraft for the supply of climate-neutral liquid biogas (LBG). From 2020, the traditional post ships will set sail with the environmentally friendly fuel from dead fish and other organic waste. With a term of seven and a half years, the contract between Hurtigruten and Biokraft is the most comprehensive agreement to date on the supply of liquid biogas (LBG) to a shipping company. The partnership includes the almost daily delivery of biogas from organic waste to Hurtigruten. The Hurtigruten ships are thus the first in the world to operate with fossil-free LBG. With the partnership between Hurtigruten and Biokraft, the world's largest provider of expedition sea voyages and the world's largest producer of biogas combine forces and expertise. The first biogas delivery from Biokraft to Hurtigruten is expected in 2020.

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Best greenhouse gas balance through biomethane cars

A study by the German and Swiss automobile clubs ADAC and TCS respectively, has examined the most common types of fuel currently available with regard to greenhouse gas emissions on the basis of a VW Golf. The study concludes that electric cars perform best when 100% green electricity is used. If, however, the current (German) electricity mix is used, natural gas passenger cars show the best greenhouse gas balance. The balance of natural gas passenger cars is significantly improved by the use of 15% biomethane. Also, the Plug-in hybrid as combination of a gasoline and an electric motor achieves no substantial improvement with application of the current mix Germany even when compared to the conventional gasoline engine. Its problem is the additional battery, which has a negative effect on the climate balance. Only with 100% regenerative energy electric car show the best greenhouse gas balance, closely followed by the fuel cell vehicle. The balance of the plug-in hybrid vehicle also improves when regenerative electricity is used. The natural gas car can also benefit massively from 100% regeneratively produced biomethane.

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