Biogas does not need subsidies

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Subsidizing the combustion of biogas is expensive and prevents its use in a more effective way, according to Ghent University (Belgium) scientists in the leading journal Energy & Environmental Sciences. They propose using biogas as raw material for the production of chemicals, with advantages for businesses, governments and the environment.

Green power subsidies

Biogas is produced from the breakdown of organic matter, such as agricultural residues. Besides locally dealing with organic waste, the biogas combustion produces electrical energy besides heat. Today, this process represents about 10% of our green energy.

The combustion of biogas is widespread, as governments grant subsidies for this sort of energy. In Europe, subsidies for biogas combustion vary between 20 and 276 euros per megawatt-hour. The actual price of electricity is only about 40 euros.

More than market price

According to scientists at Ghent University's Center for Microbial Ecology and Technology and Laboratory for Chemical Technology, this approach is not the most sensible.

"Combustion has always been the easy solution to convert raw material into energy", says Prof. Korneel Rabaey. "But only a third of the energy in biogas can be turned into electricity. The other two thirds gets lost as

residual heat."

Producing biogas and burning it afterwards results in power that is much more expensive than the market price. "Subsidies will always be necessary to maintain this process, especially now that electricity from solar and wind energy has become much cheaper", says Rabaey

Raw material instead of fuel

To avoid eternal subsidies for the biogas industry, the scientists suggest an alternative solution with advantages for all parties involved.

They suggest not to burn the biogas, but to upgrade it into bio-natural gas and to inject it into the natural gas network. Companies will be able to take the bio-natural gas from this existing network and convert it into CO, one of the raw materials in the chemical industry. This also makes sure that the biomass is processed locally, but that its product, bio-natural gas, is available everywhere without the need of any transportation.

The researchers describe the technology behind this process in a recently published article in the leading magazine *Science*.

Less CO2 emission

"Using this method, companies can lower their CO2 footprint because they replace a part of their fossil gas by bio-natural gas", explains Prof. Korneel Rabaey.

"With an eye toward a lower CO2 emission in 2030, we can cover the global demand for methanol four times using bio-natural gas from the EU. In reality this will be a mixture of different products: we estimate

that we can capture more than half of the global industrial CO2 emission in CO by using bio-natural gas, so by using biomass in a smart way."

"Eventually this will lead to processing biomass without the need of any subsidies and to producing chemicals with a lower ecological footprint", Rabaey concludes. "This would definitely be a great step towards deep decarbonisation."

The scientists suggest governments to support the transition of the biogas industry in this direction as much as they do now with green power, in order to shift the balance away from combustion to the more valuable production.

More information: Kristof Verbeeck et al. Upgrading the value of anaerobic digestion via chemical production from grid injected biomethane, *Energy & Environmental Science* (2018). DOI: 10.1039/C8EE01059E

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