Power to Gas: An Alternative Approach

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Fossil power plants, nuclear power plants, fracking - all those processes are ways to produce electricity or natural gas. They are known for being really dangerous for our environment. So the energy change has to be brought forward. The best way would be to store the excess electricity of renewable energy sources. The project's purpose is to optimize the process of energy conversion from electrical energy to chemical energy in form of methane gas which is storable. The general procedure of Power to Gas is to first generate hydrogen through an electrolysis and then mix it with carbon dioxide for the reaction to methane. In our project we focused on exhaust gas as a source of carbon dioxide and used the principle of gas-chromatography for splitting the carbon dioxide out of the exhaust gas. After trying to validate our theory last year we now developed a fully operational laboratory scale installation. For splitting the carbon dioxide out of the exhaust gas we pass it through the gas-chromatographic columns until they are saturated with carbon dioxide, afterwards we flush the carbon dioxide with hydrogen into the catalyst where the energy carrier methane is generated. It can be distributed all over the world through the natural gas network. Our system is able to convert electrical power into storable methane in an energy efficient, continuous and automatic process. It can also be understood as a contribution for saving our environment and the nature because the climate damaging carbon dioxide no longer reaches the atmosphere.

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