

## Decarbonization with gas engines and CHP

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### Abstract

Gas engine based CHP solutions are an integral part of decentralized energy supply since decades. With innovative gas engine technology and units in the 10 MW output range, today gas engine power plants up to 200 MW output are built. Several advantages are coming along with using gas engines:

- high electrical efficiency up to 50 %
- high fuel utilization up to around 95 % with Combined Heat and Power
- short start-up times of less than 5 minutes
- no output derating up to around 40°C ambient temperatures
- low total investment costs, especially for CHP solutions
- high availability with a multi-unit installation concept

Significant efficiency improvements of gas engines could be achieved over the last decades. Meanwhile all Jenbacher models above 500 kW output achieve an electrical efficiency of more than 40 %. This is equivalent to specific CO<sub>2</sub>-Emissions of less than 520 g/kWh. With an efficiency of 50 % this would be around 400 g/kWh. With the assumption of replacing heat production from a conventional gas boiler, a CHP solution can achieve about 225 g/kWh of CO<sub>2</sub> emissions based on electricity production. But a decarbonization only through fuel utilization has its limitations.

A higher degree of decarbonization can only be achieved through the fuel. The best known fuels for decarbonization are gaseous fuels such as biogas or biomethane, but also CO<sub>2</sub> neutral fuels such as sewage and landfill gas can be considered. With the introduction of P2G new energy carriers and fuels such as H<sub>2</sub>, Methanol and Ammonia are used to decarbonize gas engine power plants through the fuel.

INNIO Jenbacher will talk about experience of Jenbacher gas engines running on the above mentioned fuels, especially the use of hydrogen and hydrogen blending.