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**On the Way towards Decarbonization – Green Fuels,  
Hybridization and Digitalization in Large Engine Applications**

# **Decarbonization of Europe's Power Generation - Hydrogen-Ready Engine Power Plants for 25% Hydrogen in Natural Gas**

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This presentation describes the results of a project evaluating the effects of up to 25% hydrogen content in natural gas on INNIO\* Jenbacher\* gas engines. A test campaign was performed using a J612 (2 MW) Jenbacher gas engine installed on a development testbench at LEC (Large Engine Competence Center, Graz, Austria). Hydrogen mixing with natural gas up to 25% was investigated at various operating conditions including different engine load, ignition timing, charge temperature, NOx setting and methane number of the natural gas. Additionally, tests with hydrogen blending rate (transient) and operation at maximum hydrogen content were carried out. Finally, a mitigation strategy was applied to counteract the effects of hydrogen mixing.

Detailed combustion analysis shows the impact of hydrogen in natural gas. Due to the reduced methane number of the mixture and the increased laminar flame speed, there is an impact on the knock limit, the combustion stability and the risk for backfire and deflagration. INNIO Jenbacher investigations based on the LEC testing results led to a robust technical concept enabling up to 25% hydrogen content in natural gas.

\*Indicates a trademark