

Euromot Contribution to the 35th Madrid Forum

**“The Impact of gas quality changes on gas appliance
manufacturers and end-users”**

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Gas supply: the Past, the Now and the current CEN Wobbe Index Task Force proposal

The Past and the Now

WI for > 90% of end users:
49 – 53 MJ/m³
WI range $\Delta = < 3.7$ MJ/m³

Netherlands L: $\Delta = 1$ MJ/m³

Giving:

Maximum safety
Predictable performance
Minimum emissions

CEN proposal on the table

WI at TSO entry:
46.44 – 54.0 MJ/m³
WI range $\Delta = 7.56$ MJ/m³

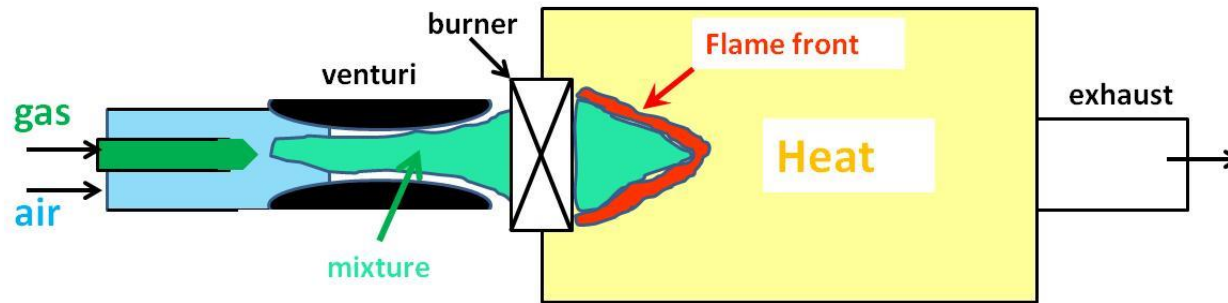
In case of 20% hydrogen:
WI range $\Delta = 12.5$ MJ/m³

End user range only narrow and stable
if entry is narrow!

Giving:

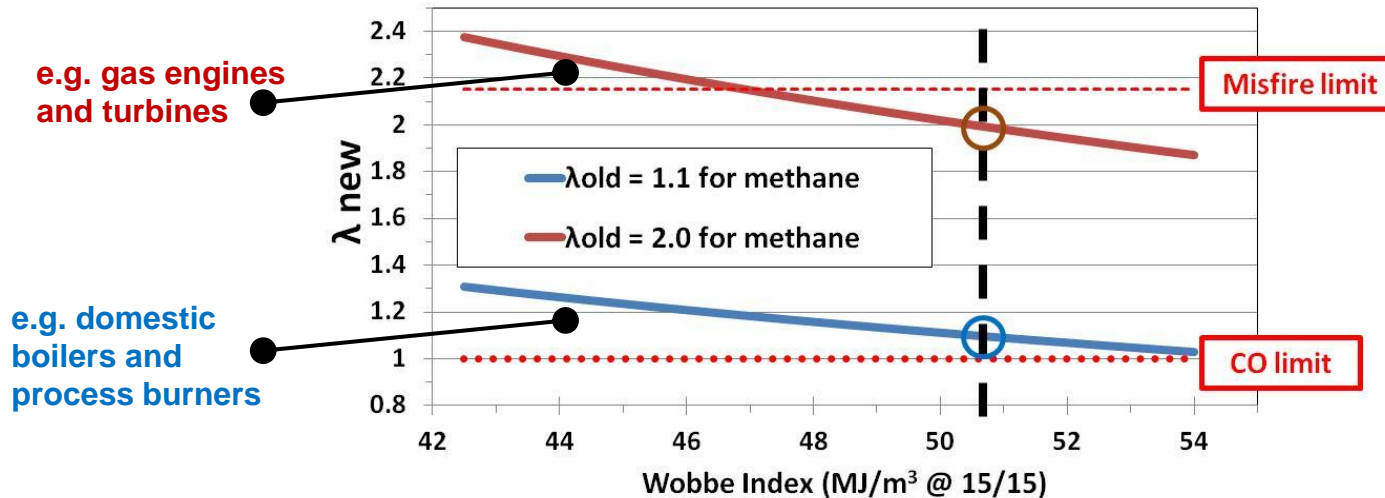
Safety?
Performance?
Emissions?

The physical effects of WI changes on the air-to-fuel ratio λ

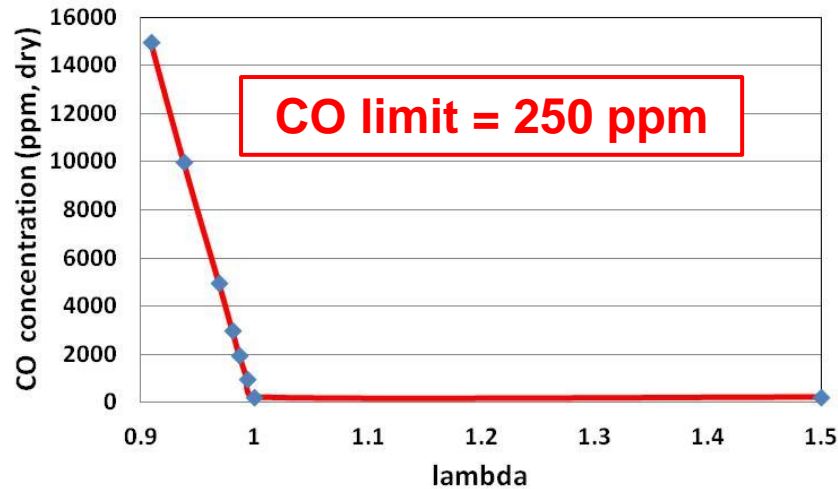


$$\lambda_{\text{new}} = \text{WI}_{\text{old}} / \text{WI}_{\text{new}} * \lambda_{\text{old}}$$

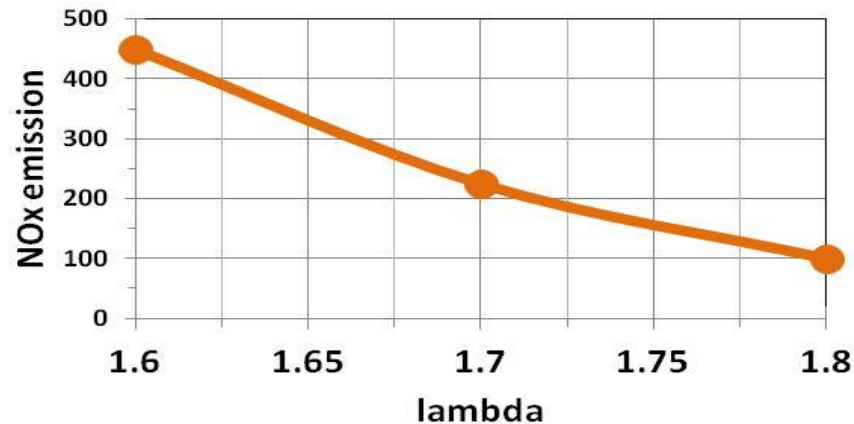
$$\text{Power}_{\text{new}} = \text{WI}_{\text{new}} / \text{WI}_{\text{old}} * \text{Power}_{\text{old}}$$



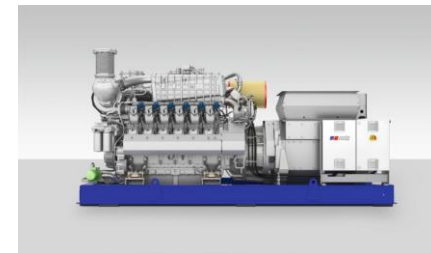
Sensitivity of CO and NOx to lambda



An issue for heating boilers



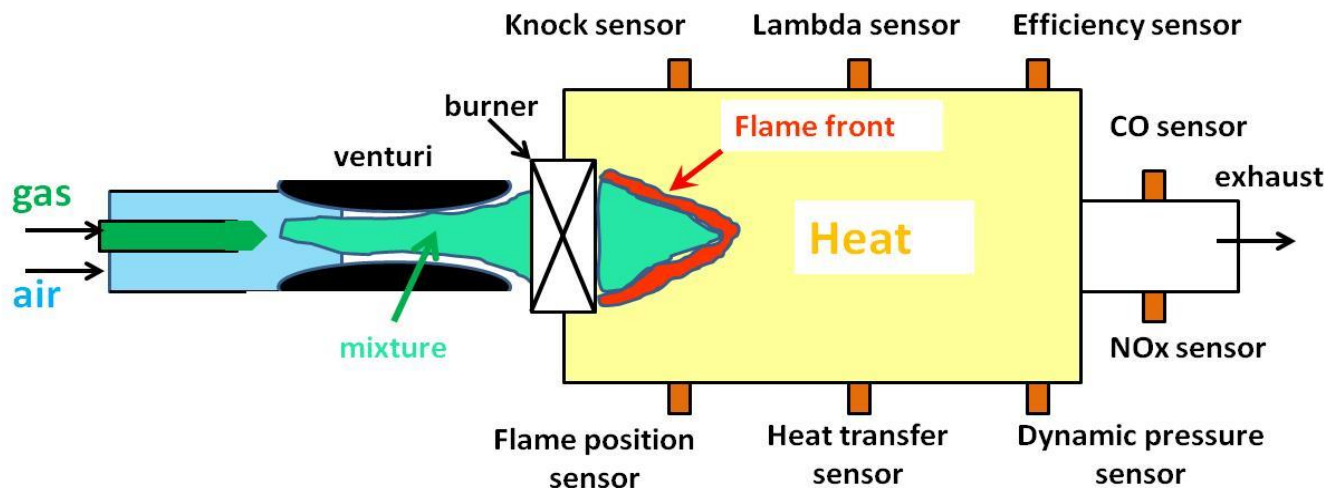
An issue for gas engines and gas turbines



It is not just the air-to-fuel ratio that will change

This is affected when the gas composition varies in a wide range

Air-to-fuel ratio λ ;
Position of the flame (flame speed) ;
NOx production;
Knocking tendency;
Flame stability, noise and pulsation tendency;
CO production;
Flash-back tendency;
Heat transfer;
Fuel efficiency.



Sensitive elements control loops



Sensors



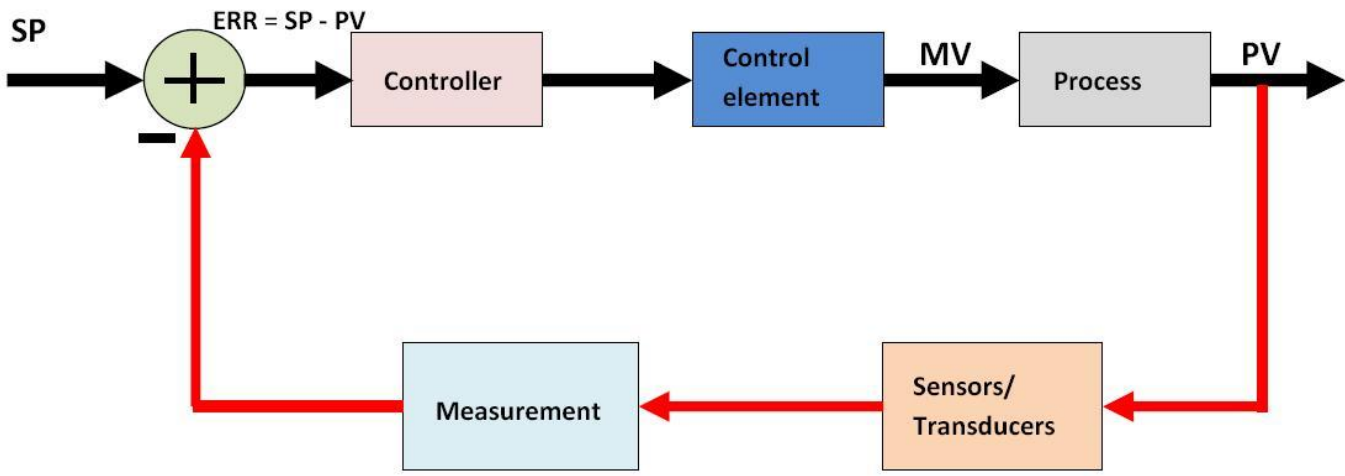
electronic controllers



control valves



electric adjusters



A recent example: gas-fired electricity generation ensured grid stability thanks to good quality gas

On January 8, 2021, an incident in Croatia almost caused a blackout in Europe. Gas-fired generation has the ability to react very fast to frequency and voltage disturbances and plays a crucial role in maintaining grid stability.

In addition, gas-fired generation has the properties to compensate for fast fluctuations in output of solar panels and wind farms. It also provides back-up power in case of a 'Dunkelflaute'. There is currently no alternative solution.

A close-to-constant gas quality ensures a predictable response of gas-fired generation.

To sum-up: Two scenarios

The Robust Scenario

EU legislation limits the WI entry to 49
– 53.0 MJ/m³

This does include good quality biomethane, synthetic natural gas and provides for sufficient import nat. gases ensuring security of supply and easy cross-border transfer.

Manufacturers and users can tune for max safety, max performance and minimum emissions.

Current CEN proposal on the table

A non-binding wide WI entry range with primarily obligations to inform the end user about gas quality changes resulting in variable application settings without any uniformity in the EU for users and manufacturers.

Added complicated controls make the system more vulnerable and less safe with a lower performance and variable emissions.

End user range only narrow and stable if entry is narrow!

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