



Green gases

Quality of SNG

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Overview

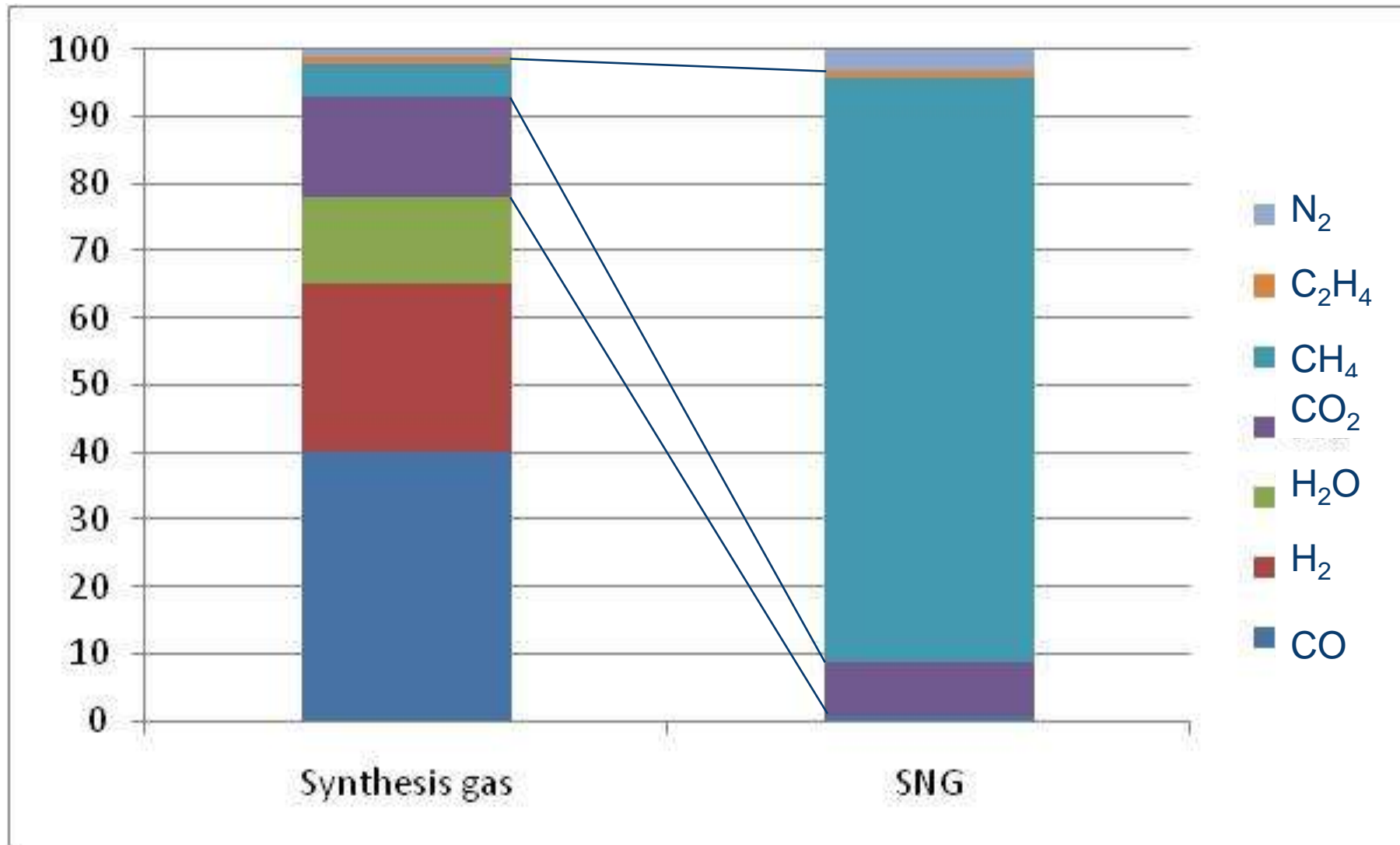
- Gas quality requirements
 - End use requirements
 - Safety and asset interaction
 - Market needs
 - Future integration of gas markets
- Adjusting the composition
 - Methods for gas quality adaption
 - Cost aspects

Typical wood syngas composition

Oxygen blown pressurized gasifier

Component	Mol.%	Component	ppm
CO	42	H ₂ S	600
H ₂	27	COS	30
H ₂ O	15	NH ₃	82,000
CO ₂	15	HCN	80
CH ₄	5	HCl	200
C ₂ H ₄	1	HF/Hg/Cd/K+Na	Traces
N ₂ /Ar	1	Dust	35 g/Nm ³
		Tar	10 g/Nm ³

Conditioning L-gas quality



Trace components

Component	ppm in Syngas	ppm in SNG	Removal
H ₂ S	600	2	99,7%
COS	30	25	16,7%
NH ₃	82,000	1	>99.9%
HCN	80	10	87,5%
HCl	200	1	99,5%
HF/Hg/Cd/K+Na	Traces		
Dust	35 g/Nm ³	Technical free	>99.9%
Tar	10 g/Nm ³	Technical free	>99.9%

Interchangeability

- NG utilization equipment is designed, adjusted, and (for domestic appliances) approved* for use with NG
- Existing gas utilization equipment must continue to function, without deterioration in performance, when supplied with any “non-traditional” gases. (= interchangeability)
- From perspective of end user, safe and effective performance must be guaranteed with all fuels supplied

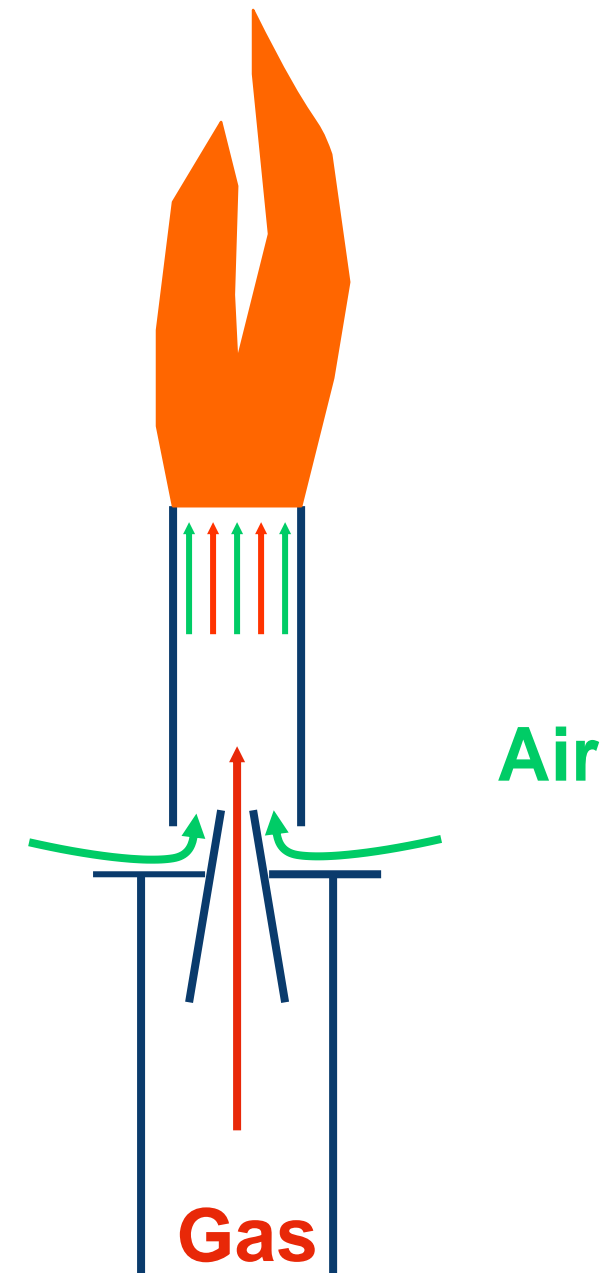
*Note: CE approval is for gases not containing H₂

Three types of gases

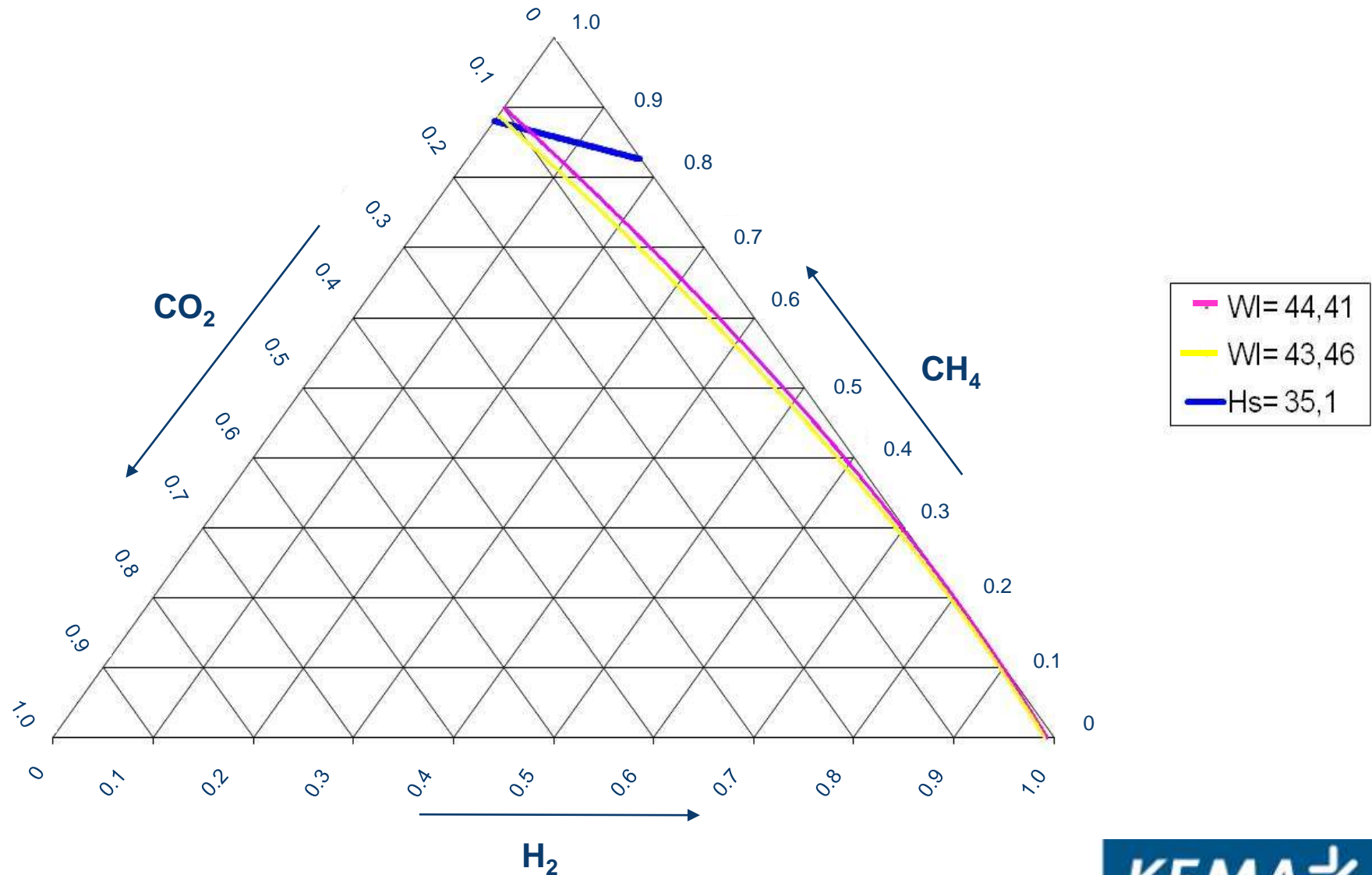
- Main combustion aspect is Wobbe-index

$$WI = \frac{\text{Higher Heating Value}}{\sqrt{\text{Relative Density}}}$$

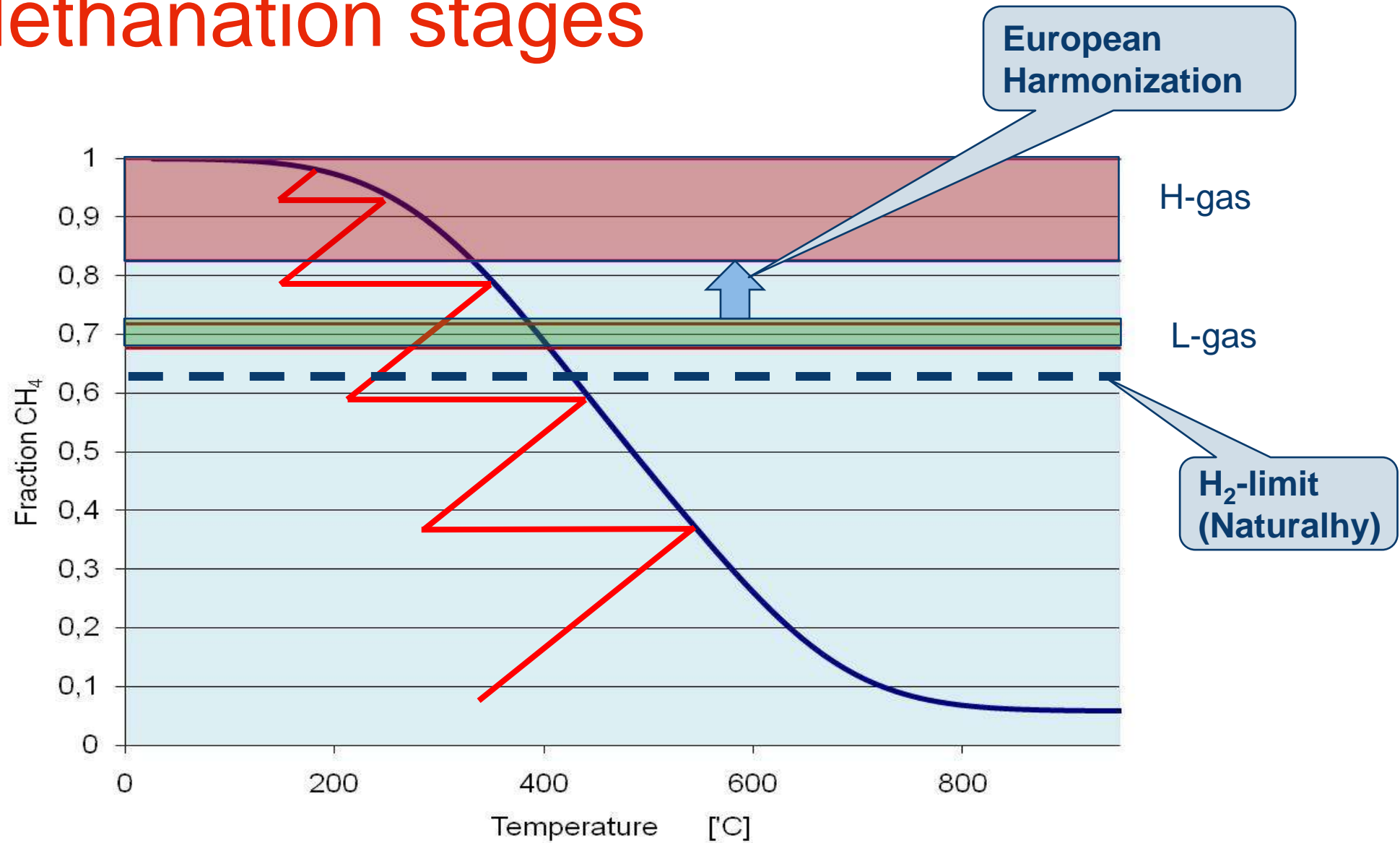
- H-gas: 48 - 56 MJ/m³
- G-gas: 43,5 - 44,4 MJ/m³
- L-gas: 42,5 - 47 MJ/m³



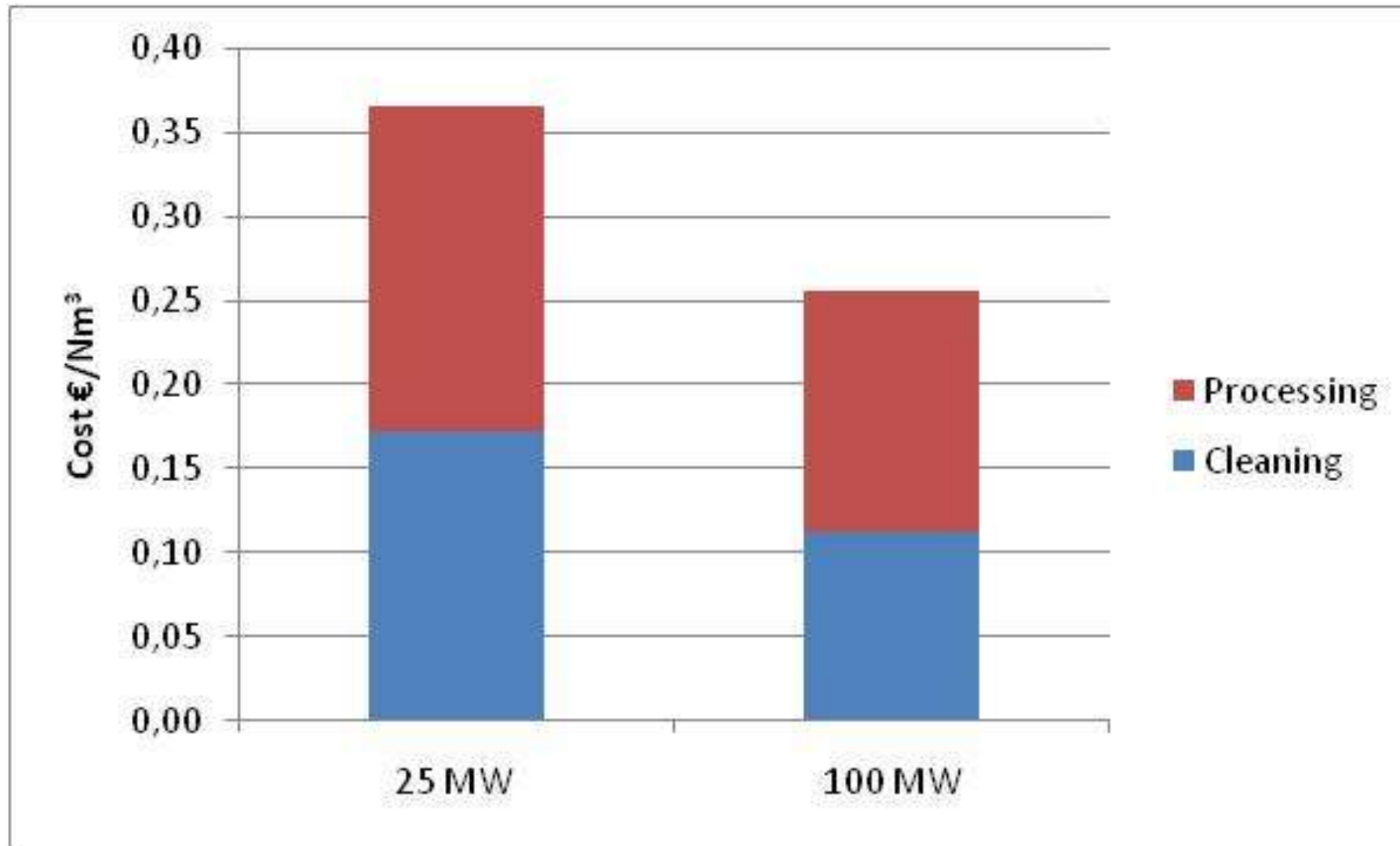
Wobbe-Index in 3 component gas



Methanation stages



Cost estimates of gas upgrading



Thank you !

- Questions?

- Contact:

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