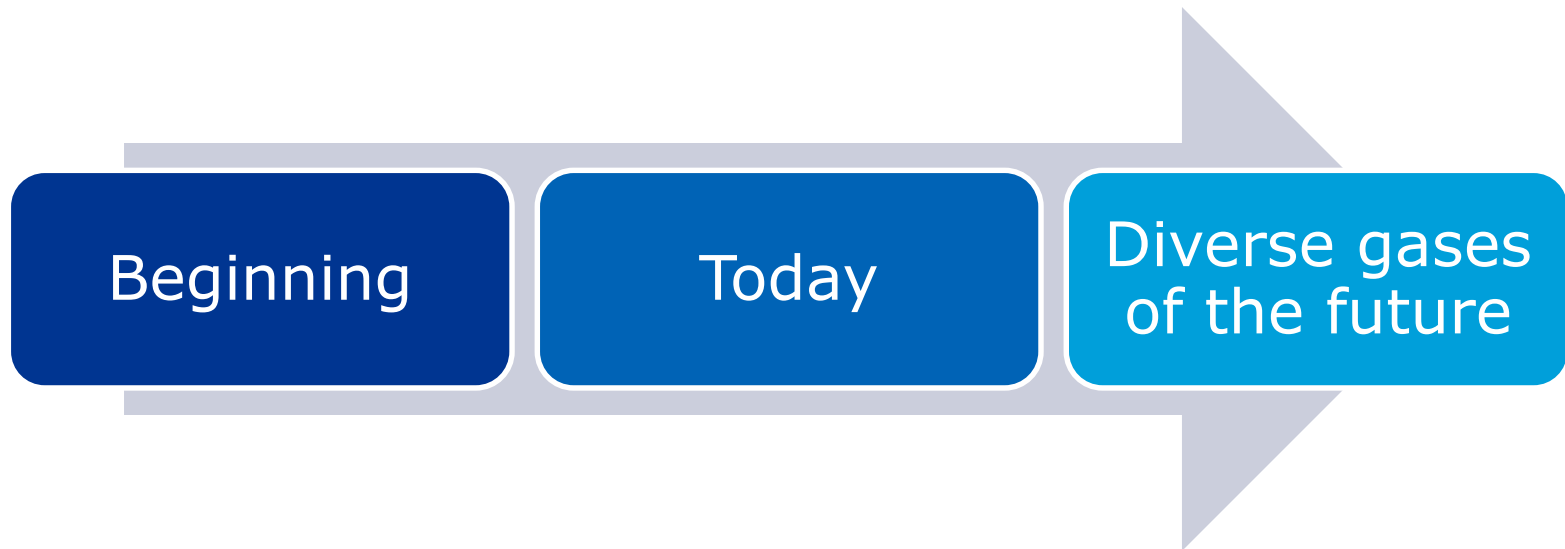


The Challenge of Gas Quality Variations

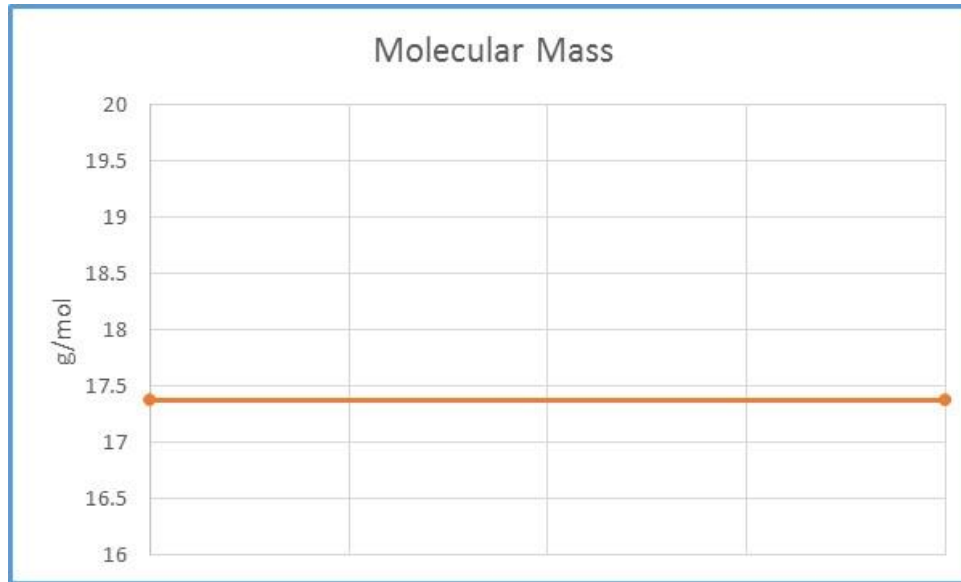
Sarah Kimpton

18 January 2018

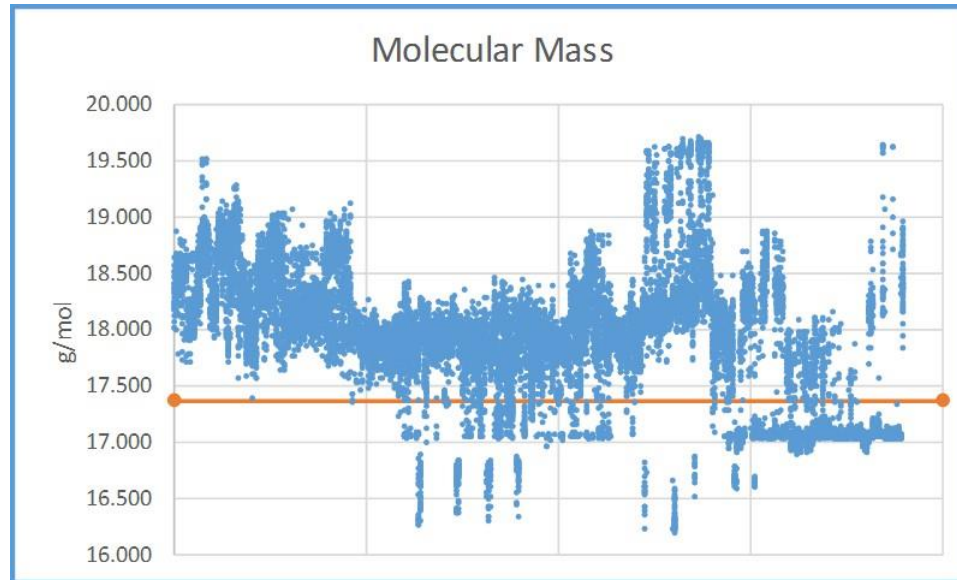
Natural Gas Quality – A Journey



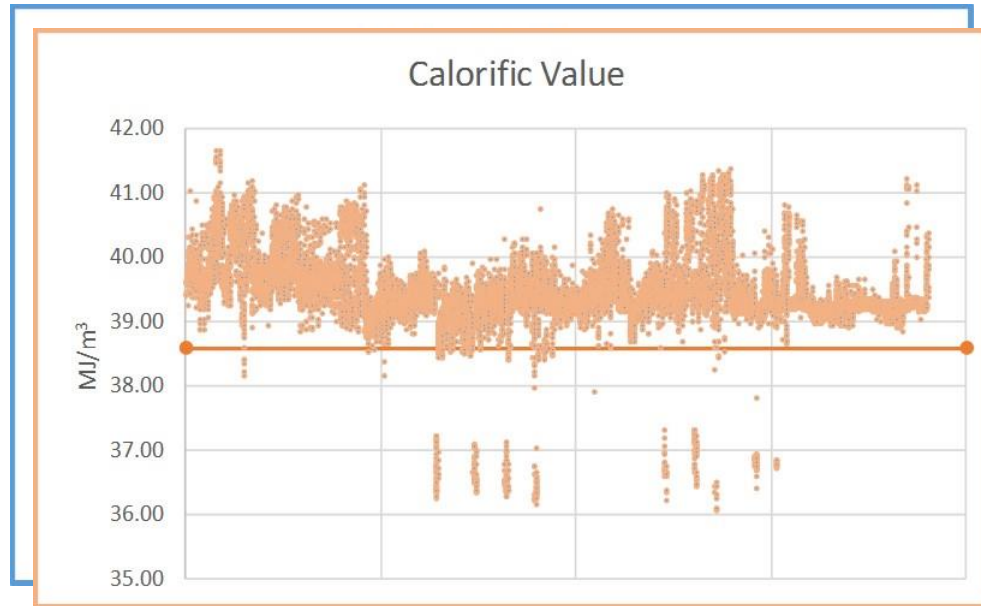
The Beginning - Mean Bacton Gas



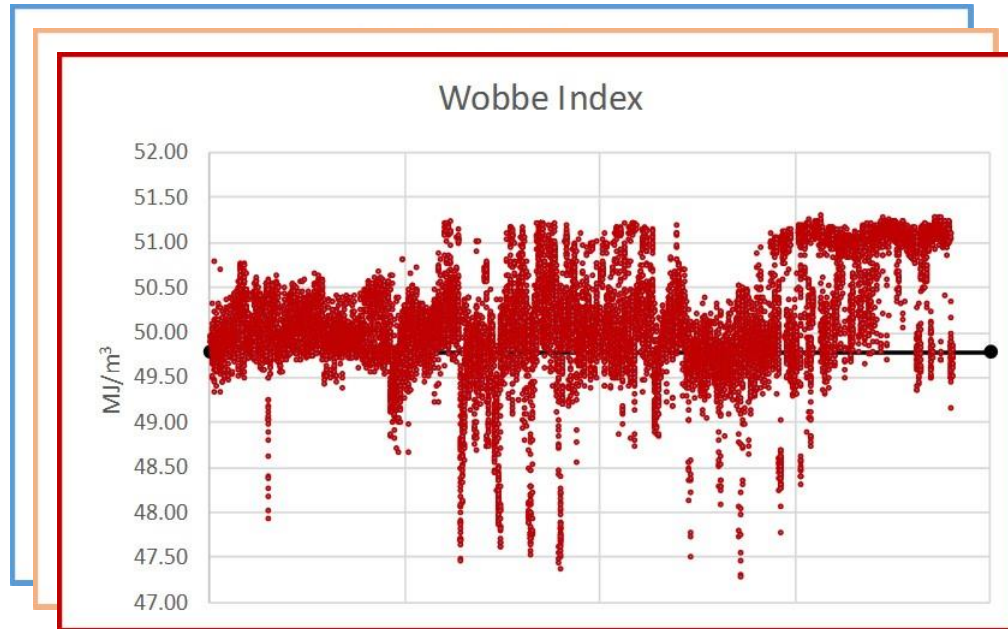
Today



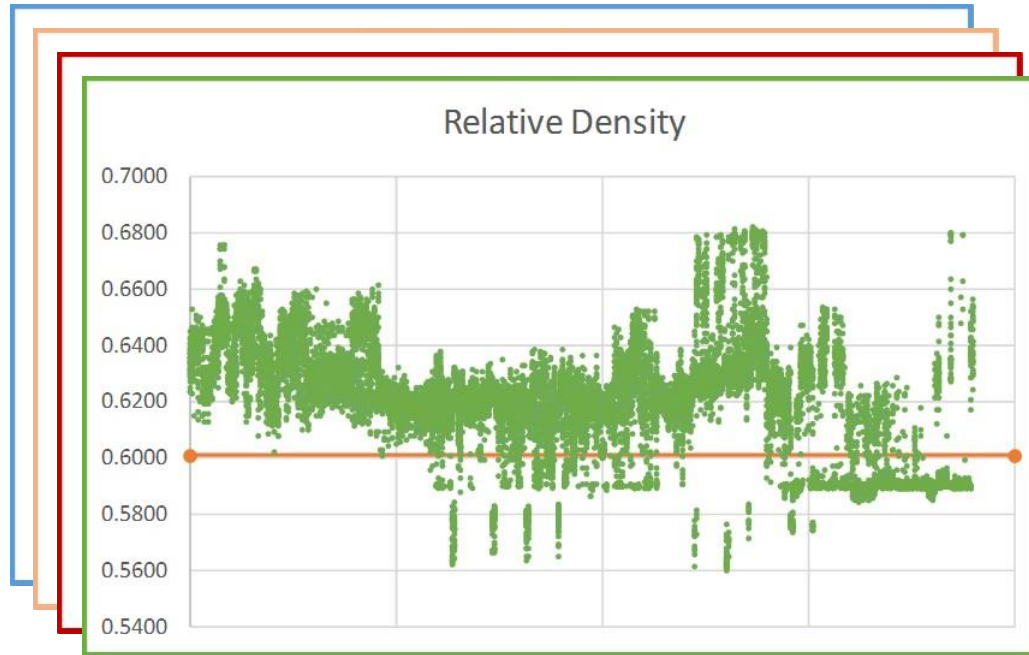
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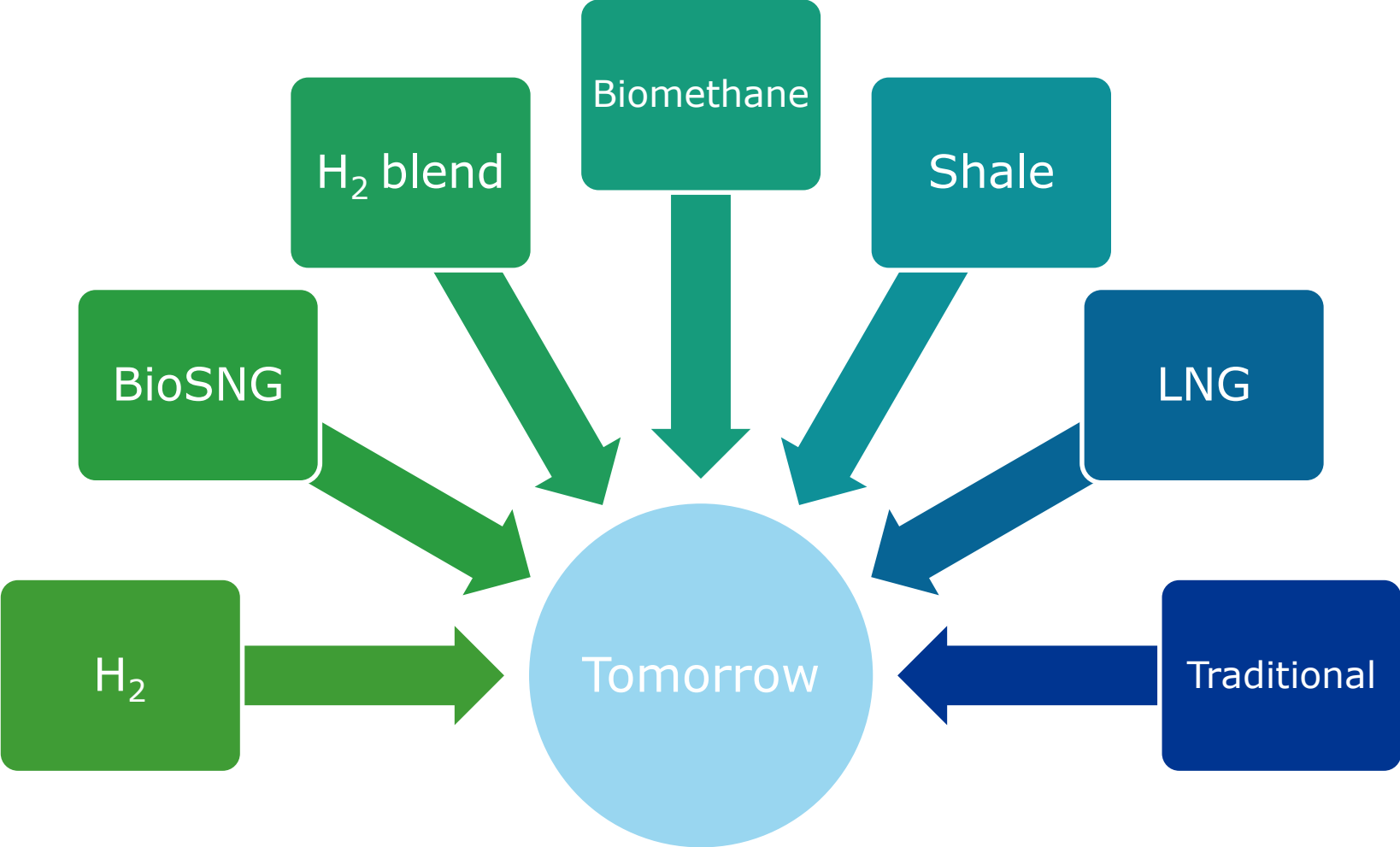
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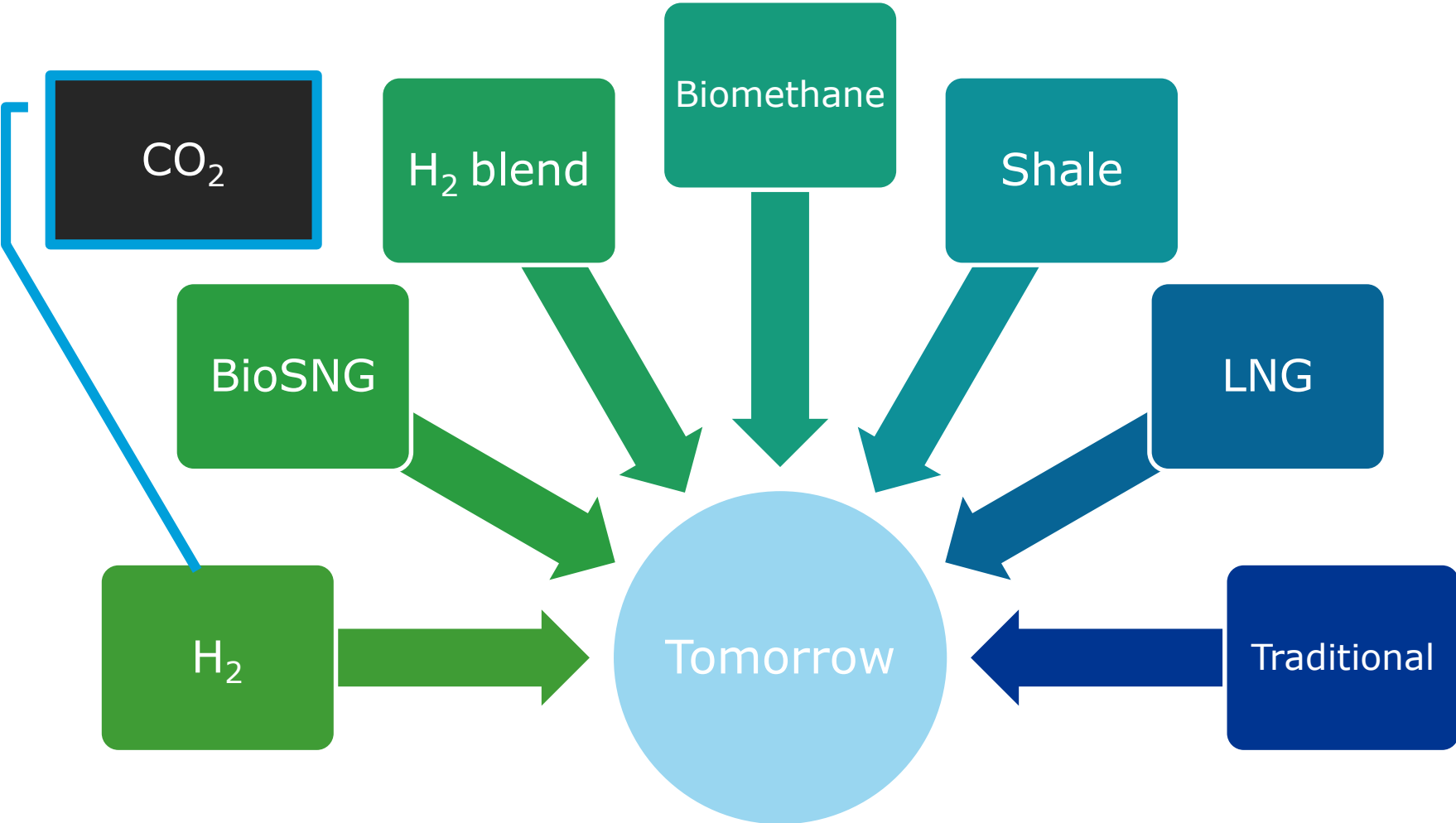
Today



Diverse Gas Quality Future of Tomorrow

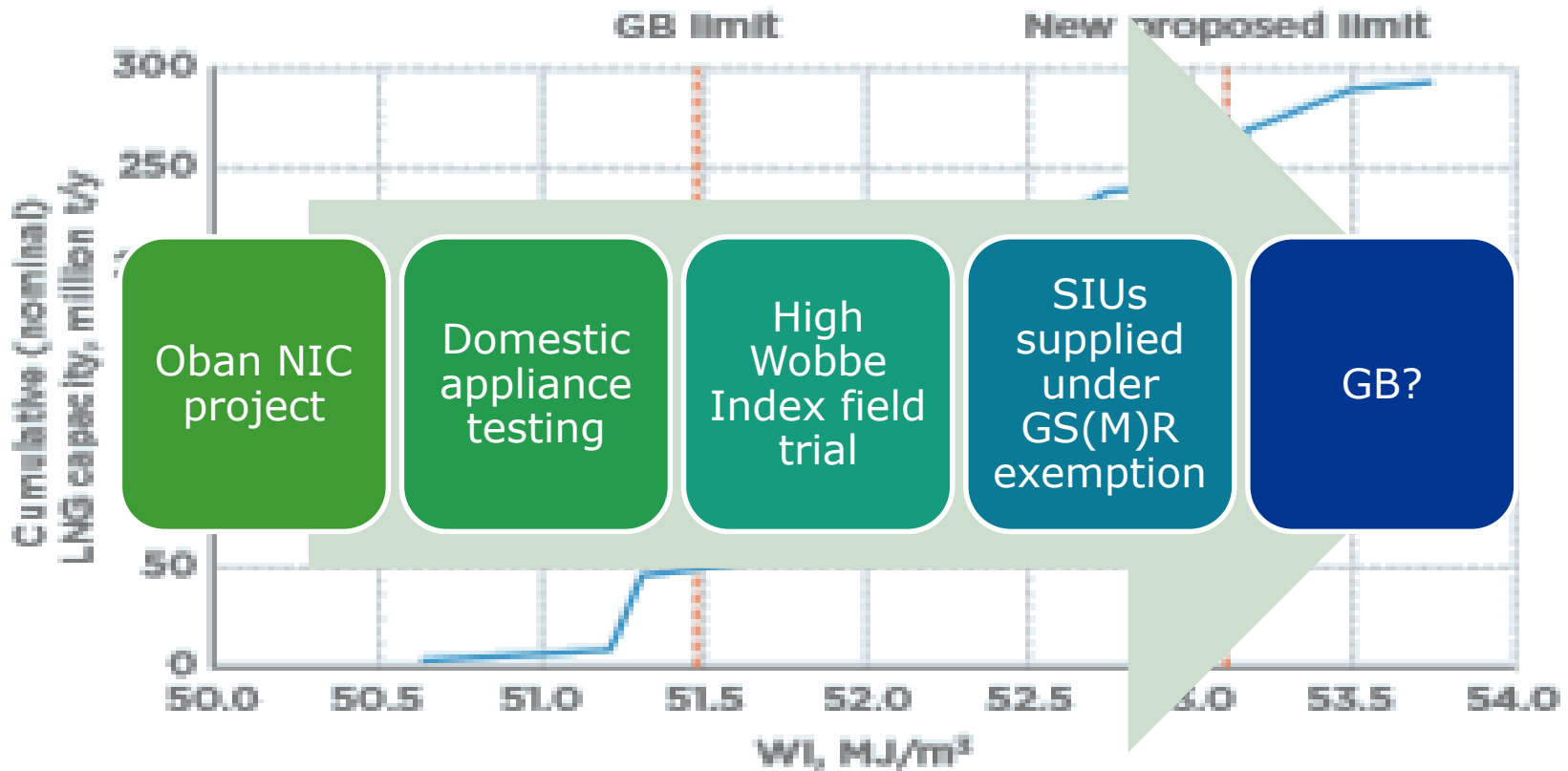


Diverse Gas Quality Future of Tomorrow



Oban and Changes to GS(M)R

Oban Project – Wider Implementation



Gas Safety (Management) Regulations

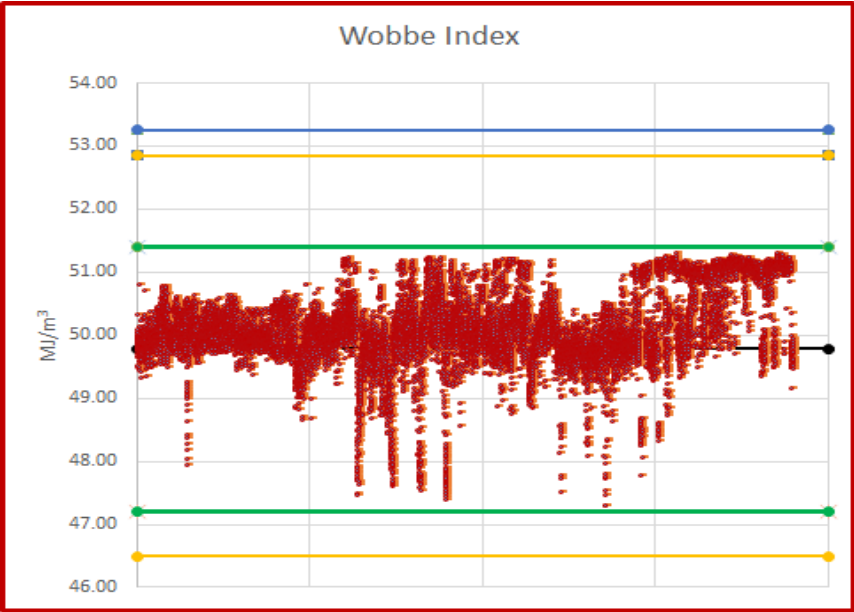
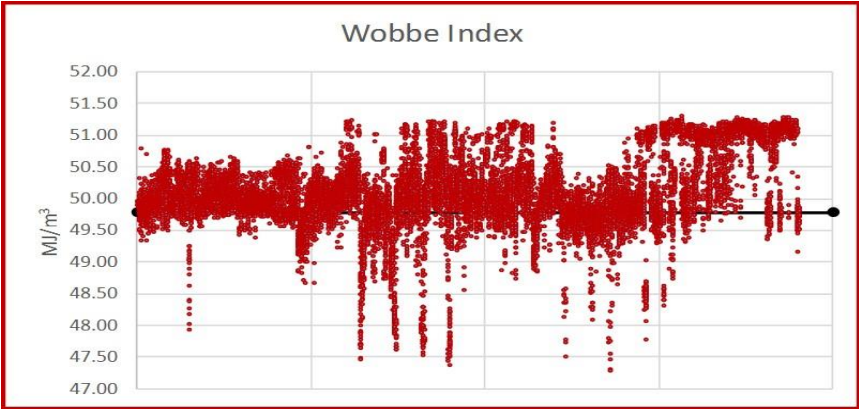
Content or Characteristic	Value
Hydrogen sulphide content	$\leq 5 \text{ mg/m}^3$
Total sulphur including H ₂ S	$\leq 50 \text{ mg/m}^3$
Hydrogen content	$\leq 0.1\%$ molar
Oxygen content	$\leq 0.2\%$ molar
Impurities	No liquids or solids that interfere with consumer appliances
Hydrocarbon and water dewpoint	No interference with consumer appliances
Wobbe Index	47.2 to 51.41 MJ/m ³
Incomplete combustion factor	≤ 0.48
Sooting index	≤ 0.60

Gas Safety (Management) Regulations

Content or Characteristic	Value
Hydrogen sulphide content	$\leq 5 \text{ mg/m}^3$
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Impurities	No liquids or solids that interfere with consumer appliances
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Wobbe Index	47.2 to 51.41 MJ/m ³ 53.25 MJ/m ³
Incomplete combustion factor	≤ 0.48
Sooting index	≤ 0.60

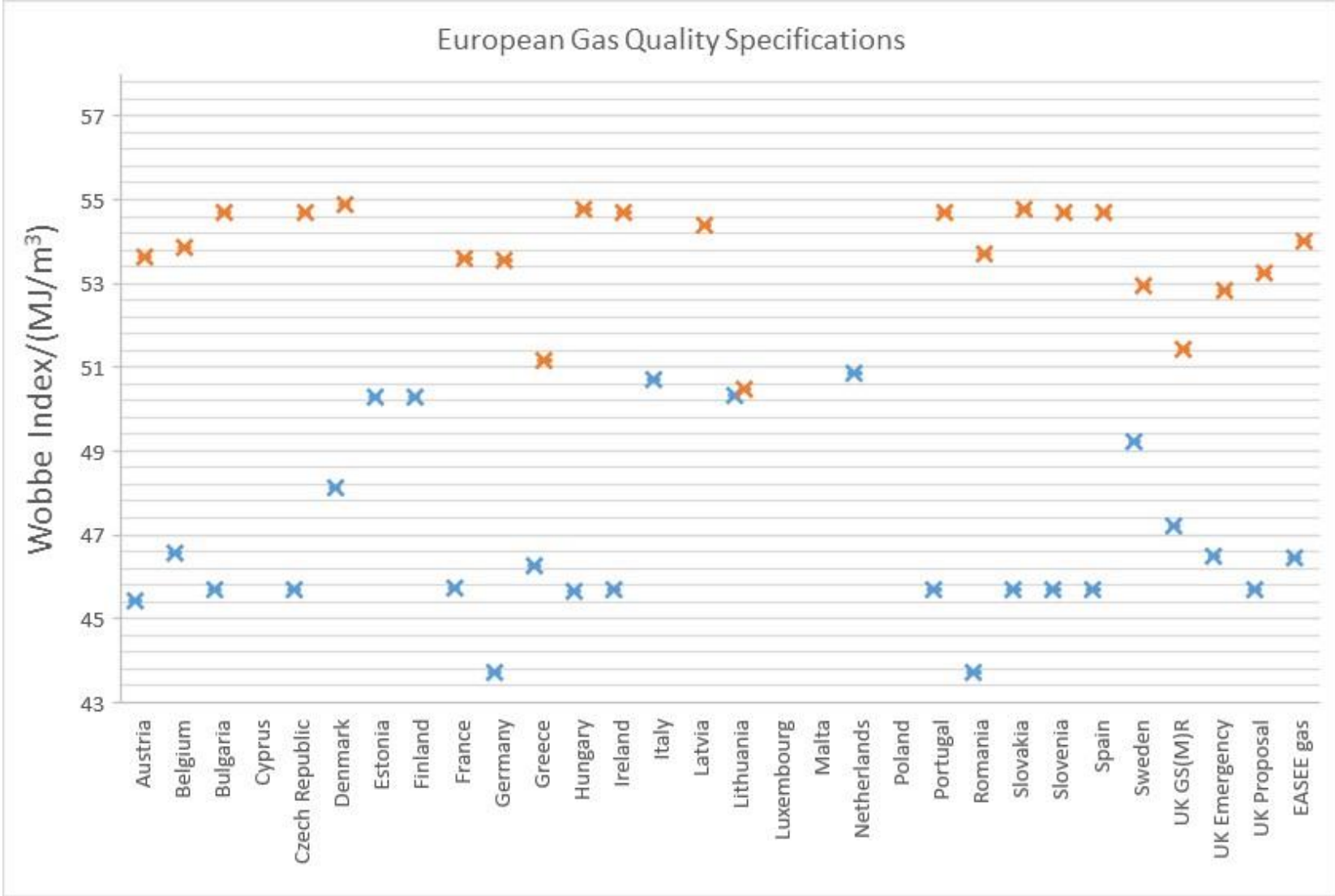
Update interchangeability parameters?

Future

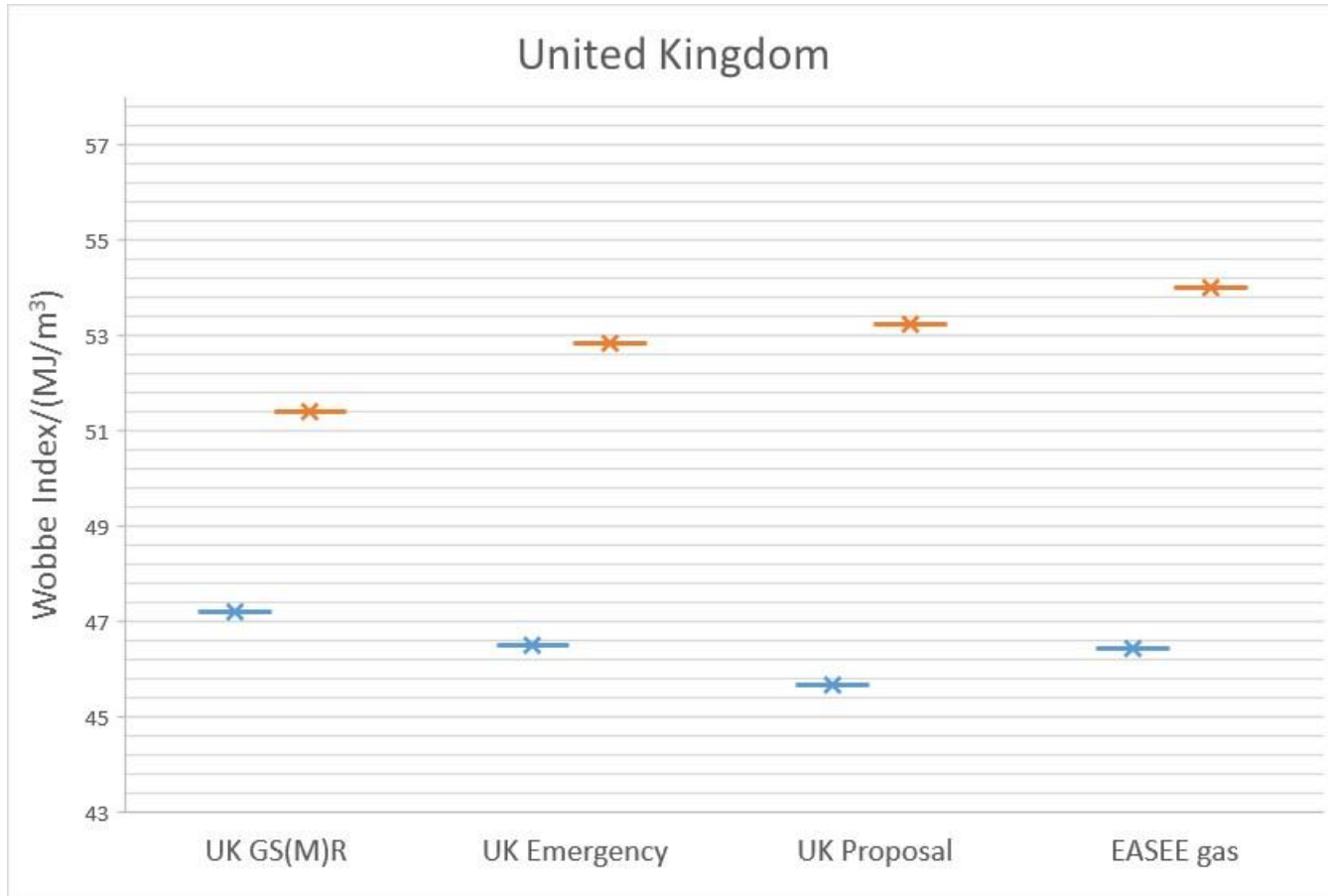


— Current limits — Current emergency limit — Proposed change to upper limit

European Gas Quality Specifications



European Gas Quality Specifications

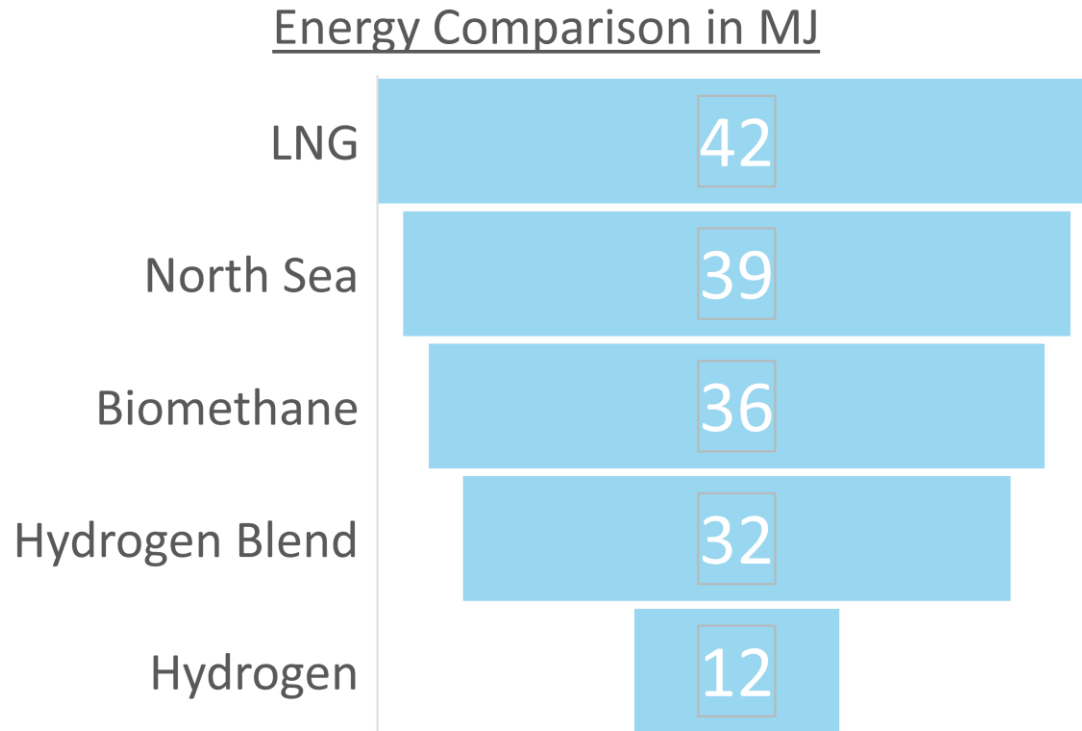


Hydrogen

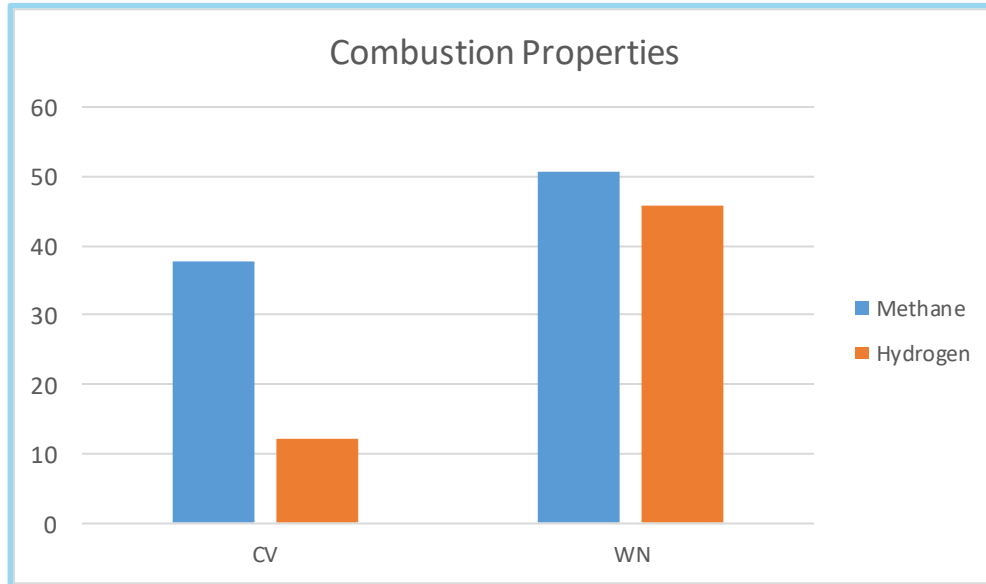
Gas Safety (Management) Regulations

Content or Characteristic	Value	
Hydrogen sulphide content	$\leq 5 \text{ mg/m}^3$	
Total sulphur including H ₂ S	$\leq 50 \text{ mg/m}^3$	
Hydrogen content	$\leq 0.1\% \text{ molar}$	Hydrogen blend not pure H ₂
Oxygen content	$\leq 0.2\% \text{ molar}$	
Impurities	No liquids or solids that interfere with consumer appliances	
Hydrocarbon and water dewpoint	No interference with consumer appliances	
Wobbe Index	47.2 to 51.41 MJ/m ³	53.25 MJ/m ³
Incomplete combustion factor	≤ 0.48	Update interchangeability parameters?
Sooting index	≤ 0.60	

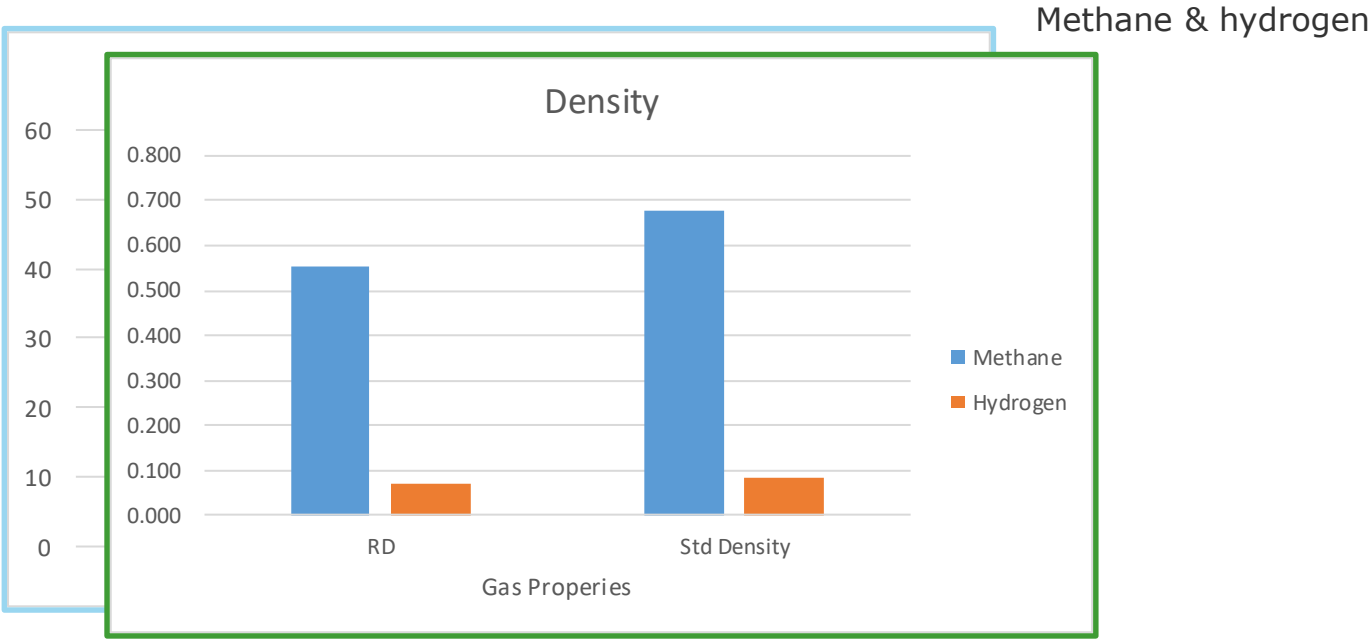
Variation in energy content in 1 sm³



...and other properties. Compare methane and hydrogen

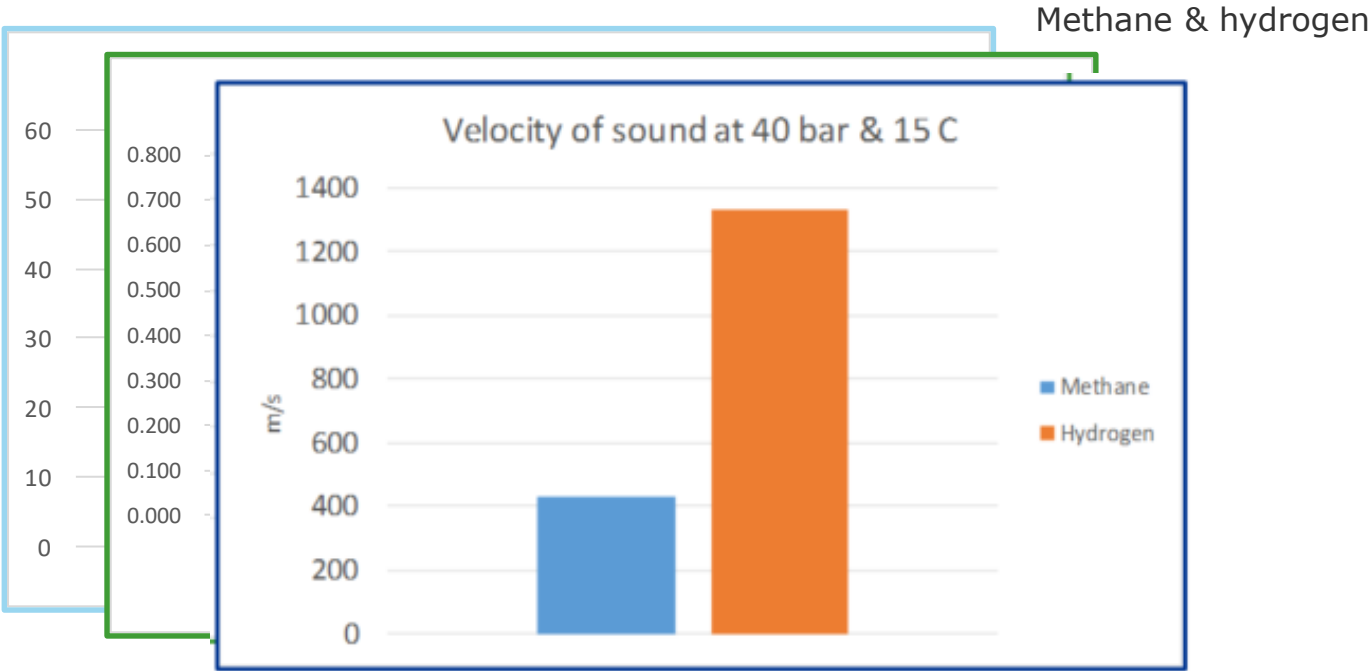


Example - Methane and Hydrogen

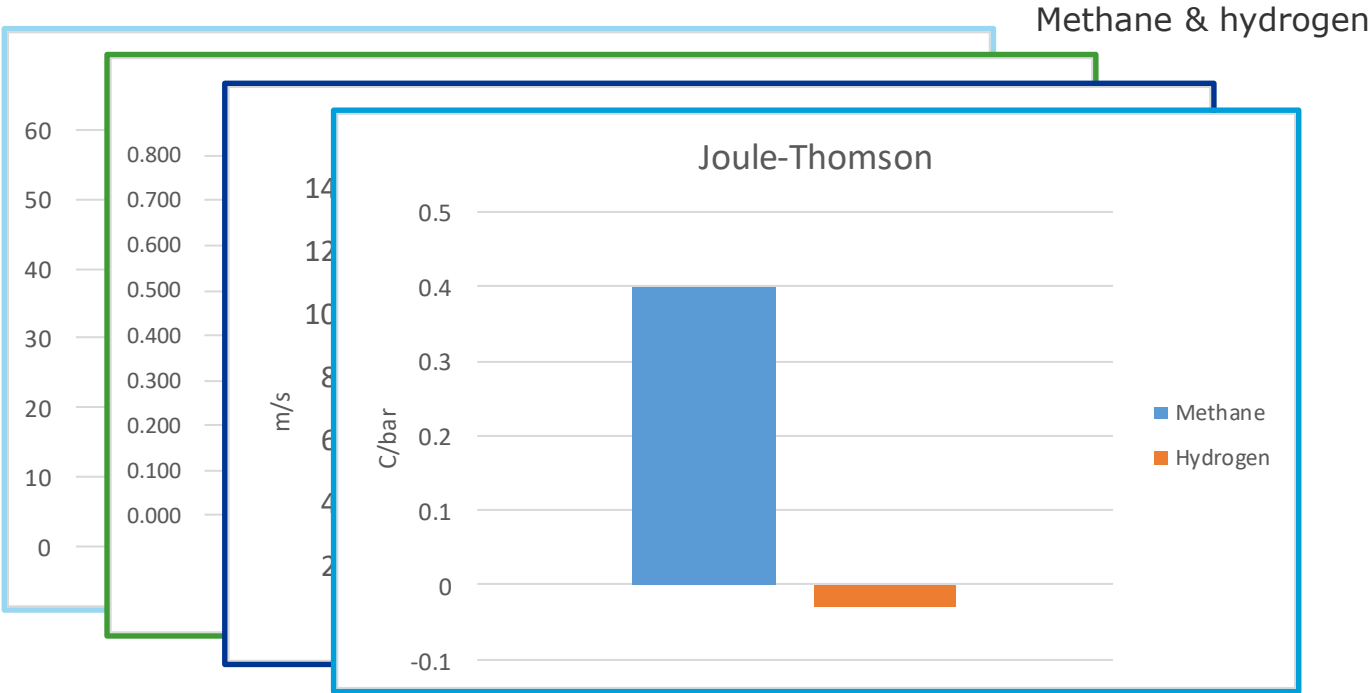


Wobbe Number is CV/\sqrt{RD}

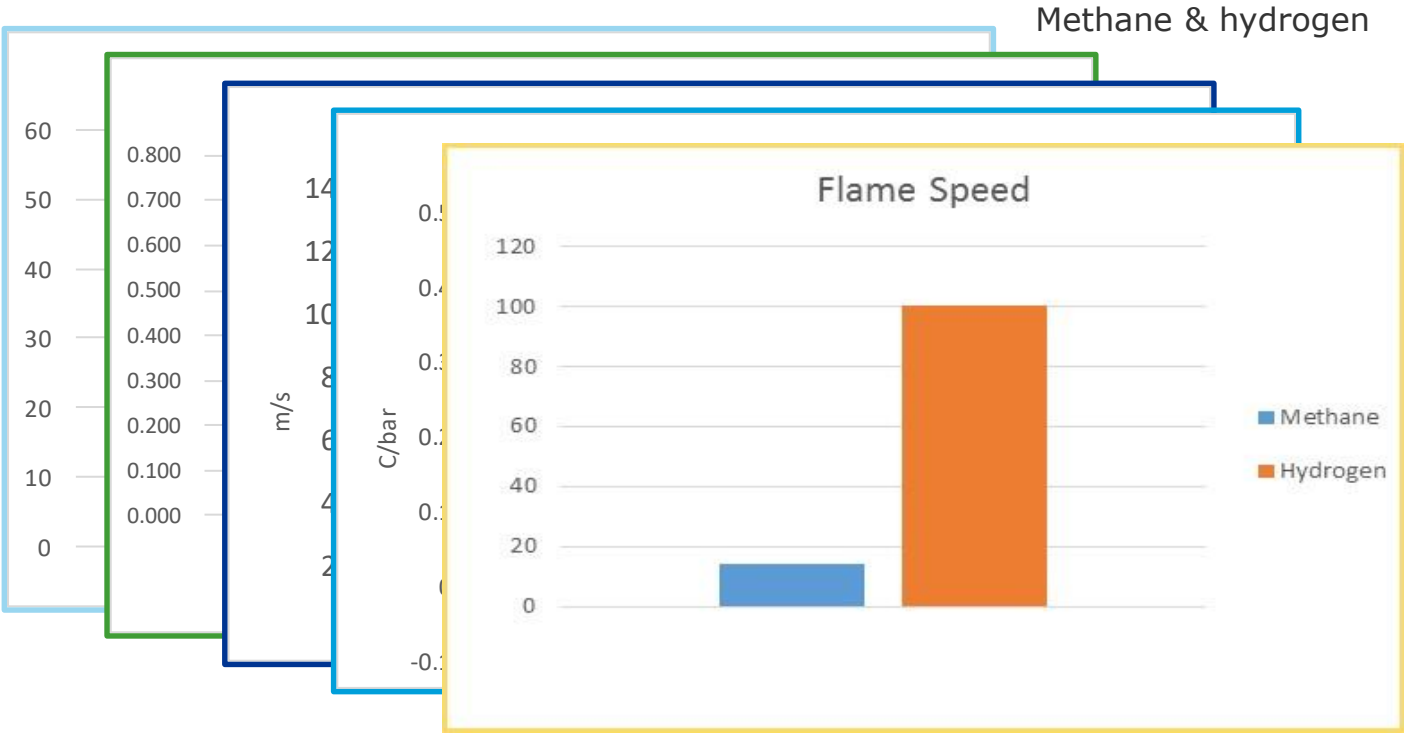
Example - Methane and Hydrogen



Example - Methane and Hydrogen



Example - Methane and Hydrogen



Gas Quality Challenges – Feedback From the Consultation



The Challenge of Gas Quality Variations

For further information, please contact:

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07964 133 912

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SAFER, SMARTER, GREENER