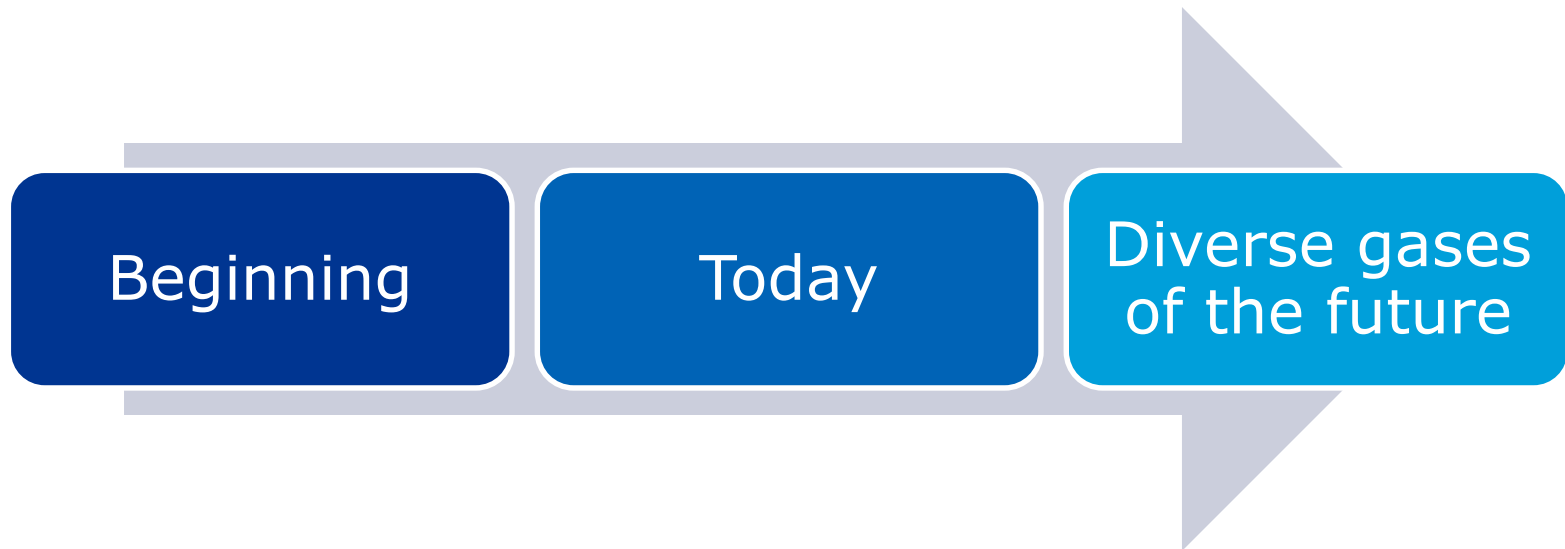


The Challenge of Gas Quality Variations

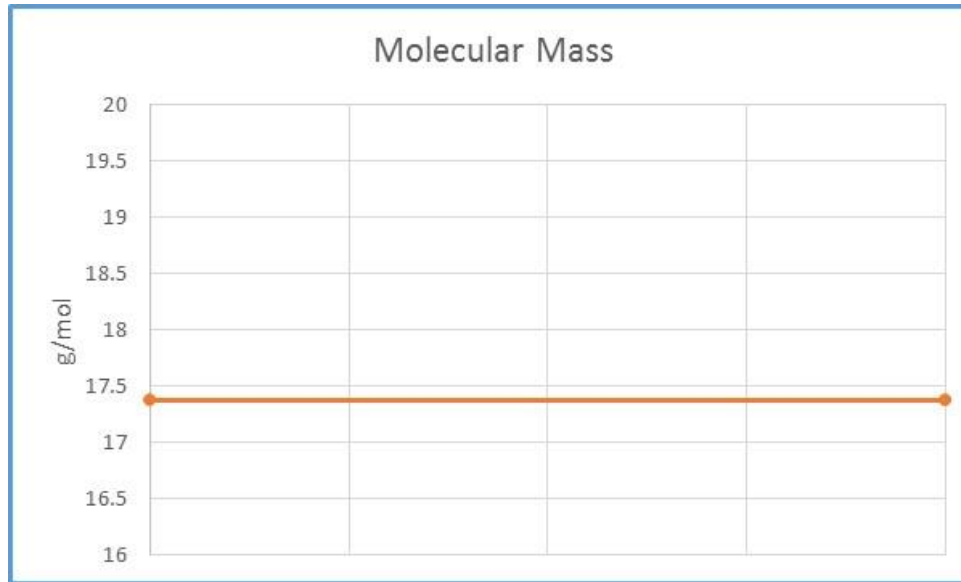
Sarah Kimpton

18 January 2018

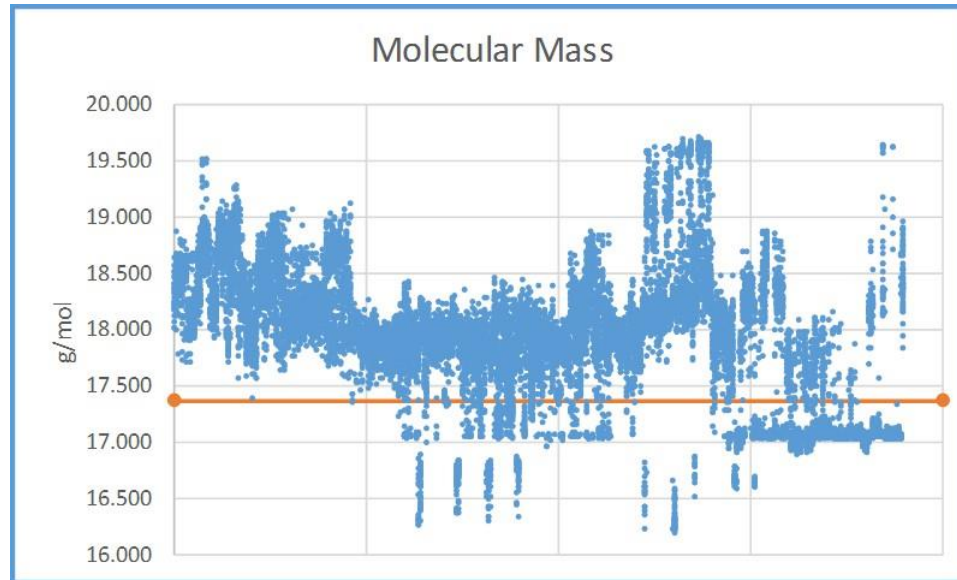
Natural Gas Quality – A Journey



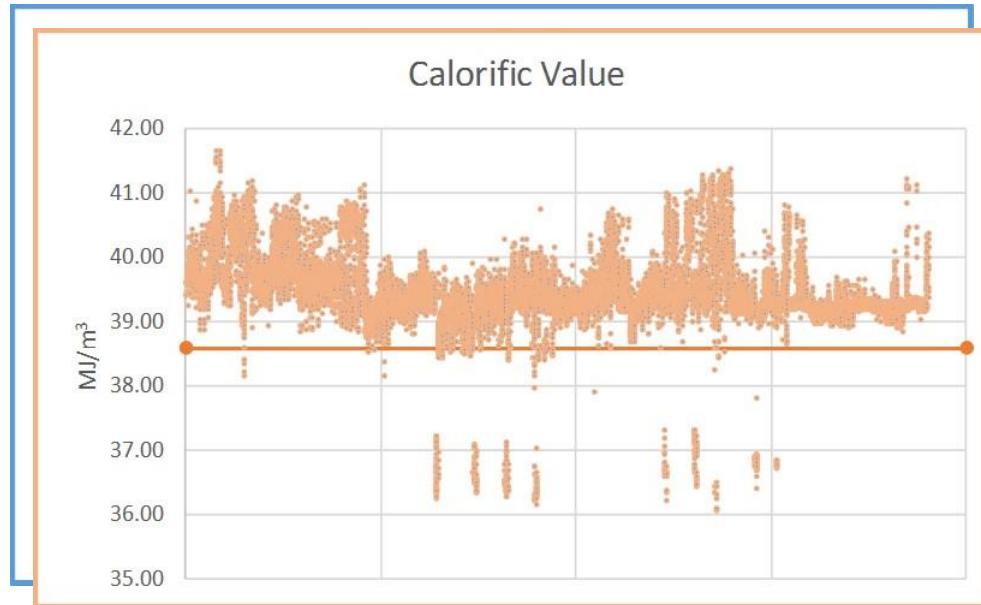
The Beginning - Mean Bacton Gas



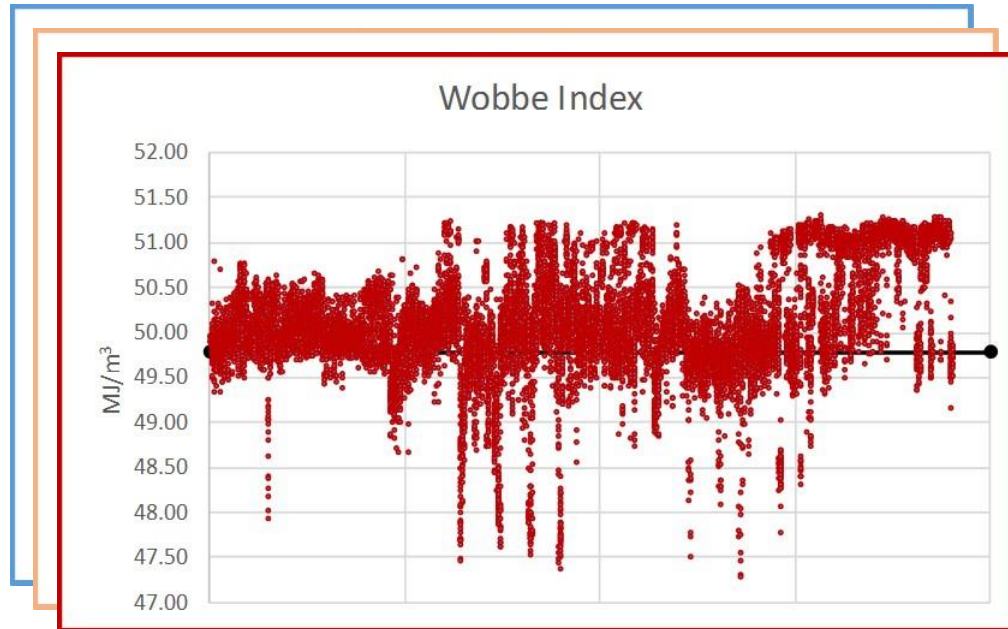
Today



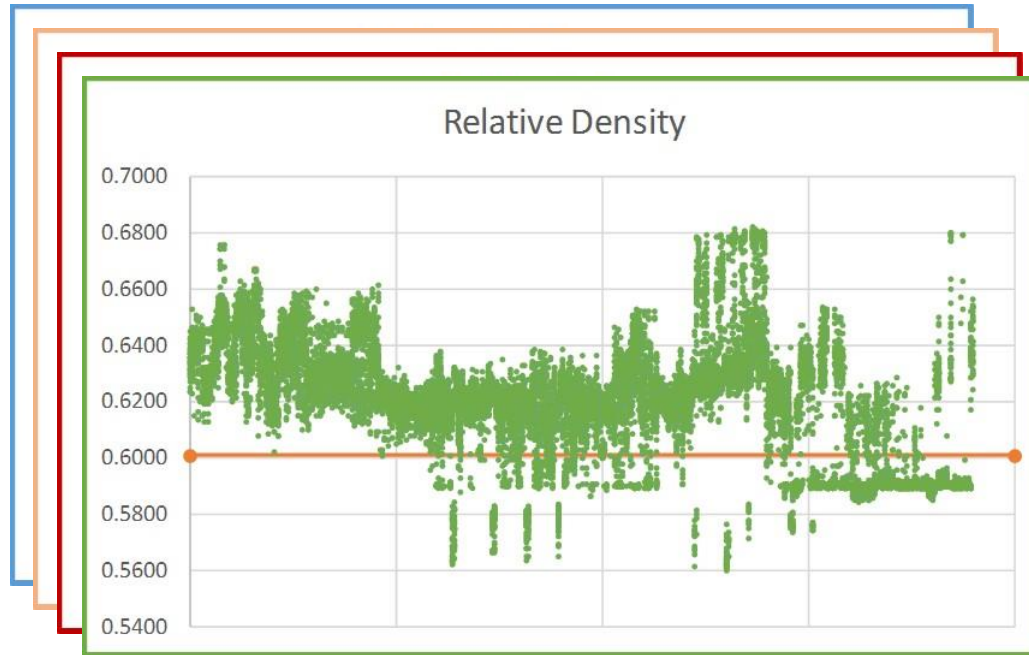
Today



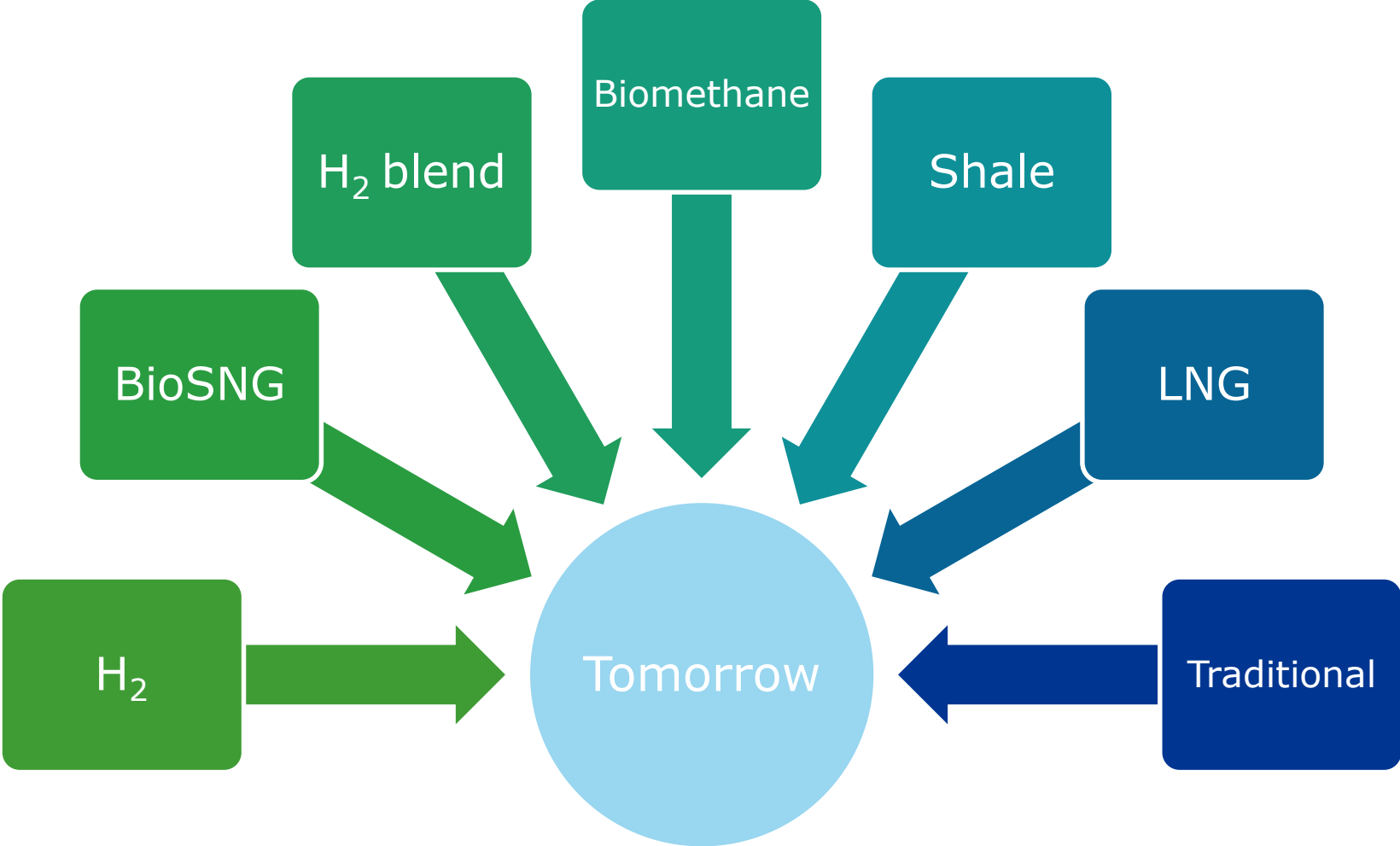
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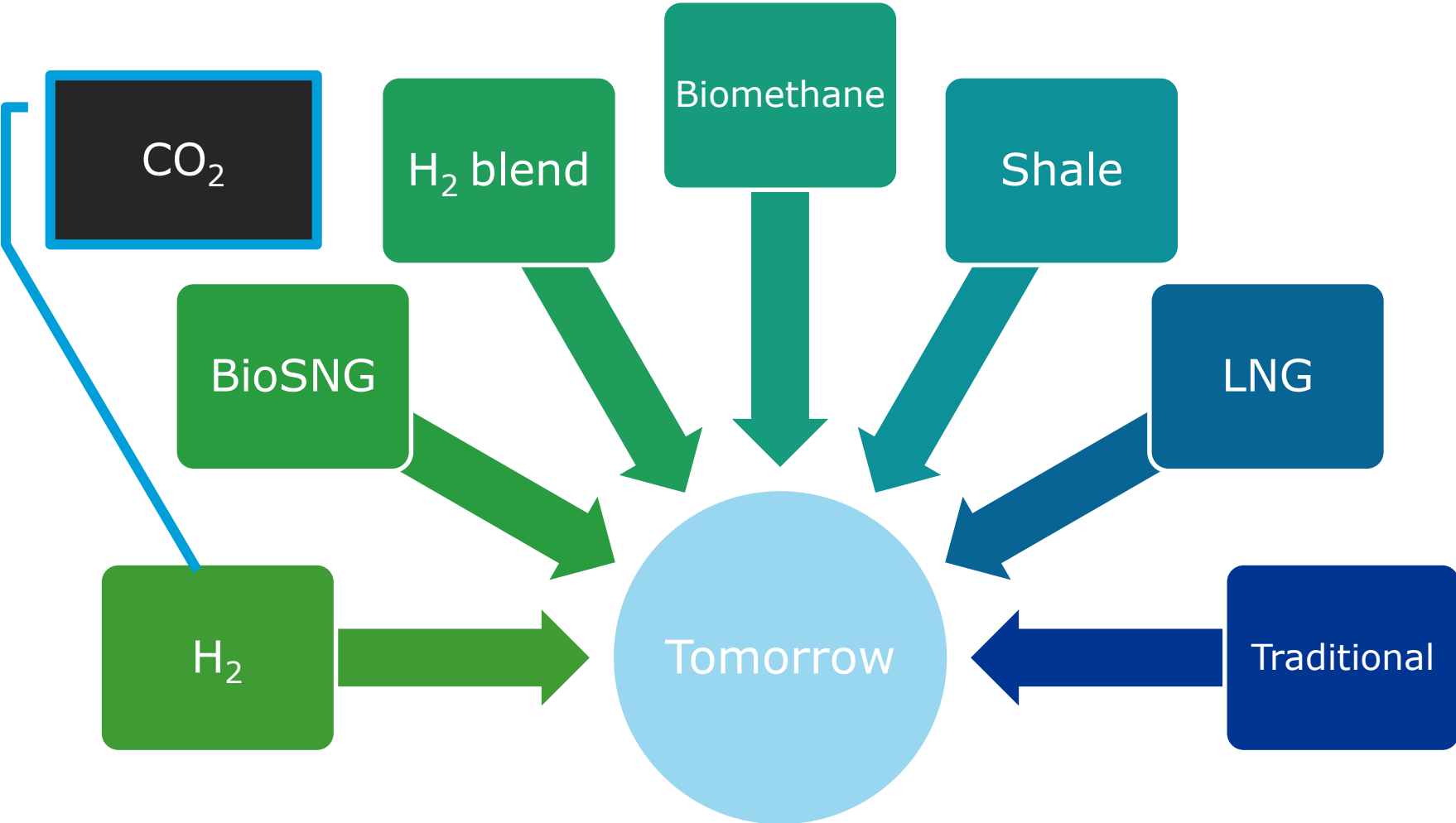
Today



Diverse Gas Quality Future of Tomorrow

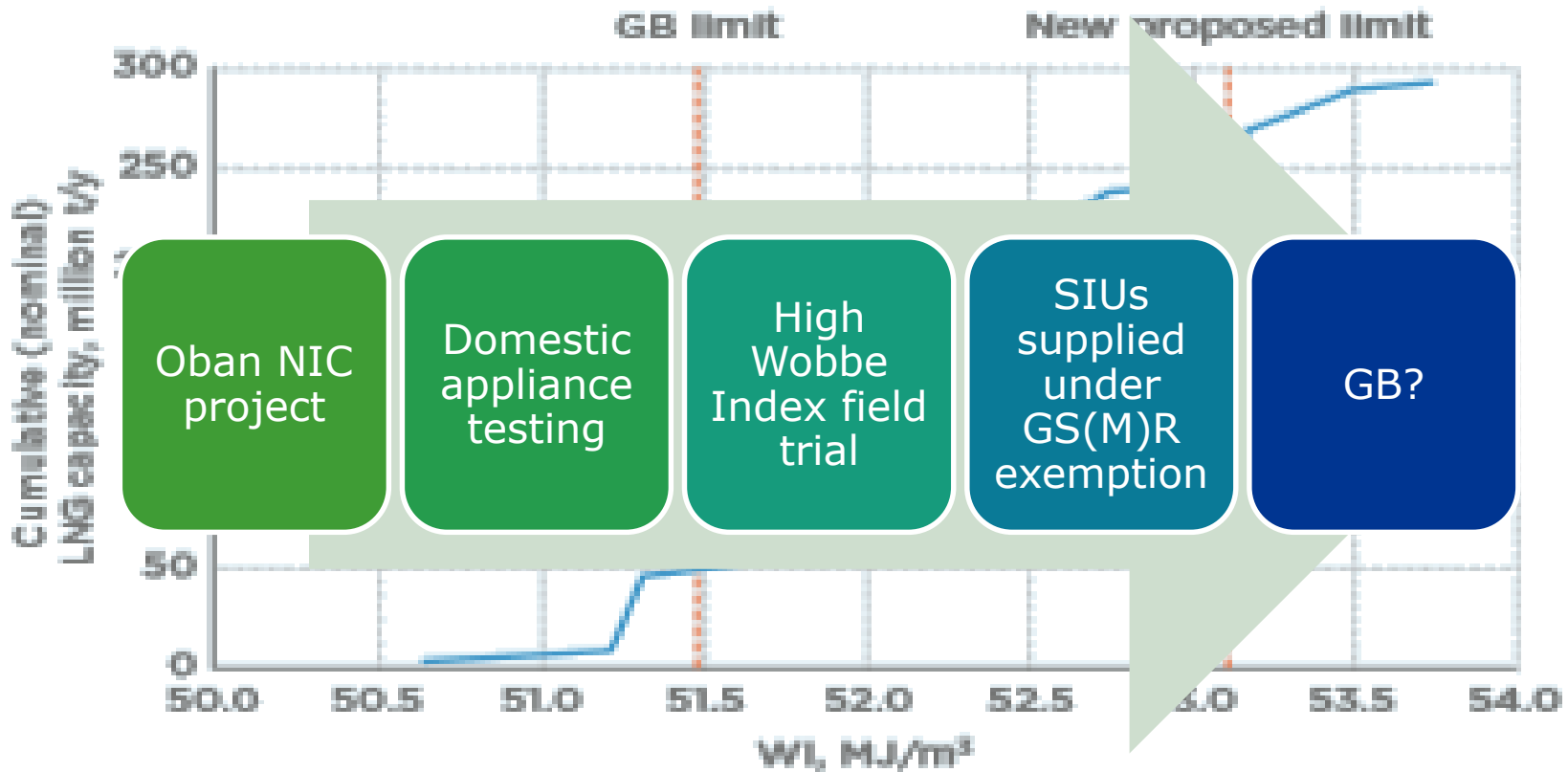


Diverse Gas Quality Future of Tomorrow



Oban and Changes to GS(M)R

Oban Project – Wider Implementation



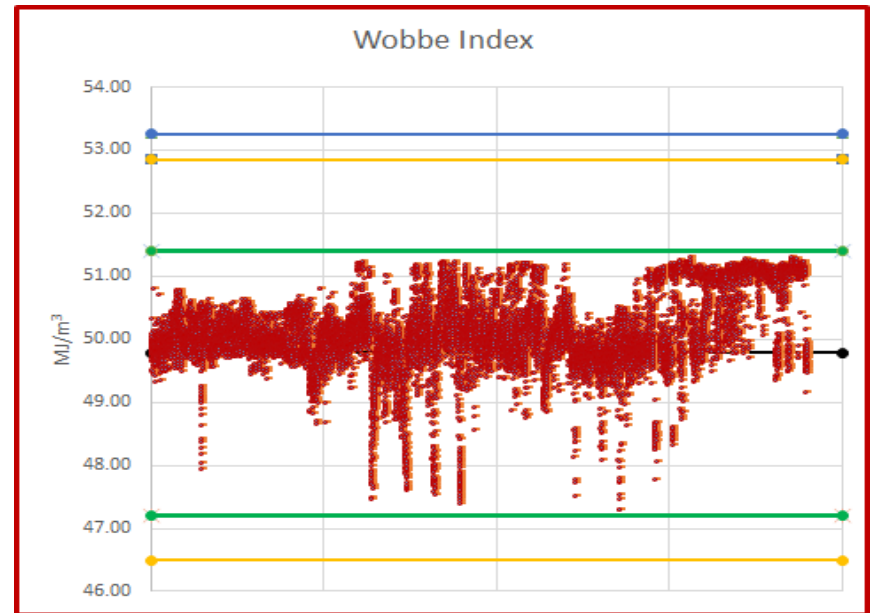
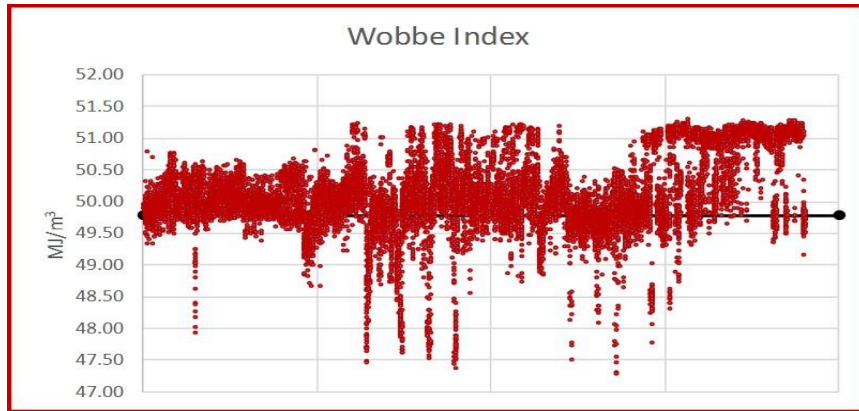
Gas Safety (Management) Regulations

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	$\leq 5 \text{ mg/m}^3$	
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 53.25 MJ/m³	
Incomplete combustion factor	≤ 0.48	Update interchangeability parameters?
Sooting index	≤ 0.60	

Future



Current limits

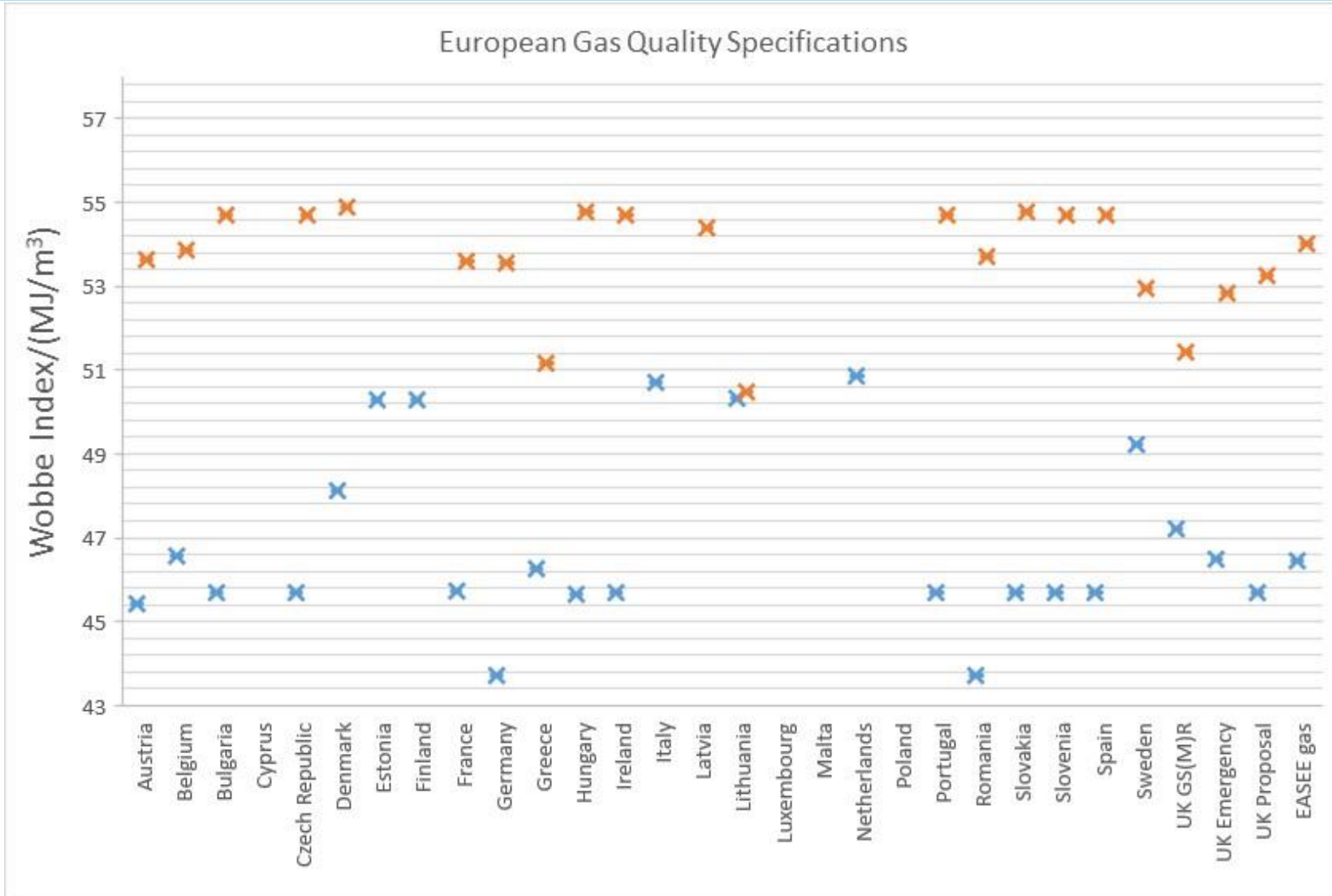


Current emergency limit

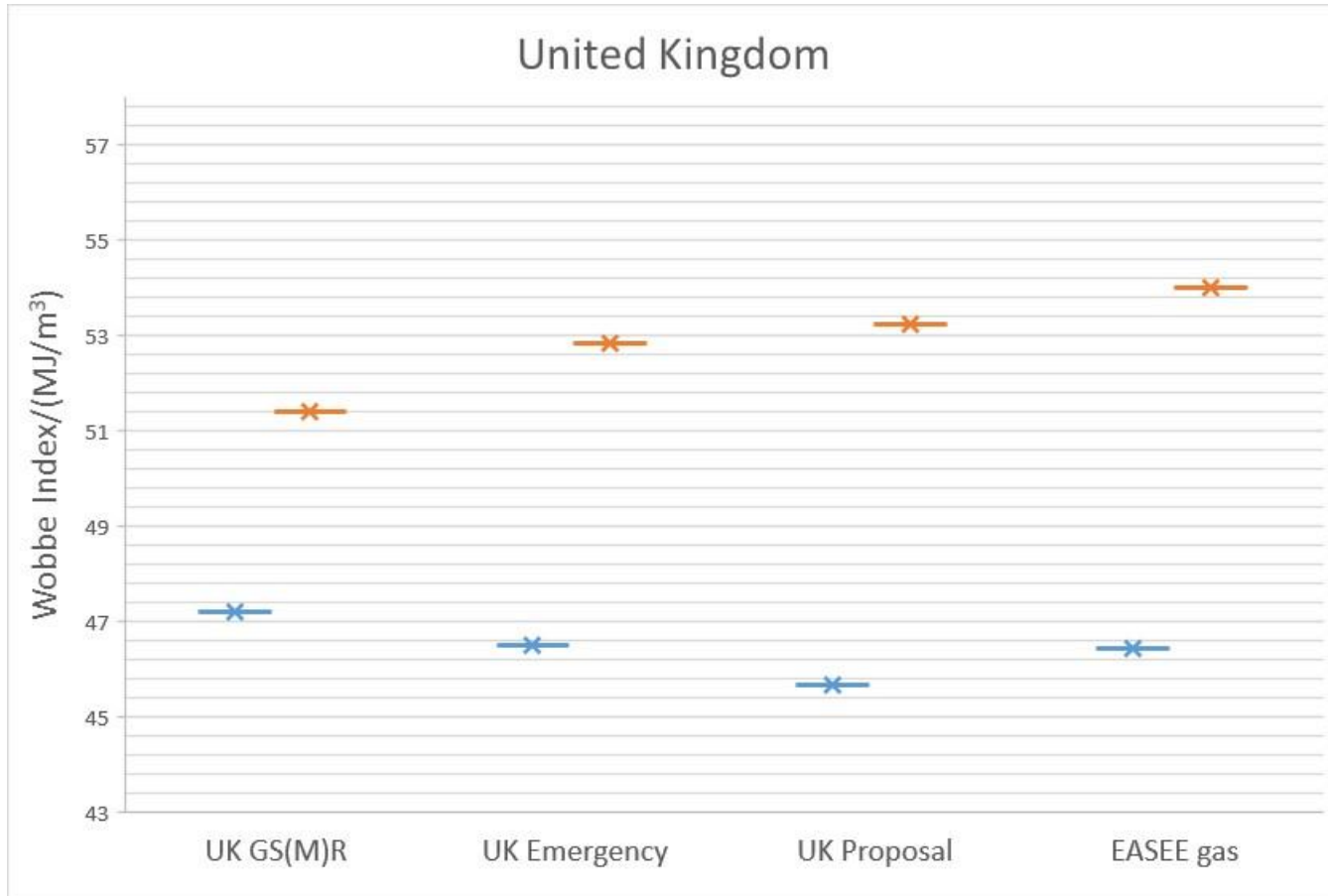


Proposed change to upper limit

European Gas Quality Specifications



European Gas Quality Specifications

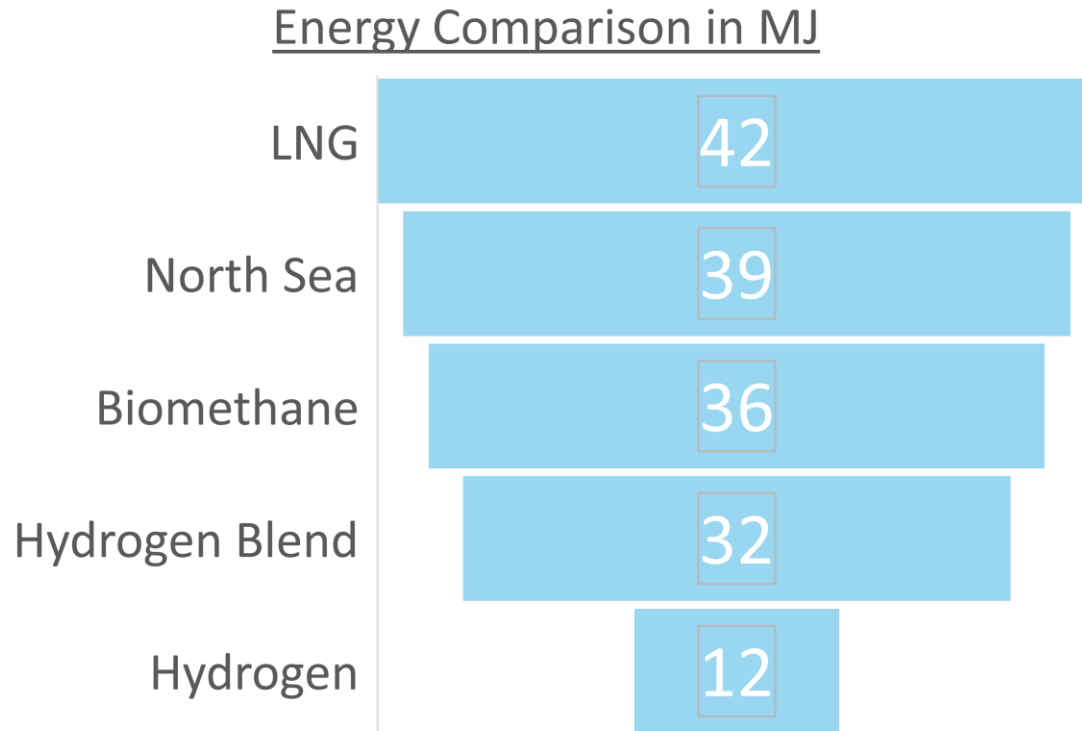


Hydrogen

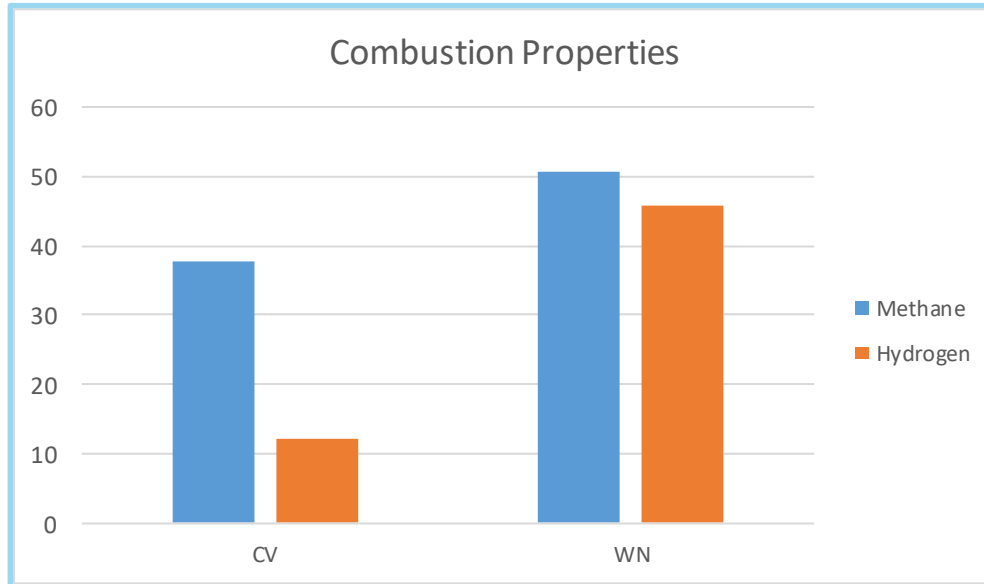
Gas Safety (Management) Regulations

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	

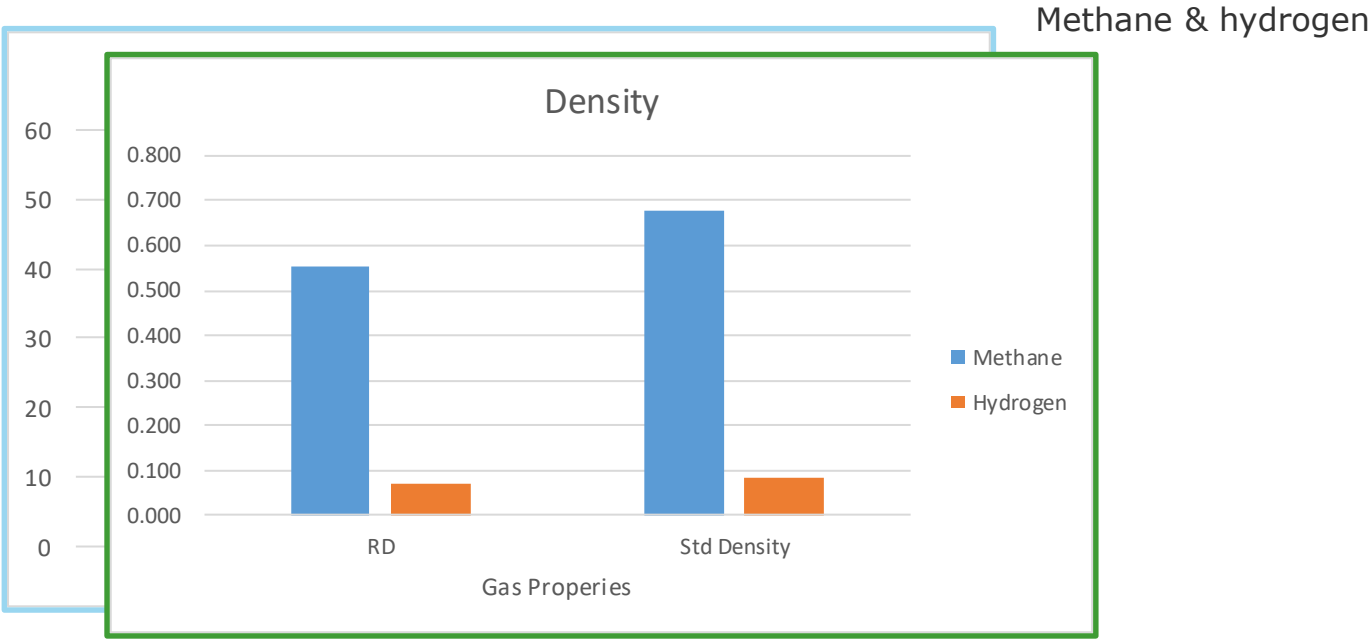
Variation in energy content in 1 sm³



...and other properties. Compare methane and hydrogen

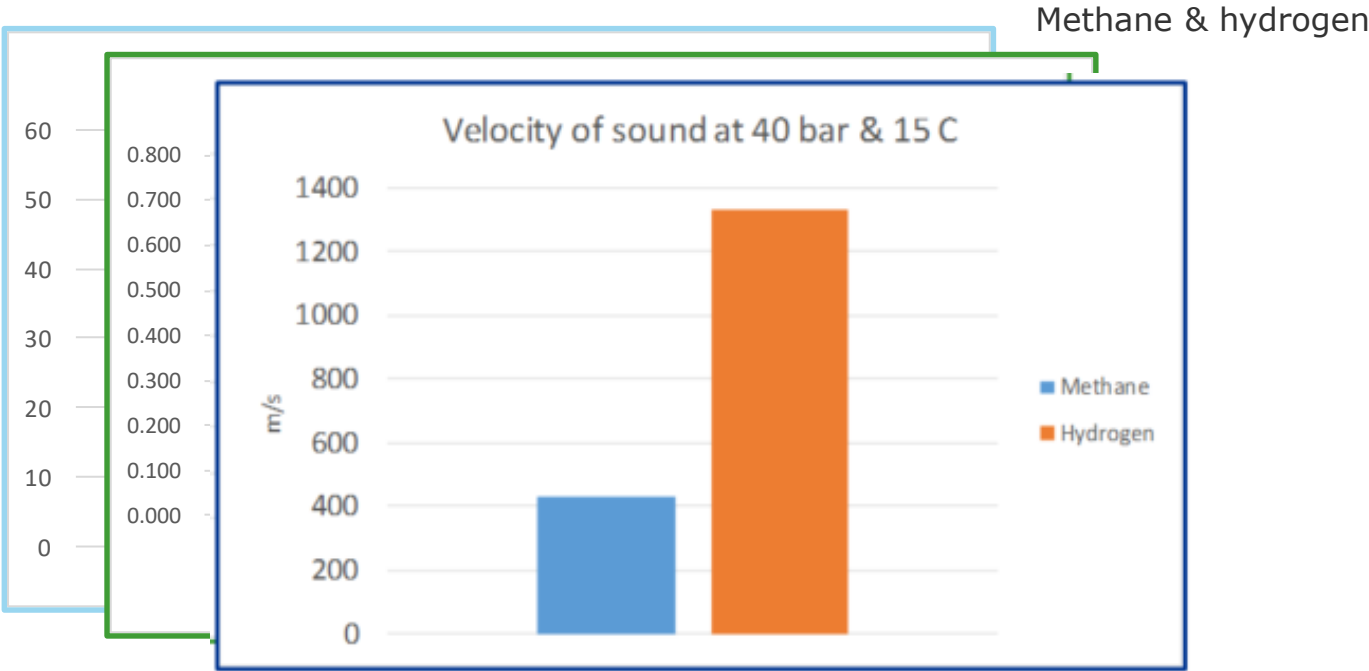


Example - Methane and Hydrogen

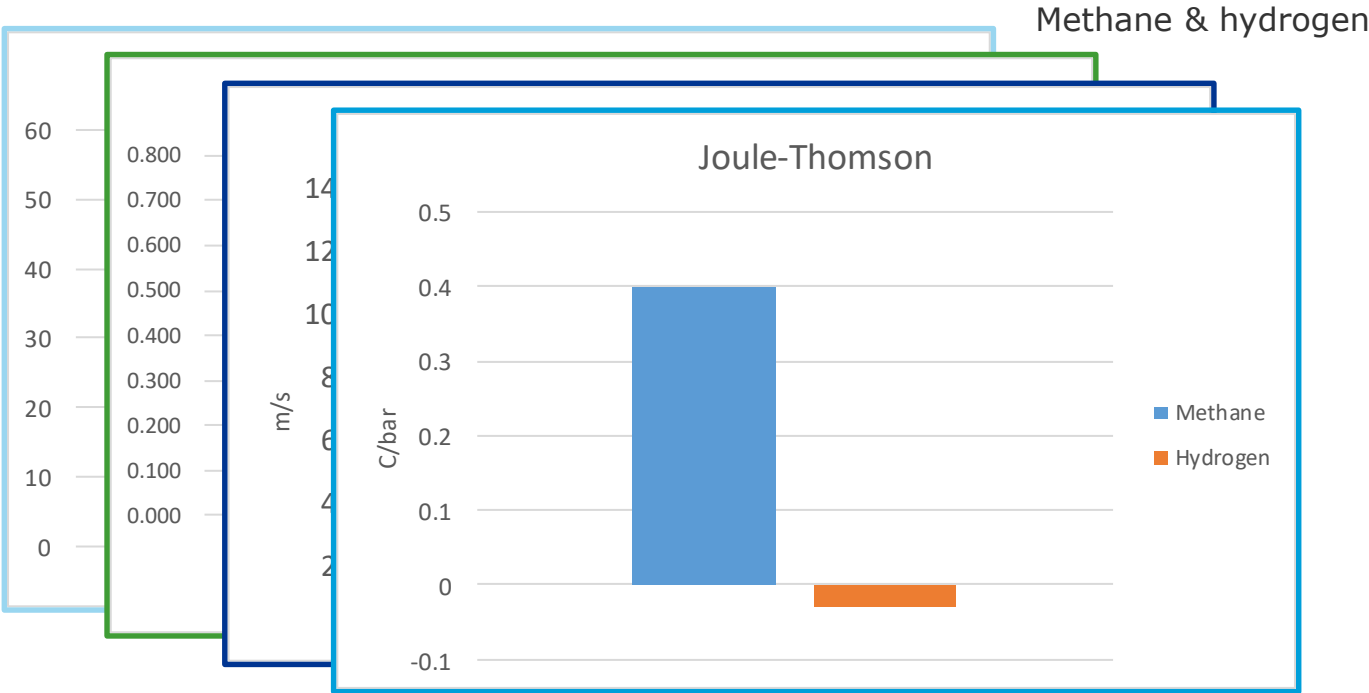


Wobbe Number is CV/\sqrt{RD}

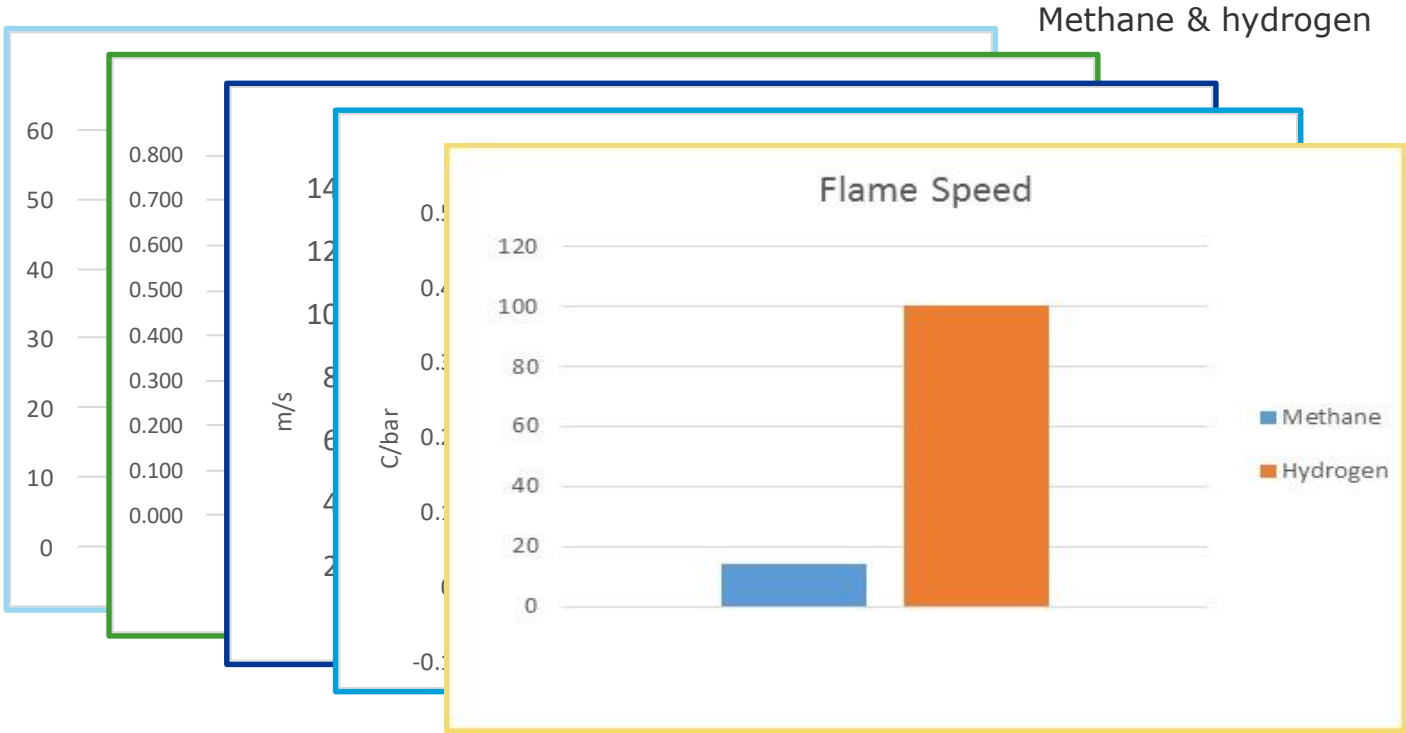
Example - Methane and Hydrogen



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